The implementation of SIGN guidelines in relation to organisational learning capacity in two NHS acute hospitals

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by

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Volume 1

Review

Methods

Results

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List of Publications

Work leading up to PhD project

Evidence-based guidelines - Implementation Plans in Scotland. British Journal of Clinical Governance 4 (3) 98-102 1999. (Republication)

Implementation methods planned and used for SIGN clinical guidelines. Journal of Interprofessional Care, 13 (4) 1999.

With Begg A, Jones J. SIGN Guideline no 40: Lipids and the Primary Prevention of Coronary Heart Disease – Annex 2, Minimum dataset and recommendations for audit, research and development., Scottish Intercollegiate Guidelines Network, Edinburgh, 1999.

Selecting audit indicators: the case of SIGN Guidelines Journal of Clinical Governance, 7, (3), 1999.

SIGN guideline 32, Coronary Revascularisation in the management of stable angina pectoris – Section 7, Key points for audit. Scottish Intercollegiate Guidelines Network, Edinburgh, 24-26, 1998.

Planned and reported implementation of clinical practice guidelines. International Journal of Health Care Quality Assurance, 11, (7) 238-243, 1998.

Evidence-based guidelines - Implementation Plans in Scotland. International Journal of Health Care Quality Assurance 10, (6) 236-240, 1997.

List of Abbreviations

AHCPR	Agency for Health Care Policy and Research
BMJ	British Medical Journal
CAMO	Chief Area Medical Officer
CE	Clinical Effectiveness
CEO	Chief Executive
CG	Clinical Governance
CME	Continuing Medical Education
CPD	Continuing Professional Development
CQI	Continuous Quality Improvement
CRAG	Clinical Resource and Audit Group
DGH	District General Hospital
DHA	District Health Authority
DVT	Deep Vein Thrombosis
EL	Executive Letter
GMC	General Medical Council
GP	General Practitioner
IT	Information Technology
LO	Learning Organisation
MEL	Management Executive Letter
NCEPOD	National Confidential Enquiry into Perioperative Deaths
NHS	National Health Service
NICE	National Institute for Clinical Effectiveness
NPSA	National Patient Safety Association
OD	Organisational Development
OL	Organisational Learning
OPEC	Organisation of Petroleum Exporting Countries

PACE	Promoting Action on Clinical Effectiveness
RCT	Randomised Controlled Trial
SASM	Scottish Audit of Surgical Mortality
SHHD	Scottish Home and Health Department
SIGN	Scottish Intercollegiate Guidelines Network
TED	Thrombolytic Elastic Device (Graduated elastic compression stockings)

Summary

This section summarises the content of each section of the thesis. The preface summarises the function of each chapter in the thesis. The detailed aims, the research questions used, the answers found, and definitions of terminology follow in a separate aims and research questions section.

General Aim

This thesis investigated whether two patterns of implementation of evidence-based clinical practice guidelines in two NHS acute hospitals in Scotland were associated with different levels of Organisational Learning (OL) capacity. There was a lack of research on the relationship between the OL capacity and the process and outcome of guideline implementation. Clearly, checking compliance with the guideline and guideline implementation were likely to support each other. But checking compliance was time consuming, resource intensive and might encourage defensiveness and low motivation. If the abstract notion of Organisational Learning capacity can be shown to be statistically connected to a real world activity such as the implementation of evidence-based clinical guidelines, not only will this validate the concept, it will provide a quicker and cheaper way of externally or internally checking on the likely success of a particular hospital's implementation of these guidelines as a proxy measure.

Background

The literature review gives the background to the study in three parts. First it covers strategic change in the NHS and then theories about strategic change. This looks at the pressures on the NHS for change, and the NHS responses, including the clinical audit initiative. It describes ways of understanding and managing change from the strategic literature, and then selects some key

themes through which to understand the differences between the hospital contexts likely to affect the implementation of change.

Secondly, the main theoretical approaches to Organisational Learning (OL) are described, and one, the information perspective, is selected as the most appropriate view for understanding guideline adoption. The other perspectives on communication and innovation are used within this. The importance of theory about the existence of different learning styles for OL research is pointed out.

Thirdly, the history and role of clinical guidelines is discussed in detail. They were about change. Their aim was to improve quality of service (including safety). This was also using guidelines as a means of getting research evidence into practice quickly. A final section shows the relevance of strategic change and OL theory to guideline implementation and evaluation, and refers back to strategic theory to define the contextual issues in hospitals relevant to the research questions about guideline implementation. The research questions are stated.

Methods

The research strategy was comparative case study. Guideline implementation processes and outcomes and views and beliefs about them were compared and contrasted in a high and a low OL capacity hospital. Nested within the hospitals was a case comparison of two professions which were compared where appropriate between and within hospitals. Guideline implementation focused on two main SIGN guideline topics, DVT prophylaxis and Diabetes. The professions were doctors and nurses. An initial idea of the OL capacity of the two hospitals, which informed their selection, was obtained before fieldwork commenced. This used a number of routine statistics thought likely to be related to OL capacity and a related dimension, organisational complexity. Two sets of data were collected. Firstly, the OL capacity of each hospital was confirmed in the

fieldwork using an OL capacity measurement scale developed elsewhere. Secondly guideline implementation was compared between the cases using semi-structured interviews with study samples in each profession and hospital.

Results

Survey response rates were highest among senior staff (over 50%), and after reminders in hospital 2, were comparable between hospitals. Interview response rates were somewhat lower. The OL scale was validated against three other scales. It correlated mostly as expected, there was however not the expected weak negative correlation with organisational formality. Sub-scales of the OL scale were all correlated strongly with the main scale. Seniority was correlated with OL score, Age ranges had different correlations with OL score in the two professions.

There were two datasets, these came separately from the interviews and the scores for Organisational Learning capacity produced by the OL survey. The two hospitals were analysed separately, and then combined to relate OL score to particular guideline implementation beliefs and activities. The two hospitals had the expected relationship with regard to OL score, hospital 1 was higher, but the difference was not statistically significant. As expected too, doctors scored their hospitals higher overall than nurses, but not significantly so among the senior group in each profession. Nurses' OL scores caught up with doctors' with increasing age and seniority. They rose consistently, while doctors' peaked at 31-40. Consultants in hospital 2 were much lower scoring than G-grade nurses and than consultants in hospital 1, but given the low numbers available this was not a statistically significant difference.

Guideline implementation patterns were analysed by coding interview data from an OL perspective which saw learning as information creation and use. Two

patterns were confirmed, a type of implementation which could support both single loop and double loop learning and one which could support only single loop learning, which aimed to satisfy pre-established goals.

Key results are summarised below.

Dissemination

Those involved in guideline implementation had significantly higher OL scores than those who were not involved in each hospital, especially on the leadership sub-scale. Most interviewees had been involved. This applied also to those who used guidelines compared with those who did not. Doctors were significantly more involved in protocol development than were nurses. Doctors used significantly more double loop friendly methods of implementation than nurses. Using the SIGN guidelines for setting clinical policy was mentioned significantly more often in hospital 1 than in hospital 2.

Nurses were significantly more likely to learn about guidelines through references already filtered through their ward structures while doctors received their own copies of all SIGN guidelines from SIGN. Nurses were significantly more involved in guideline adaptation in hospital 1 as compared to hospital 2.

The disseminees reproduced dissemination methods they had experienced when they disseminated in their turn, in that those who had used both one-way and two-way methods tended to have had both methods used on them when guidelines were disseminated.

Audit

In hospital 1 doctors were most involved in doing audit, in hospital 2 it was the audit office. This was a significant difference between hospitals. The main aim seen for audit was checking on compliance. Both those who held this view of audit and those who wanted organisational support for guideline implementation were lower scoring on OL than those mentioning other single loop activities.

Change

There was a significant difference in OL scale scores after bonferroni correction between those reporting type 1 change and type 2 changes associated with guideline adoption in hospital 1. Those reporting type 2 change also reported significantly higher OL capacity in hospital 1. In both hospitals audit results were usually communicated for whole teams rather than for individuals. Doctors were significantly more likely than nurses to want support from the organisation for the facilitation of change, and those who identified this as a need scored their organisations lower on OL than those who did not. Innovative change often involved collaboration between specialist nurses and specialist medical staff, for example in hospital 1.

Learning

Nurses did significantly more type 1 learning than doctors in their own teams or directorates. There was more single loop learning in hospital 2 in comparison with hospital 1. Inter-organisational learning through the communication of audit results was significantly more frequently mentioned at hospital 1. Learning was most often about improvements to processes of care.

General views on purposes and uses of guidelines

The most frequent view about the purpose of guidelines was that they were to improve the consistency of care. Reference was the most frequently mentioned use. Dissemination difficulties were the main barrier to implementation, and formal organisational support was the most mentioned facilitator for change.

Contextual issues

There were a number of contextual differences and also many similarities between the hospitals. Very briefy, a more collaborative culture at hospital 1 resulted in more sharing and multidisciplinary creation of information.. Information systems appeared more reliable at hospital 1, but in neither hospital was there a central archive of audit results. Innovation was more in evidence at hospital 1 where it involved nurses and doctors together, and was related to specialisation. The audit support structure at hospital 1 seemed to be more facilitative in style, while at hospital 2 it still appeared to be attempting to drive audits centrally, and there were some negative comments about the audit department. Leadership in hospital 1 (but not hospital 2) was, clinically, strongly bound up with recognition as an expert, and so with specialisation and knowledge.

Discussion

After summarising the literature review, the results for each of the research questions were discussed in turn as follows.

The lack of a significant negative correlation between organisational formality and OL, which was unexpected, perhaps implied a lack of acceptance and knowledge of the hospital mission among clinicians. The possibility that hospital 2 was a sink hospital in a spiral of decline is discussed in relation to the lower OL capacity of consultants and of junior nurses. A quicker decline in OL

capacity with age was evident in hospital 2 doctors, although the highest age range gave a higher score. Possible reasons are discussed in relation to the hospital context.

Two patterns of guideline implementation, which had been hypothesised, were identified at each stage of guideline adoption. They were logically, rather than statistically, linked across the stages. They were not entirely separate activities in the hospitals. Type 2 change to personal practice as a result of guideline implementation was reported in hospital 1 but not in hospital 2. This type 2 change was reported by respondents giving significantly higher OL capacity scores than those reporting type 1 change. The possibility that this was because there was more time available in hospital 1 to play with and try out new ideas is discussed. Similarities as well as differences between hospitals are explained using institutional theory, as are reasons for the much greater prevalence of type 1 than type 2 guideline implementation activities and outcomes. A main difference was the greater involvement of hospital 1 consultants in the professional Royal Colleges of both Glasgow and Edinburgh. Guidelines could reduce or increase the chance of both error and innovation in different ways which are described, and this, together with the importance in it of groups with mixed learning styles and of inter-professional learning, is noted.

The higher OL capacity of guideline users in leadership and transfer of knowledge suggested using guidelines was a leadership activity. Those who saw audit as checking practice scored their hospital lower on transfer of knowledge than others who mentioned type 1 aims for audit. There was a possibility that this indicated that audit in this type 1 mode made respondents more aware of organisational deficiencies in this area. The finding that those who wanted more support for guidelines implementation were less aware of organisational mission (clarity of purpose) suggested the guidelines were professionally led

and controlled. I suggest here that leadership of OL needs to better integrate individual and organisational learning in a less formally oriented way than seemed to exist at present. An OL strategy-making process with wide involvement might start to achieve this. It would distinguish for example between ignorance and confusion and help clinicians integrate clinical and hospital learning priorities.

The limitations of the study included the hospital selection procedure, which was not ideal. The MacLean report on hospital 2 helped to validate it. The later implementation of the guidelines in hospital 2 may have affected the changes seen. There were no reminders in hospital 1, but response rates in the senior clinical comparison group were similar and above 50%, which was reasonable in the context of other similar research in this setting. Some advantages and disadvantages of the coding and analysis procedures are stated. Possible mechanisms affecting the success of guideline implementation included the role played by specialisation, span of control (particularly for effective dissemination), and peer pressures.

Some limited methodological insights resulting from the project are described. The possibility is highlighted that the findings of this research might help to justify the measurement of OL culture as an additional way of accrediting hospitals in the new less monolithically managed NHS. OL could also be a core function of managed clinical networks in Scotland.

Literature search

At the start of research, relevant research studies were found using exploratory search strategies summarised in appendix A2. The titles and abstracts (if any) were scanned and references were selected for further reading only if they were relevant to the theory or practice of guideline

implementation or organisational learning. Pure audits were not included unless there was a research dimension. The search strategies were narrowed when the searches were updated at the end of the study, and there was more reliance than at the beginning on scanning selected core journals, and on government web sites for legislation and policy documents.

Preface

A personal journey

It is perhaps illuminating to give a flavour of my personal journey towards this research before a more formal statement of aims and questions. The specific aims evolved over a period of several months, but I had been involved in the general area for seven years. I had a generally relevant work background which gave me first hand knowledge of many of the issues, and which had stimulated my interest in them. In the early part of the 1990's I had a 2-year spell as a clinical audit co-ordinator appointed to introduce medical audit (which rapidly became clinical audit) in an English district health authority which quickly became a hospital acute trust. This was followed by a period as a research co-ordinator in a community and mental health trust then recently formed from two smaller community and mental health trusts. After that, I carried out evaluative research into clinical audit and guideline implementation in a centre funded by the Scottish Office through the Clinical Resource and Audit Group (CRAG). CRAG was a Scottish national committee of health professionals and civil servants which aimed to improve health care and use resources better. My unit (the Scottish Clinical Audit and Resource Centre - SCARC) was jointly hosted in the University of Glasgow by the two university departments of Public Health and Postgraduate Medical Education.

I had encountered systems theory in the late 1980's during a year of postgraduate work at Lancaster University. This was guided by Peter Checkland, the originator of the soft systems methodological approach to solving ill defined and messy organisational problems. The idea of the organisation as a learning system was central to his thinking. At SCARC I came across the writings of Argyris and then Senge on Organisational Learning (OL), and was immediately interested in their application of systems concepts to

strategically identify and also to implement organisational change as a learning process. This way of understanding and dealing with change seemed very suited for understanding the problems which were appearing internationally in implementing clinical guidelines. Essentially, these were that some doctors felt that evidence-based guidelines, rather than enhancing their professional autonomy, were a threat to it, especially because of legal issues. To implement the guidelines in a learning framework sensitive to the learning needs in different organisational contexts seemed the most sympathetic (and therefore the most effective) approach possible in the face of these professional concerns.

I could not find any previous empirical research work on this topic in the hospital setting. So I decided to do the work myself.

Epistemological position

An issue both for the effectiveness of the NHS and for the research I undertook was the existence of very different epistemological perspectives among the key players in the NHS. Very different views, not just of the world, but about the ground rules for understanding it and for creating knowledge were held by managers and clinicians. The role of the manager replaced the administrator role with the introduction of general management in the mid 1980's following the Griffiths report. Some management practice was based on theories developed through management research. Management research was based predominantly in social sciences. A phenomenological epistemology underlay much of social science. In 1997 the manager role was well established in the NHS but still fairly recently introduced. Clinicians were based in the tradition of natural science and founded their professional knowledge on the epistemological position of positivism. Because of the complexity of the

research topic I needed to use multiple methods to increase the validity of my findings. The use of multiple methods demanded multiple epistemological positions. The most complete position for me as a researcher seeking to satisfy the demands of both the epistemological positions of those researched and of the management research tradition within which I was working, was the phenomenological stance, since this could address positivist attitudes and behaviour either quantitatively or qualitatively by viewing them as phenomena. A positivist position was arguably more limited than a phenomenological one in the way it could deal with social and organisational constructs.[1] The quantitative and essentialist comparison of hospitals on levels of Organisational Learning Capacity is to be read as existing within an overall phenomenological framework which includes both this and the more contextual analysis.

The research problem was seen under a general theoretical heading of how best to manage change, a strategic question. The main value of strategic perspectives on managing change was in improving managers' understanding of the many complex influences at work, to help them chart an accurate path through the turbulent waters of current organisational environments. Organisations were managed better by managers who understood them better. Doing strategy was about improving understanding and insight in order to select goals which were then implemented by other processes, while perhaps under continuous strategic review. This was a phenonomenological stance. In this sense strategy itself was never implemented, except by involving as wide a range of key players in the process of strategy-making as practicable.

[1] This was because the multivariate complexity of these constructs increased to an unmanageable level when they were deconstructed (even if we assume it possible). By this, I mean splitting them up into component variables simple enough to behave according to mathematical formulae which could predict events for individual entities.

The function of the thesis, chapter by chapter

Chapter 1 reviews the different perspectives on management strategy-making. Strategy-making is seen as understanding the most appropriate ways of identifying and implementing useful change in a particular context. For those responsible for setting strategic direction in organisations, this helped them navigate through the many competing environmental pressures and internal competing viewpoints. The history of clinical audit is traced as a strategic change implementation initiative which preceded the introduction of clinical guidelines. The chapter also describes the structural framework known as "clinical governance", which brought together clinical audit and other elements of a learning system for hospitals in the NHS. Guideline implementation was an essential link between theory and practice in this learning system. Some of the main perspectives on strategy are reviewed in the light of their appropriateness to the job of best managing change in acute hospitals. The processual perspective is selected as most suited to the NHS hospital context.

Chapter 2 takes the processual perspective further, into the field of organisational learning theory, which is seen as a useful extension of the processual strategic perspective, and a potential way of putting it into practice in managing change. This is done for example by measuring different dimensions of organisational learning capacity to improve understanding of weaknesses and how they prevented new strategy from emerging or being implemented freely.

Chapter 3 reviews the literature on guideline development and implementation methods. The problems in implementing clinical guidelines are seen as an instance of the wider problem of the implementation of change in hospitals, and recent work in that area is reviewed. That perspective emphasises the

importance of the organisational context for the kind of implementation used and its success. Both strategic change theory and a particular field within it, organisational learning theory, are argued to be relevant theoretical frameworks to approach the practical problems of implementing and evaluating the implementation of evidence based clinical guidelines in acute hospitals.

By charting the relationship of guideline implementation processes and outcomes to organisational learning capacity a contribution was planned to knowledge about the relationship between organisational learning and the success of guideline implementation, and to knowledge about the practical use of this strategic perspective.

Chapter 4 describes the research methods used in relation to the research question and hypotheses. Case study was used to compare the two hospitals selected. The method of selection of the hospitals, guidelines and professions for the study in such a manner as to maximise a contrast between them on learning capacity is recounted. The method of selection of possible tools to measure organisational learning capacity (OL capacity) is described, as is the structure for the interview.

Chapter 5 describes the pilot study. It states reasons for the choice of the OL capacity tool which was selected and described changes made to the interview schedule.

Chapter 6 reports the response rates for the OL capacity survey and for the interviews. These were over 50% for senior staff and somewhat higher for consultants than senior nurses. Reasons for non participation showed a number of valid exclusions could be made from the sample.

Chapter 6 then reports the validity of the survey results by comparing the response rates between relevant demographic and organisational groups in the population, sample and the response group. The senior staff who responded are concluded to be representative of all senior clinical staff in their hospitals.

Finally chapter 6 describes the validity of the scales in the NHS acute hospital setting. All the scales gave normal distributions of total scores for all staff and for subgroups by seniority and profession. The scores for each dimension of organisational learning capacity are shown by line graph to have very similar patterns in each hospital. As expected, hospital culture and job satisfaction were positively correlated with OL capacity, and formalisation was negatively correlated with OL capacity. These correlations varied somewhat with the different age groups, especially after age 50.

Chapter 7 carries out the humanistic qualitative analysis promised in the methodology section, comparing the context of the two hospitals to illuminate differences in OL capacity and guideline implementation without any recourse to statistical comparisons. Evidence of more innovation and a more specialist but also more collaborative culture was found in hospital 1 as compared to hospital 2.

Chapter 8 is the hypothesis testing core. Although a statistically significant difference in OL capacity was not found between the senior clinical groups in the two hospitals, hospital 1 scored higher than hospital 2, which was as predicted. There was a much larger difference in the consultants' average scores between each hospital, which may well have been clinically significant. H2 consultants scored lower than their counterparts in H1, again this was as predicted. It was remarkable that the OL capacity scores of consultants and senior nurses were reversed between hospitals. At H1 consultants scored higher than senior nurses, at H2 senior nurses scored higher than consultants.

Another difference between hospitals was the fact that in H2 there was a significant difference between senior and junior nurses in OL capacity but this was not so in H1, although both H1 and H2 senior nurses scored more highly than junior nurses.

Chapter 9 compares the interview data about guideline implementation activities and beliefs between the study samples (cases). The data had been finely coded into substantive activities (ie according to the content expressed by the interviewee) at the most basic level, and these codes were aggregated into higher level substantive activity and belief categories. They were also coded from OL theory into activities and beliefs supporting either learning seeking to comply with existing goals (Type 1 OL) or learning aiming at developing new goals (Type 2 OL). The main (most frequent) substantive category for each topic was tested using chi square to compare the frequencies for these nominal and therefore qualitative data between the hospitals and professions in order to provide a rigorous method of finding statistically significant differences between them in their guideline implementation activities and beliefs. This analysis used a quantitative method to compare qualitative data, mixing methods like this was legitimate bearing in mind the dual epistemological status of the subject matter (the management perspective needed to implement guidelines was social science based and took a largely phenomenological stance, while health professionals took a natural science based positivist stance in their reading of the evidence transmitted by the guidelines).

Chapter 10 analyses the guideline implementation activities and beliefs by comparing the OL capacity scores associated with each of the main substantive and theoretical themes about guideline adoption. This analysis attacked the overall research question in a different way from the comparison of the hospitals themselves. The question was still about whether high OL capacity

was associated with different patterns of guideline implementation from low OL capacity (ie it hypothesised high OL capacity to be associated with type 2 guideline implementation). It differed in that it compared OL scores between those mentioning instances of type 2 implementation or main substantive categories, and those who did not mention them. Thus it took one step back from the case context of the hospitals, but it was still connected with the case context because the frequencies of these categories had already been compared between hospitals.

Chapter 11 is the discussion and conclusions chapter. It starts by summarising the answers to each research question, and then discusses these findings in the context of other research, focusing on the hospital context. There were no statistically significant differences in OL capacity score or in type of guideline implementation between hospitals per se, and contextual information and institutionalist theory are used to explain and illuminate this. For example some statistically significant differences were found between the OL capacity associated with certain guideline implementation activities and beliefs and other replies of the same type about that topic. These differences were tested to see whether they applied particularly to one profession. Together with the information about differences in professional learning capacities within each hospital context, and the other contextual information under the 6 contextual themes, this illuminated the differences between the hospitals and helped explain how the different learning capacities were reflected in their guideline implementation.

Weaknesses of the study are discussed. The main weakness was that the two hospitals selected for comparison were not in fact significantly different on OL capacity, meaning that the hypothesis that guideline implementation would differ between hospitals of significantly different learning capacity could not be tested. The more contextual analysis, which had in any case been intended,

assumed more importance. It included comparisons of the OL capacity of professions in each hospital, professions' comparative involvement in guideline implementation, and other theoretically identified contextual themes as expressed in the interview data.

Aims and research questions

The aim was to find out whether greater Organisational Learning (OL) capacity was associated with a greater emphasis on guideline implementation activities and beliefs likely to support double loop learning - the independent development of new professional goals both desirable and feasible in the local working context. Conversely, lower OL capacity was likely to be associated with activities which did not support double loop learning. OL capacity was always taken as a property of hospitals. Individuals and other groups within the organisation viewed it as greater or smaller. An average score for a representative group (senior clinicians) was used as a proxy or indicator of the value of OL capacity for each hospital.

A potential benefit in posing this question was that if higher OL capacity and successful guideline implementation were linked, money and time currently employed in monitoring compliance with guidelines could perhaps be reduced. This would instead be done by monitoring OL capacity in relevant clinical groups, (hospitals, directorates or specialties). That would be in addition to the compliance level and perhaps partly instead of it. Another possible benefit was that if guidelines and innovative learning were shown to coexist, health professionals, particularly doctors who saw this research result would be more confident that guideline implementation would not diminish them professionally, and so be less resistant to it.

The research question

The broad research question was whether adaptive or generative activity and belief patterns surrounding guideline implementation were differently associated with a broader hospital culture of organisational learning. The null hypothesis was:

"There are no differences in the SIGN guideline implementation process between acute hospitals of different OL capacity."

Conversely, the hypothesis was:

"SIGN guideline implementation would have more of the features of generative guideline implementation in the hospital with the highest OL capacity."

The analysis by hospital was the focus of the study.

The research questions were divided into preliminary and main or hypothesis testing questions because some preliminary selection processes needed to be carried out to find hospitals and guidelines that were likely to have different OL capacity. Results of this had to be checked. The questions, were as follows, very brief answers are given with each research question:

Question 1 (Preliminary) - OL Capacity

1a - Was the OL capacity scale valid in the acute NHS hospital environment?

Answer: Yes, various tests of validity were passed.

1b - Were the OL capacity scores of the hospitals significantly different as theoretically predicted?

Answer: Hospitals – not significantly, but they were different, hospital 2 lower as predicted. Professions were not significantly different overall, but doctors scored higher especially in hospital 1 as compared to doctors in hospital 2. Scores of those implementing different guidelines could not be realistically compared as there were too few diabetes responders to tell. Diabetes consultants were few in number – 1 in each trust.

Question 2 (Preliminary) - Guideline adoption

Was it possible to identify different guideline adoption patterns (reflected in dissemination, implementation and audit activities and beliefs) as theoretically predicted?

Answer: Yes, there were examples of both types of implementation, and type 1 was the most frequently occurring

Question 3 (Main hypothesis testing) - Types of guideline adoption and OL

3a – Did the hospital of higher OL capacity have significantly more emphasis on generative guideline implementation patterns than the lower OL capacity hospital?

Answer: No, not from quantitative comparisons. There were some significant differences in substantive activities and beliefs mainly between professions, and this could be interpreted in the light of the differences in OL capacity in doctors between hospitals. The qualitative data supported this, because hospital 1 had many more contextual features conducive to change implementation than did hospital 2.

3b - Were potentially goal changing (generative) guideline implementation and dissemination methods and beliefs (model 2) connected to significantly higher OL capacity from adaptive beliefs encouraging compliance?

Answer: Generative change was associated with higher OL capacity in hospital 1.

Question 4 (Hypothesis testing) - Substantive activities and beliefs involved in guideline adoption and OL

Were the main specific guideline implementation activities and beliefs connected to significantly different levels of OL capacity from others?

Answer: Yes some were. Those involved in guideline implementation had significantly higher OL scores than those who were not. Two single loop beliefs were associated with significantly lower OL scores than other single loop beliefs.

Definitions

Strategy

This is "the *direction* and *scope* of an organisation over the *long term*, which achieves *advantage* for the organisation through its configuration of *resources* within a changing *environment* and to fulfil *stakeholder* expectations."[206]

Implementation patterns

Understandings of implementation of SIGN guidelines were addressed. The working definition of implementation was 'purposeful use of the guideline'. Details of the uses found are given later in the results.

Acute hospital

Scottish hospitals were classified by the NHS. There was no separate classification of acute hospitals. The classifications relating most closely to acute hospitals were chosen on the basis of the descriptions of the functional classifications, given by Information and Statistics Division (ISD).[197] Hospitals were categorised by CAMO (Chief Area Medical Officer/Director of Public Health) functional classification. [197]

SIGN guideline

An evidence-based guideline for clinical practice developed with the support of the Scottish Intercollegiate Guidelines Network using a set process validated by the SIGN organisation. The guideline was published and formally approved by SIGN as a SIGN guideline.

The SIGN guidelines selected for the study were No 2 The Prophylaxis of Deep Venous Thromboembolism (DVT) and all the SIGN guidelines on Diabetes (No's 4, 9, 11, 12, and 19). Further details on the reasons for this selection are given in sections 4.2.4.

Organisational learning capacity/capability (OL)

An organisation's effectiveness in the detection, correction and prevention of error,[6] and secondly in increasing organisational capability.[370] It was measured using the Learning Organisation Survey (LOS).[151] The LOS was a measure of individual satisfaction with the organisation's learning capacity; the mean score for each hospital was an indicator of the OL capacity of the hospital. The mean score for a subgroup within each hospital was an indicator of the OL capacity of the hospital for that subgroup.

Kinds of organisational learning

Two main kinds of organisational learning were relevant to the study, the single feedback loop and the double feedback loop. Single loop was termed 'adaptive', and double loop 'generative' by Senge.[370]

Section 1 – Literature review

Introduction to Section 1

As Fig. 1 shows, guideline implementation was seen as an instance of the implementation of a strategic change. The first chapter explains different theories about how strategy was made in organisations. This work showed that strategy was a process of developing new understandings rather than setting particular organisational goals, although of course the new goals were implemented as part of this ongoing learning process. This insight led logically to examination of the theory about organisational learning, which provided a structure for framing the research questions. The research questions used OL terminology and OL concepts, but OL theory was seen as a specialised subset within strategic theory.

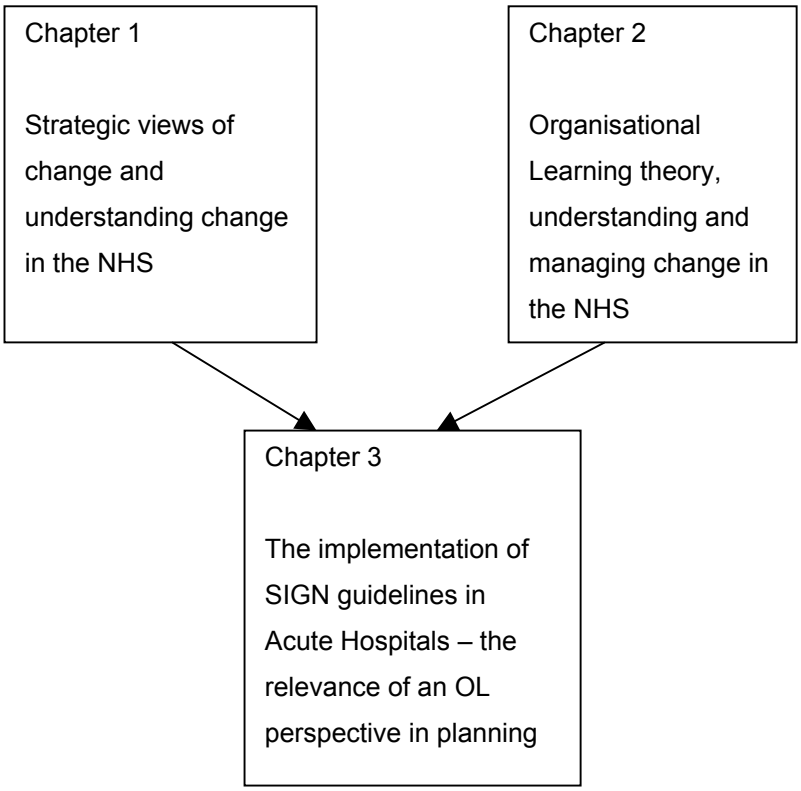

Fig 1 The logic of the Literature Review.

Chapter 1 Strategic change theory and the NHS

Purpose of this chapter

The purpose of this chapter is to set this research in the context of British National Health Service (NHS) change strategy, and especially the implementation of the clinical audit initiative, to review approaches to strategic theory as a basis for the research questions, and to provide a context for the discussion.

1.1 Change in the NHS

Many legislative and policy changes have aimed to make the NHS more efficient and effective in the face of increasing environmental pressures, which included, for example:

- rising demand owing to an aging population with greater health needs,
- an increasing number of costly health technologies,
- more retired and economically inactive people not contributing to the Gross Domestic Product and to National Insurance,
- ever-rising consumer and electoral expectations of health care, and
- an increasing threat of litigation when treatments have not met expectations.

The history of the various pieces of legislation, policies and the strategic changes in structures and associated processes in response to these environmental pressures has been documented at length by a number of writers, including Forbes.[134] It would not be appropriate to carry out such an analysis here for three reasons: lack of space, lack of immediate relevance, and because it has already been done by others. Chapter 3 gives the immediate

historical context for evidence based guidelines, and this chapter 1 will set the research in the context of the development of clinical audit.

A brief summary is needed of the main NHS strategic changes to provide a background to the research approach taken later. The broad picture of strategic developments in the NHS from 1948 to 1972 was of government reports leading up to major reform in 1974. The 1974 reforms aimed for better co-ordination between health authorities and local government through changes in NHS structures. This was when the 15 Scottish area health boards were introduced, to replace regional and area health authorities. Unification of the previous tripartite structure (acute, community, and primary care) was the aim. Community services were brought under the control of area health boards. The consensus approach was adopted, and doctors had a right of veto over management decisions.[170;227]

The next major reform was in 1979; it was set out in the white paper "Patients First"[90], which delegated more power to local units, and put more emphasis on information systems. A number of separate efficiency initiatives were implemented in the 1980's, the most important being the establishment of performance indicators in 1983.[134] These allowed comparison of hospitals on cost per patient, waiting lists and availability of services to any particular population. The new structure was complex and over-specialised, the tiers did not communicate well, and strategic decisions were delayed.[19]

A new enquiry into the management of the NHS was headed by Roy Griffiths in 1982[155] and implemented in 1985 in Scotland. Griffiths described the main constraint on the effectiveness of NHS management structures as being the lack of an identifiable individual in charge in every hospital, and his solution was to introduce hospital general managers, who were intended to give a new focus for the whole organisation. Other problems were a lack of concern with policy

implementation and a lack of a performance orientation. For this he recommended a more extensive review process, incentives to managers, and tighter cost-control mechanisms. A lack of attention to patient needs was another of his criticisms, and he suggested more market research to correct this. Ham suggested that the political drive to reduce spending had put cost and efficiency issues before quality of service and effectiveness.[170] Griffiths' management budgets "failed to link costing and budgeting developments with the hospital management process and particularly with individual patient activity.".[134] As a result this budgeting system was not supported by healthcare professionals, and failed.

The next initiative also focused on costs. The Resource Management Initiative (RMI) in 1986 was intended to make doctors more cost conscious by showing them what they were spending. Other aims of the RMI were to involve doctors more in the management process, and to provide accurate information about what clinical activities were being carried out.

A further review in 1988 aimed to increase the market focus of the NHS and thus make it more responsive to patient need and more efficient. The review produced a White Paper, "Working for Patients" (1989),[91] which resulted in the NHS and Community Care Act 1990,[92] implemented from the first of April 1991. This attempted to set up an "internal market" in the NHS. The main features of the internal market were:

- Hospitals and community health services could become self-governing, and Trusts and General Practices could apply for fund-holding status.
- Fund-holding practices were allocated a budget from a health board for purchasing services autonomously, and Trusts could in theory make service contracts with any purchaser.
- Care was purchased by health boards and GP fund-holders from provider units – mainly hospitals and community health services.

- "Working for Patients" also introduced clinical audit, discussed in the next sections of this chapter, which provided data for measuring the quality of care.
- The internal market structure led to increased administrative costs and, reportedly, to a reduction in information sharing and co-operation between providers.

Clinical audit

The immediate fore-runner of clinical guidelines work was clinical audit. The next part of this chapter traces the history of the implementation of clinical audit to explain why guidelines were needed. Finally, I point the way ahead to OL (further discussed in chapter 2) and the role of guidelines themselves (further discussed in chapter 3)

Origins of clinical audit – the consumer movement and the NHS

The consumer movement gathered pace in the 1970s in the USA. It was a reaction to large, producer-centred monopolies and cartels in business. For example, the oil companies were accused of having a prime loyalty to their suppliers, the Organisation of Oil Exporting Countries (OPEC), rather than to their customers.[353] In the UK, the movement influenced the introduction of clinical audit in the NHS.[185] The costs of legal action for clinical negligence became a cause for concern from the UK government in the late 1990s. Litigation cost the NHS £235 million in 1996-7, "an increase of 17%" (sic).[86] The Scottish Executive introduced a compulsory indemnity scheme in 2001.[367]

Clinical audit implementation in the NHS

Systematic monitoring and improvement of the quality of clinical care was the aim of medical audit, which in England was implemented through the White Paper 'Working for patients',[91] from 1/4/1991 as part of the NHS and

Community Care Act 1990.[92] In Scotland, medical audit was introduced through Scottish Working Paper 2 'Medical Audit'.[65] As a government policy, rather than an initiative by local management, medical audit was introduced in hospitals under medical control and in isolation from trust management structures. Audit was initially confined to the medical profession with ring fenced funding separate from general trust and DHA allocations. Participation was voluntary.

Medical audit was publicised as a way to improve the care actually delivered. Costs often rose or shifted to other activities. For example, audit of consensus dyspepsia management guidelines agreed by GPs resulted in increased prescribing costs and reduced referral rates, but no change in use of investigations (radiology or endoscopy).[214] Multidisciplinary clinical audit, rather than medical audit, became the policy in 1992, and nurses and professions allied to medicine were expected to be included in the process. Clinical audit was the mechanism for developing and implementing clinical quality standards, and formed the first basic hospital organisational learning system.[298]

Barriers to clinical audit implementation

Medical practitioners had traditionally held management at arms length.[201] Professionals thus viewed the clinical audit policy with suspicion at first. Was it a means of reducing the money available to treat patients? Some justification to this view came from a study of methods of rationing health care.[173] Clinical audit, especially when formalised, was seen by many clinicians as an irksome and onerous extra task, but not as real (clinical) work:

> "The audit cycle has become a vicious circle, a noose to strangle any chance of it ever being a practical everyday tool;… a whole service industry has mushroomed around this fatal flower, and with every new blossom it becomes more and more remote from real practice and from the people who are actually doing the work."[118]

The most important barrier facing the clinical audit process was the difficulty in getting agreement on the standards against which to measure practice, because of lack of evidence (for example, in infection control in the USA).[273] This culture had to change for effective implementation.[110] Slowly, internationally, a realisation dawned that efficient and cost effective care was compatible with good care. The attempt to be efficient was not in itself an attempt to cut costs.[239]

When Trusts became established, the OL function of audit suffered in some hospitals when audit data were retained by individual providers (rather than being District or Regional Health Authority (DHA or RHA) wide. One reason for this was concern about medico-legal issues with audit data, and its possible use in lawsuits for negligent practice.[13]

This concern increased with the advent of guidelines. One approach to agreeing audit standards was for experts to agree guidelines and use this to create an audit questionnaire. An example was hospital care of acute asthma.[26] Some staff saw the main purpose of explicit guidelines as a means for their hospital to avoid litigation.[238] Others, especially medical staff, used to defining their own practice, saw them as creating a threat of litigation rather than providing a protection from it. Guidelines were eventually agreed to have a subordinate role to that of expert witness in court proceedings, and doctors still had a responsibility to exercise their clinical discretion.[188;189]

Limitations of Clinical Audit

In April 1992 a working group was set up on the relationship between clinical audit and management. Chaired by Sir Thomas Thomson, Chairman of Greater Glasgow Health Board, its report, published early in 1993, was entitled "The Interface between Clinical audit and Management".[404] It will be referred to here as the 'Thomson Report'. In the foreword, the Chief Medical Officer and

the Chief Executive of the NHS in Scotland introduced the topic, saying clinicians and managers both had high hopes that clinical audit would lead to more effective and cost-effective clinical services. He went on to highlight the diverging views of clinicians and managers on the role of clinical audit:

> "However by 1992 it was clear that there were a number of areas where the assumptions and expectations of the two groups were significantly different. Most of these differences of opinion concerned the respective roles, rights and responsibilities of health care professionals and managers and the time scale within which clinical audit could reasonably be expected to produce results."

Cost effectiveness and clinical efficacy/effectiveness did not need to be always in accord in practice. Instead, Thomson presaged an idea of an organisational learning type dialogue between the two. Thomson saw computer systems as linking data on cost and quantitative clinical audit data. He warned against a threat to this from 'protective attitudes' but at the same time recommended setting explicit levels of confidentiality to prevent any need for protectionism, an example of the defensive 'doublethink' required to negotiate the minefield of competing interests at the time. Managers were to be allowed access only to aggregated, anonymised data. Data about individual clinicians' work "should be shared with clinical peers only by prior agreement of the individual health care professional involved".

Clinical directorates were an attempt to simplify the complex specialty structures and manage costs. They started in the UK as a clinical initiative at Guy's hospital, London in 1985,[381] though the original idea was developed in 1974-5 at Johns Hopkins hospital in Baltimore US.[181] In both cases, the introduction of the system was a response to financial problems. Clinical directorates were intended as mini-hospitals within the hospital, holding their own budget and functioning autonomously with clinicians taking responsibility

for finance. There were several possible groupings of specialties in clinical directorates.[51] Clinical directorates did not always function as intended. Lay managers saw them as a means of gaining control over consultant decisions,[207] and chief executives did not always relinquish their control to clinical directors.[56]

For Thomson, the clinical director would be the interface between managers' questions based on aggregated data, and individual clinicians. In Thomson's view, the link between audit conclusions and named patients should be broken by destroying records "any paper or computer record which could link individual patients or health care professional to audit conclusions must not be retained."

These measures were necessary to create a positive atmosphere for clinical audit at the time. In the long term, they were actually anti-evidence, and in the wider framework of OL, anti-learning, because they destroyed the audit trail from error to cause, making it impossible to test and verify clinical directors' decisions about solving any problems found. For Thomson "The purpose of audit was to raise overall standards, not to identify unacceptable performance, for which other mechanisms exist". The other mechanisms were not specified. In 1998 the General Medical Council (GMC) published guidance on good medical practice and how to maintain it, which recommended using local procedures in Trusts and health boards before any referral to the GMC.[146;147] Clinical audit was not linked to these mechanisms, so raising overall standards could be impeded by individual clinicians. There were still some clinicians who trusted their own experience more than research evidence collected outside their own local setting, so called 'cookbook' medicine.[384] For hospitals, there was no way of insisting that clinicians subscribed to the evidence-based standards, or participated in clinical audit to check, improve and update their practice.

The Thomson report acknowledged that clinical audit could be "viewed as an element of quality assurance," but it stated that quality assurance was concerned with "non-clinical factors, that was, quality of service issues, (e.g. hotel services)". Though they might be brought together in the future, "for the present the two [clinical and non-clinical] activities should be considered separately." In accordance with this view, Thomson recommended that managers be involved in Area Clinical Audit Committees and Unit/Trust Audit Committees, but that there should also be professional-only audit subcommittees.

In conclusion, Thomson emphasised reassurance:

> "reassurance to health care professionals that managers would not use clinical audit results inappropriately; and reassurance to managers that clinical audit results would be available to them to inform the planning and management of health services."

Three years later, in 1996, Hopkins reviewed weaknesses of clinical audit. [185] He drew attention to methodological weaknesses, including bad data for audit based on record review, and lack of clarity about aims. He mentioned the importance of social structures for creating good care systems. Beliefs acting as barriers to audit included:

> "1. A reluctance to judge peers,
> 2. The danger of reducing public confidence in doctors,
> 3. A belief that doctors have already been auditing their work for years,
> 4. Inadequate data and information systems,
> 5. A lack of time,
> 6. The fact that the process can be threatening or boring,
> 7. Suspicions about managers' interest in audit,
> 8. A view that audit was a mechanism for the control of junior doctors."

He concluded "Audit has failed to win the hearts and minds of the medical profession." For Hopkins, clinical audit and guidelines had to be valued by clinicians as clinical work as important as research, with an important organisational dimension for planning whole services not as a 'bolt on extra.'[185]

Clinical audit began to provide evidence not only of variations in treatment process and outcome but also of inequitable treatment standards and unmet need. These could imply a theoretical need for more, not fewer, resources.[249] In summary, clinical audit had patchy impact as shown in a number of evaluations.[279;341;415;416]

The integration of clinical audit into a nascent OL framework gathered pace in the Scottish NHS in 1995. The publication in July 1995 of "A Strategic Framework for Clinical Audit in Scotland"[66] introduced the idea of clinical effectiveness as being the development of evidence-based guidelines and the implementation of clinical audit. The term 'clinical effectiveness', which originally applied to drug tests, was soon adapted and developed to mean an organisational process to improve delivered health care using and linking studies of cost effectiveness, research and development, education, and outcomes measures in addition to audit and guidelines.[117] Resource distribution between health boards was revised by another process which did not take quality of guideline implementation into account.[5]

Implementation of the clinical effectiveness initiative was slow. As late as 1997, most Trusts had no written strategy for improving clinical effectiveness, and it was rare for chief executives to retain clinical effectiveness as their own responsibility. Hospital libraries restricted access to particular groups and to office hours.[417] There were calls from the medical profession for clinicians to develop a culture of constant update and learning.[136] Others recommended this be linked to practice and audit.[40;41;440]

The continuing need for the prevention and detection of error in health services (Argyris' and Schon's definition of OL) was shown by Leape.[240] Leape estimated that if the adverse event rate shown in three large US studies (3.7% of hospital admissions), then 1.3 million people were being injured annually by treatment intended to help them. Fourteen per cent, or 180,000 of these died as a result. Two thirds of such adverse events were found to be due to human error and were therefore preventable. Serious dosing errors in the administration of drugs made by nurses were in the order of 20%. In two per cent of patients these caused injury.

Leape argued that the 'train and blame' approach to dealing with errors encouraged cover-ups. Giving doctors and nurses anonymity and immunity from disciplinary action increased error reporting, and made them "willing even anxious to discuss their mistakes and try and understand why they occurred." The recognition that errors were a function of the system within which people worked encouraged change to that system, but this attitude was not always understood by clinicians as an accepted feature of clinical audit in practice.

The recognition of a need for evidence based clinical guidelines sprang from the failings of medical audit (doctors only) and then clinical audit (all clinical professions). The validity of audit standards was improved by more valid guidelines. The new techniques used to create guidelines[17] included more powerful computer literature searches and better synthesis of the methods and the results of research especially in randomised controlled trials. Research synthesis was pioneered by the international Cochrane collaboration which distributed the Cochrane Library of Randomised Controlled Trials (RCTs) via the internet.[398] The evidence was used in guidelines such as those developed by the Scottish Intercollegiate Guidelines Network (SIGN), which now could not

be ignored. Good data was a pre-requisite for OL too, so the clinical and business approaches to quality improvement were converging.

Explicit, evidence-based guidelines had the potential to allow a reliable and meaningful comparison of process. Guideline-based documentation such as prospective audit sheets, or care pathways, offered a chance of improving the validity and reliability of process audit. SIGN guidelines encouraged consensus on audit criteria because they were an authoritative guide to the latest clinical evidence. Clinical discussion was recommended as a means of ensuring the effectiveness of audit and guidelines.[342;403] Valid data and agreed clinical processes were intended to support discussion in their turn. The history of the development and implementation of clinical guidelines and their incorporation into Scottish NHS strategy is given in chapter 3.

Sharing the learning from adverse events has since been called for elsewhere.[285] In 2002 a national UK system for clinicians to report errors anonymously so that learning could take place was planned by the National Patient Safety Agency (NPSA).[139]

The internal market ended with the implementation of a new approach in both Scotland and England in 1997. The two White Papers: 'Designed to Care'[401] (Scotland, 1998) and 'The New NHS modern, dependable'[84] (England and Wales 1997) continued the pressure for change. The Scottish structure was implemented from autumn 1999. A consultation paper on Clinical Governance (CG) was circulated widely within the NHS in Scotland in August 1998.[369] CG was defined as "corporate accountability for clinical performance." The consultation paper described CG as giving to NHS management the benefits of:

- Assurance to enable it to meet its statutory duties, and
- Creation of a culture throughout the trust to sustain and improve the quality of clinical services.

CG is further discussed in relation to clinical guidelines in the final chapter of this first section of the thesis. CG was in turn included in a new draft Scottish performance assessment framework[366] as one of seven elements. The others drew on Maxwell's dimensions of health service quality.[266;366] Success criteria for each of these dimensions were specified as the characteristics of a 'successful local health system'. The seven headings under which performance was to be analysed were:

- Health improvement and reducing inequalities,
- Fair access to health services,
- Clinical governance, quality and effectiveness of health care,
- The patient's experience,
- Involving the public and communities,
- Staff governance,
- Organisational and financial performance and efficiency.[366]

Separate English and Scottish consultations in 1998 covered a new approach to quality following these White Papers. They were the 'Acute Services Review',[400] which reported in June 1998 (Scotland) and 'A First Class Service',[85] (England). The 'Acute Services Review' devoted a chapter to 'Quality Assurance and Accreditation'. This recommended compulsory, professionally led, external accreditation. Accreditation methodology and standards were to be developed and safeguarded by a new Scottish national body, the Clinical Standards Board. For Scotland only, a Management Executive Letter[293] gave more detailed guidance on the introduction of Managed Clinical Networks in February 1999. It defined them as:

> "linked groups of health professionals and organisations from primary, secondary and tertiary care, working in a co-ordinated manner, unconstrained by existing professional and Health Board boundaries, to

> ensure equitable provision of high quality clinically effective services throughout Scotland."

Among twelve proposed principles that an MCN would have to satisfy to be recognised, was:

> "use a documented evidence base, such as SIGN clinical guidelines where these are available, and must be committed to the expansion of the evidence base through appropriate R&D."

The Scottish 'Our National Health',[292] like the English 'The NHS Plan',[88] addressed patient issues, putting a specific emphasis on patient friendly versions of guidelines "all clinical guidelines will have a version specifically written for people who use services".[292] 'Our National Health' included a plan to create a centre for change and innovation.

The report 'An organisation with a memory'[87], presented an explicitly learning approach to the whole NHS at organisational level. It emphasised the importance of culture in learning, and the systems approach. After the Bristol case, the prevention of error became discussable, and the report recommended:

- unified mechanisms for reporting and analysis when things go wrong;
- a more open culture, in which errors or service failures can be reported and discussed;
- mechanisms for ensuring that, where lessons are identified, the necessary changes are put into practice;
- a much wider appreciation of the value of the system approach in preventing, analysing and learning from errors. [87]

The 'Learning Together' strategy published in Scotland in December 1999[261;364] made explicit reference to the 'Learning Organisation' with a particular

emphasis on knowledge management and improving access to information facilities and libraries. The report tasked health boards and Trusts with working 'in partnership with their local partnership groups to develop and publish local learning plans.' The improved access involved lifting restrictions on access to libraries for certain professional groups. A Scottish Executive Publication 'A Focus on Quality'[362] in Dec 2000 further integrated a strategic vision of requirements for the connection between NHS quality, research and information initiatives in Scotland. The implementation of SIGN clinical guidelines was at the heart of this.

1.2 Institutional context

This section considers a number of variables affecting organisational autonomy in relation to OL. The variables were seen in terms of institutional theory. This was a body of theory about institutions, separate from organisational theory.[360] It applied to my research topic in a general sense, especially the idea of 'mimetic isomorphism'. This applied especially to organisations which played safe under environmental pressures from societal institutions by changing only by imitation of practices proved to work elsewhere. I wanted to explore what other implications this might have for guideline implementation. Organisations were often institutionalised, or routinised with set roles, norms, and values. There could be a normative pressure to fit in with prevailing orthodoxies[441] and this went a long way to explaining why acute hospitals were in many ways so similar to each other.

In public organisations and especially in the health service, the New Public Management (NPM) had replaced an older Public Administration model for running public organisations.[121] It had been the context of both the implementation and the rationale for quality improvement, and, in the NHS, Clinical Governance. It focussed on performance assessment by outcomes rather than probity and parsimony. Outcomes were notoriously difficult to

measure validly for healthcare organisations. This had led in the Scottish NHS to institutional requirements for the implementation of evidence based guidelines as a proxy for outcomes. Harrow stated that, although it was never intended to incorporate equity or social justice concerns, the NPM had not been proved to have excluded them yet.[174] Guidelines might have promoted equity by providing a basis for consistent standard setting for measurement of the clinical process in all providers.

Countering institutionalisation

To allow change, especially in the context of the NPM, the question then became how organisations could divest themselves of institutionalist attitudes. The overall research focus in the terms of the debate about deinstitutionalisation[300;301] was on whether OL was enhanced in an organisational context which balanced institutionalist mimesis and risk avoidance equally with innovation and risk.

For Oliver strategic responses to institutionalisation existed on a continuum ranging from passivity to increasingly active resistance (see fig 1.1)

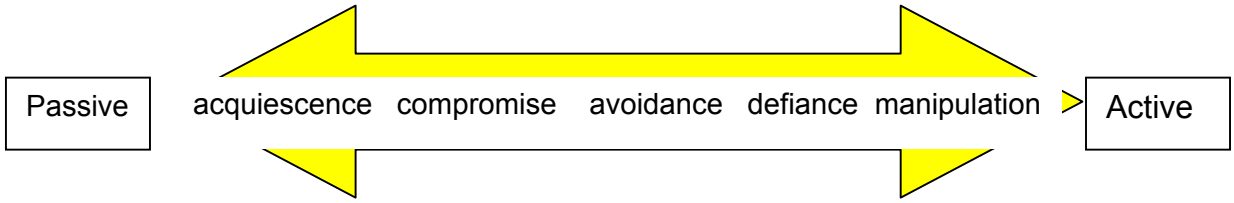

Fig 1.1 Strategic responses to institutionalisation[300]

Compliance was a subcategory within acquiescence in Fig 1.1. It was conscious obedience, not simply the unconscious obedience of habit in imitating already known and trusted others. The strategic response by hospitals to the requirement for guideline implementation was nearly always to comply. In OL terms mimesis was equivalent to single loop learning, and Oliver's range of strategic responses to institutionalisation were, at the passive end of the scale,

reminiscent of Argyris's defensive culture. By becoming more conscious and active towards the other end of Oliver's scale the responses escaped the charge of being simply defensive and became innovative albeit in a defensive way.

Institutional pressures and guideline implementation

SIGN evidence-based guidelines were mentioned in the Scottish office guidance on clinical governance.[363] The content of the guidelines was to an extent self-imposing for the health professions, because they were evidence based, and the professional imperative was to use the most effective treatments for the maximum benefit of patients. Clinical Governance has been seen as an initiative to increase customer orientation equivalent in the NHS to "Best Value" initiatives in the majority of the public sector.[180]

Oliver predicted strategic responses for different institutional factors.[300] These could be related to guideline implementation. The fact that guidelines were evidence based for example, gave them high legitimacy (an institutionalising factor for recommendations based on the strongest evidence), and Oliver predicted this factor would lead to high acquiescence (Hypothesis 1). The large number of guidelines, from a variety of sources, could be seen as an example of Oliver's "multiplicity" an element of her "constituents" institutional factor, and likely in her view to lead to compromise or other resistance rather than acquiescence (Hypothesis 3).

Clinical guidelines were often compatible with hospital goals and when this was the case hospitals (and directorates) usually were willing to comply, in accordance with Oliver's hypothesis 5. Since SIGN guideline implementation was expected by Health Boards and NHS Scotland who funded hospitals, compliance was again likely (Oliver hypothesis 4). However it was the "context" factor that pointed most strongly to the way institutional pressures on

Scottish hospitals were increasing, and increasing the likelihood of compliance with SIGN clinical guidelines. Oliver had two hypotheses about context, that lower environmental uncertainty increased the likelihood of resistance to institutional pressure and that lower interconnectedness in the institutional environment led to greater resistance to institutional pressure (Hypotheses 9 and 10). It was at first sight difficult to interpret hypothesis 9 for hospital environments and in the context of SIGN guidelines. Though the guidelines were evidence-based, which seemed to increase certainty, at the time this research was undertaken, all of the following were still uncertain:

1. the most effective methods of implementation for guidelines,
2. the legal position of clinicians who did not follow guidelines which had been accepted by their peers,
3. the future uses to which guidelines would be put, whether accreditation of hospitals, detection of underperforming clinicians etc.

At the time of the research interconnectedness in the institutional environment was increasing, with the establishment of clinical governance structures within hospitals and of external national bodies for the inspection of hospitals and improvement of health care. Most of these factors were pressures for compliance by implementing guidelines rather than resistance to the evidence-based quality improvement agenda.

Scott's model of "Top-Down and Bottom-up Processes in Institutional Creation and Diffusion"[361] (see Fig 1.2 below) provided a framework for thinking about the strategic reasons for the diffusion of models of practice such as evidence based clinical practice guidelines. We could for example see guidelines as a strategic initiative to make professionals more tightly coupled with the state, more accountable for their recommendations and so more motivated to take resource availability into account when arguing for change.[361] Guidelines could also be seen as a governance structure[361] to facilitate the regulation (through

accreditation) of healthcare providers. Another strategic aim we could see as satisfied by guideline implementation is that the New Public Management needed a mechanism for encouraging equity.[174]

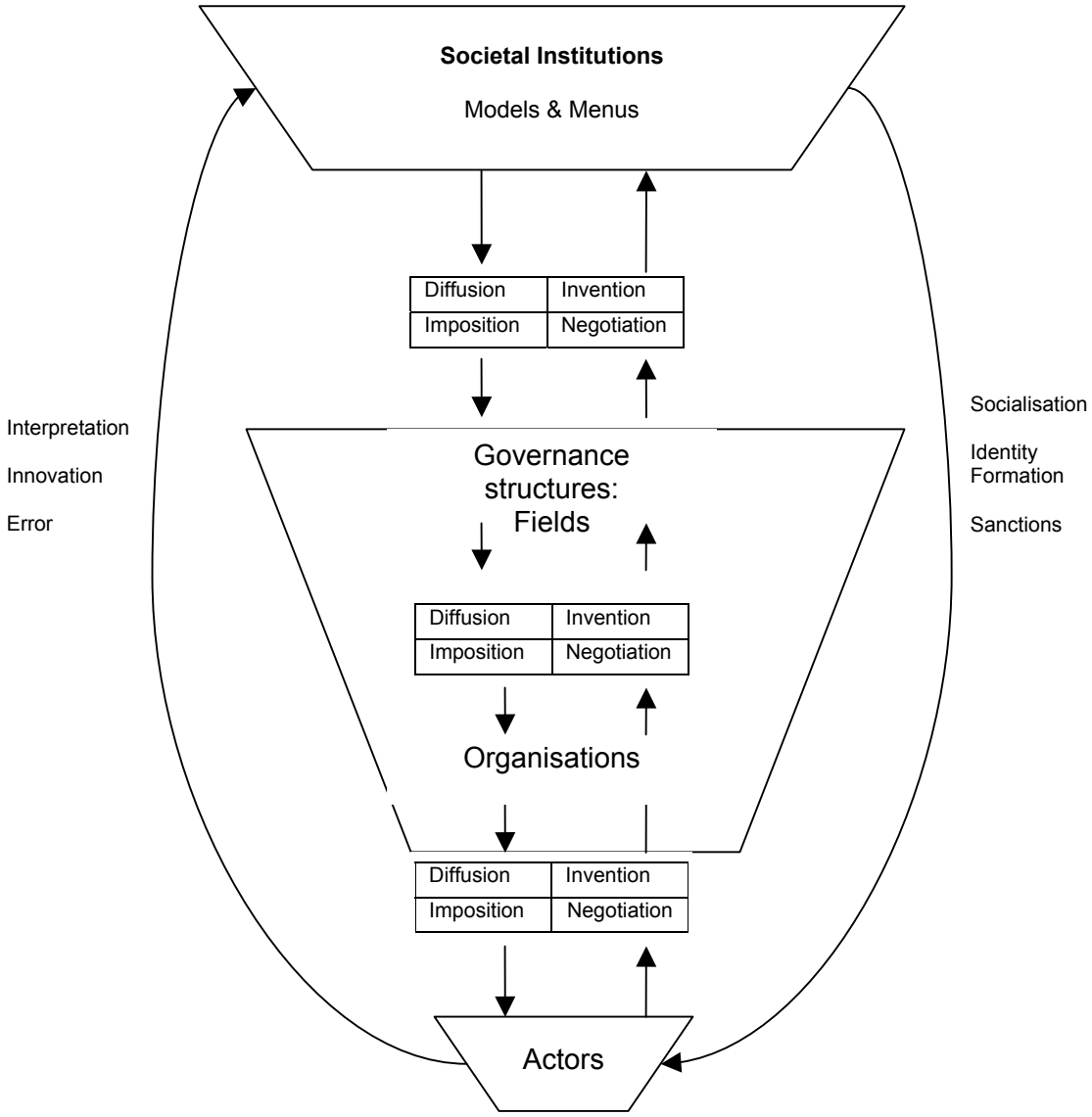

Fig 1.2 "Top-Down and Bottom-up Processes in Institutional Creation and Diffusion"[361]

From the de-institutionalist perspective the better an organisation could resist environmental pressures from state and other institutions the more it was likely to have de facto autonomy (or self determination) and therefore more innovative ability than organisations that passively accepted them. This was an

alternative view to the classical one that learning resulted from close contact with market trends, or the systemic view that learning by a system was facilitated by openness of the system to its environment.

Autonomy, self-accountability and innovation

Context was multifactorial. This meant it was difficult to predict the future behaviour of a particular organisation in a particular context, though Boyne argued it was in principle possible to do so provided a small number of variables were used in statistical analysis.[37] In practice it was often difficult to identify all the key variables. Although unpredictability was not the same as the willed self directedness of true autonomy, it was perhaps in retrospect rationalised as such by those involved, particularly if the organisation had successes. Clinical guidelines provided a basis of formal intention, a crystallisation of will, which might have helped prevent post-hoc rationalisation of chance success and improved an organisation's active control of clinical events. This did not prevent innovation, in fact Mintzberg interpreted Jelineck,[204] who argued in favour of strategic planning, as saying that the formalisation of work (for example by Frederick Taylor)[394] enabled it to be conceptualised, and so controlled, at a higher level of abstraction, and these conceptualisations could be changed and refined to generate innovations to practice.[282] Another means of encouraging innovation in a formal setting was to formally reward it, and as Nord reported, this may work to the extent that unusual responses could be increased.[295] Yet again, as Zucker pointed out, some innovations were institutionalised and some were not. Guidelines would come under the former category, and were less risky to adopt than were non-routine unexpected innovations.[441] Non-routine innovation differentiated organisations, giving some a theoretical edge in competitive environments. In fact, Zucker found that non-routine innovation decreased performance, but not enough to alter organisational survival rates [441]

Guidelines and institutional power

Rowlinson's definition of institutional power suggested that the use of guidelines was a means of exercising it:

> "From an institutional perspective, power was constituted by the ability to construct and ensure the continuation of institutional constraints on organisations.".[348]

In this view, institutional power was a limit to action rather than an increase in capability for action. Mintzberg argued that formal organisational systems such as those tending to result from institutional pressures did not create new strategies or innovations, these were driven by intuitive synthesis not rational analytical processes.[282] Greenwood and Hinings took an opposite perspective, arguing that newer institutional theory could give an account explaining radical organisational adaptive change, which linked context and the internal dynamics of the organisation.[154] Even radical adaptive change was not the same as pure innovation, but the distinction between these two typologies of change was perhaps not as hard and fast as often accepted by the literature (for example Argyris's single and double loop – there were perhaps any number of part loops) so that the adaptive/generative distinction was better seen as a continuum rather than necessarily either one or the other.

Pettigrew distinguished two types of power. He implicitly saw power as a means of creating strategic change. Firstly, unobtrusive systems of power operated through the management of meaning. Symbolic activities shaped culture, which in turn defined some activities as valued and some as not valued. Secondly, there was a more public power:

> "more public face of power expressed through the possession, control, and tactical use of overt sources of power such as position, rewards or sanctions, or expertise."[322]

Guidelines certainly operated in Pettigrew's first mode, as part of the evidence-based culture current in the NHS at the time of this research. They were underpinned in his second mode by the possibility of sanctions both at the level of the individual clinician through internal clinical audit, and for the organisation through the external accreditation process. While the expertise of the developers was certainly important in their effectiveness strategically, individual guidelines could also be challenged on this basis by local experts.

So, institutional pressures through guidelines might operate less powerfully where evidence was weaker, increasing the chance of innovative learning, but at the same time an evidence-base was needed upon which to build. So guidelines containing a few well evidenced recommendations would be likely to promote OL better than numerous recommendations backed only by weak evidence.

1.3 Strategic perspectives

There were a number of perspectives within strategic theory which were potentially useful to understand and so to manage the changes required within hospitals to structures and work processes as a result of these environmental pressures. The rest of this chapter considers the main views and their suitability for understanding change implementation in hospitals, particularly of course with reference to guideline implementation. A full review of the strategy literature was not required for this.

A number of writers explained strategic management from multiple perspectives. For example Johnson and Scholes[206] used a three part taxonomy for strategic approaches –

1. The Design lens – this was like the classical perspective (below) – the view that developing strategy can be a logical process using analytic and evaluative techniques to adjust the direction of the organisation to cope with environmental changes. It was useful but not sufficient. The

complexity of the NHS hospital, its vulnerability to political change at the state level, and the existence of multiple professional worldviews and interests all made for a difficult fit between this as a sole approach to strategy-making, and conditions in NHS hospitals. In its favour though, was that it offered clarity and explicitness, which potentially both aided transparency in the strategic decision-making process, and provided an audit-trail, giving the process a degree of protection from domination by the interests of particular groups. However it was difficult to apply this.

2. The Experience lens – this was a view in which models and paradigms became taken for granted, and where change came about as the adaptation of past strategies in the light of experience. It was like the processual view (below) in its focus on the detail of day to day operations. This had the advantage of enabling close links with the reality of day to day operational problems, giving the ability for a quick response to changes such as increase or decrease in client flow. An intuitive approach like this had some disadvantages, especially in a large organisation with a number of different operational realities which might make it more difficult to take an overview for the whole organisation. So while the evolutionary change from the strategic activity resulting from this understanding might be of limited success in particular contexts, the overall sense of direction might suffer.
3. The Ideas lens – this was where both order and innovative ideas were seen to be generated in an unplanned (or 'emergent') way in conditions of diversity and through imperfect copying, at lower levels in the organisation, and from contact with the environment. It had the advantage of offering a way of understanding and so managing the innovation process, but new ideas would have to battle their way through the forces of routine and habit at lower levels of the organisation to survive.

This simple three lens structure had the overall advantage of being explicitly phenomenological with its metaphor of the lens, and so it was conceptually easy to apply each lens to a situation and use all of the insights given.

Mintzberg (1990) identified ten schools of strategic thought:

1. Design
2. Planning
3. Positioning
4. Entrepreneurial
5. Cognitive
6. Learning
7. Political
8. Cultural
9. Environmental
10. Configurational[281]

The complexity of this structure made it difficult to apply. There is not space to discuss each model here. They were all based on different configurations of the same elements. These were the ideology of the organisation, a central hierarchy composed of strategic apex, middle line managers and operational core, and parallel groups of support staff and of technical support staff.[283] Mintzberg in another publication distinguished seven types of organisation based on different emphases or 'pulls' within this basic concept. There is no need to list them, as they overlapped with the fuller list given above. The disadvantage of his classification was that it took on the whole a positivist stance which did not allow multiple perspectives on the same organisation. Strategy was seen as a particular type of product tied to a particular structure, rather than, more flexibly, as a process. The advantage, possibly, was that each strategic structure Mintzberg listed had some substantive content, and so could be adapted to function as an 'ideal type'. Mintzberg fell

into the spirit of the processual school (see below) in his attention to structural detail, but he was not a processualist in the same sense as Pettigrew because he put much less emphasis on the historical or narrative logic of organisational events.

Whittington[428] saw approaches to strategy as falling along two dimensions which if conceptualised as intersecting at 90 degrees, provided quadrants. The dimensions were Processes which could be deliberate or emergent, and Outcomes which could be profit maximising or plural (see fig 1.3).

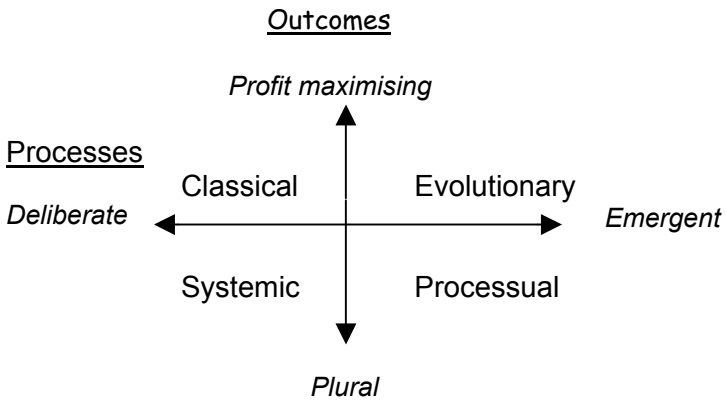

Fig 1.3 Whittington's Approaches to Strategy[428]

Focus on profit maximisation

The two views where this was a core feature were:

1. The Classical view, which aimed deliberately to maximise profit. It was assumed people would behave rationally according to self interest in planning.[428] The problem was that external events to the organisation were unpredictable, for example a stock market collapse could occur.
2. The Evolutionary view, which less deliberately held that all you could do was keep your options open and costs low, and strategy emerged to maximise profit

Focus on plural outcomes

This was a core feature in:

1. The Systemic view, where managers created strategy by deliberately playing by the local rules, because the social context determined the reality engaged with, various outcomes could be aimed for, profit maximisation was not the only one,
2. The Processual view where managers created strategy by keeping in close touch/involvement with everyday operations to allow effective strategies to emerge, various outcomes could be aimed for, profit maximisation was not the only one.

The Classical view

This used militaristic assumptions about implementation, for example that there was a chain of command and that orders relayed through it would be obeyed.[428] It was similar to the design lens in its assumption that there was a single rationality and therefore one best way to design a particular organisation. It was accompanied by the idea of the rational economic man who acted to maximise his economic advantage with perfect rationality.

> "The profit maximising assumption was merely the economic expression of Smith's sad belief that self interest was 'inherent in the very nature of our being'" [428]

The defensive characterisation of Smith's belief as "sad" encapsulated the idea that the classical view was limited and narrow. It did not allow for motivations other than economic, such as altruism – doing something for the greater good, or enthusiasm - doing something for its own sake, and these motivations may have had a part to play in NHS hospitals. In the NHS, saving cost replaced profit. This immediately invalidated the classical view for this setting. Although it was possible to conceive of a business as solely a money making or profit generating machine, a public hospital was not a cost saving machine; it could not switch to other activities. So, in the NHS context, a difficulty with the above

perspective was that there was no place in it for the effectiveness of the activities actually being undertaken, reducing mortality and morbidity for example. Although it was not the primary aim, there was still an important place for cost saving in the NHS.

Ferlie[120] identified a distinctive cluster of traits applying to public sector organisations which distinguished them from the private sector: weak and ambiguous goals, multiple stakeholders, high degrees of professionalisation and politicisation, very large organisational size, weak markets and few private property rights. Apart from the first, these seemed to apply to the NHS, which most would view as having a clear goal – the delivery of healthcare for the public in order to extend life and reduce morbidity.

The Evolutionary view

From this perspective, markets selected the best strategies – managers did not need to be rational optimisers – but this did not exclude a learning approach to strategy allowing a degree of anticipation and swift adaptation to market change. For example, in discussing strategies for differentiation it may be best:

> "to experiment with as many different small initiatives as possible to wait and see which flourish and which fail..."[428]

For big companies this could be about selecting markets rather than being selected by them. Again it was difficult to see how this could apply to a public organisation which provided defined services for a defined whole population, unless overseas markets were targeted. For NHS hospitals this view was not a good cultural fit either, since it offered no real rationale for innovating within a professional canon, and actively improving the service, a prime received value in this professionalised and research-based environment.

The Systemic view

Planning was possible, from this perspective, but did not necessarily have to be done under the monolithic assumptions of Classical rationality because firms were recognised to differ according to the social and economic systems in which they were embedded.

> "The main message of the Systemic perspective, then, is that strategy must be sociologically sensitive." [428]

This view of strategy was relevant to the complexity of the NHS in another way: it was the complexity created by the need to deliver services which satisfied not only many different client needs but also many different professional worldviews. Services had to continually learn their way to better solutions driven by developments in each of the professions involved. The fact that guidelines were multidisciplinary and were regularly revised fitted this strategic approach. A disadvantage was that this approach to doing strategy found it difficult to both involve, and manage power relationships between, vital groups in an organisation, some of whom could become disaffected if promises of empowerment and recognition for their worldview proved hollow in practice.

The Processual view

This was particularly informed by the notion of bounded rationality – that because of our limited human cognitive capacity we are reluctant to consider more than a handful of factors at a time:

> "Strategic behaviour therefore becomes entrenched in the "routines" and standard operating procedures imposed by political exigency and cognitive limits." [428]

For Whittington, some key features of the processual view were:

- The technique of 'adaptive rationality' or the gradual adjusting of routines meaning also that organisations aimed to satisfice rather than profit maximise.
- Logical incrementalism was seen as more rational than classical rationality because it accepted bounded rationality, and that strategy emerged after action,
- It was acknowledged that plans reassured rather than guided

This approach was the most in tune with the complexity of the conditions in the NHS, and evidence based clinical practice guidelines (guidelines for short) seemed the very model of such a boundedly rational approach to dealing with complexity.

Because processualism emphasised learning, it placed strategic importance on cultivating internal competencies – through knowledge management for example. Understanding this learning and bargaining process was influenced by systems concepts from psychology. Argyris used systems concepts, (feedback loops for example[6]) though he was a psychologist in the interpersonal tradition, and thus perhaps sat more happily in relation to the processual school of strategy. Although learning was particularly associated with the processual view of strategy, systems thinking was seen as a key element of organisational learning (OL) by Senge, who was influenced by Argyris's ideas. For him the systems approach united the other four OL disciplines,[373] and allowed a higher level form of strategic learning based on recognising similar systems archetypes in different business contexts, and thus understanding what was going on. So although the systems approach to organisational strategy-making was separate from the processual one, there were also common areas, meaning processualism could incorporate some systems approaches to enhance understandings of relationships. In conclusion, the processualist strategic approach to understanding organisational change was on balance the most appropriate to

add a qualitative dimension to this research, firstly because of its strengths in unravelling contextual differences through close attention to processes, secondly because the NHS functioned in a complex way driven by multiple key groups, rather than as a simple top-down command and control model, and thirdly because of its emphasis on a learning approach to developing strategy. This processualist approach was taken further to use OL theory, in both a qualitative and a quantitative analysis. It remained to choose some particularly relevant topics within strategic theory to apply analytically to the implementation of guidelines, and also to OL.

Processualism in relation to other strategic approaches

Pettigrew classified the concept of emergence as "an interpretive view in which strategy was seen as the product of individual or collective sense making."[323]

The four views on strategy making and implementation within Whittington's framework have already been discussed. They were the Classical, Evolutionary, Processual, and Systemic. Many of the other views can be mapped on to this framework. Since processualism was closest to a learning approach to organisational strategy creation, and also an intellectually sympathetic strategic counterpart to the implementation of clinical guidelines, it was appropriate to look more closely at some of the work of the seminal figure in this field, Andrew Pettigrew.

Pettigrew[324] provided a taxonomy of approaches to strategic choice and strategic change. These were the rational, boundedly rational, incremental and garbage can approaches.[324] They seemed to cover Whittington's classical (rational), processual (boundedly rational and incremental) and evolutionary (garbage can) perspectives, but not the systemic perspective.

Writing in the early 1980's, Pettigrew felt that change research did not take account of context, history or processes.[324] It was cross sectional rather than longitudinal. It was unnecessarily constrained by using the change intervention as the unit of analysis. Pettigrew took account of these. His work on ICI had at times almost the flavour of an epic novel. His aim was to describe and explain the:

> "varying impact of five Organisational Development (OD) groups" in different divisions of ICI, "in facilitating and inhibiting organisational changes in each of their arenas of action and the natural history of each group's emergence, development and fate." [324]

The work was mostly descriptive. Although well written and full of small insights, explanatory conclusions were few and perhaps even rather banal. He said for example that those allied with powerful senior figures (such as John Harvey-Jones) were more likely to survive and have an impact than those with less influential links. Again, if line managers perceived an OD department as a threat they were less amenable to working with it. While useful to state it, this did not go beyond what a modest amount of experience might reveal. The position of non-clinical staff in guideline implementation and audit departments in acute hospitals was not dissimilar to that described for OD departments in Pettigrew's ICI.

Pettigrew excelled in his thorough and systematic historical approach. It gave a solid and convincing base for these pieces of knowledge, better than simple assertion by an experienced person, or a survey of experienced people, because he gave examples of how OD groups worked over time in differing but linked contexts. He compared and argued the contextual reasons for success or failure. This was the evidence of narrative, compelling our belief by creating a world. Like a good novelist, Pettigrew revealed general truths about the human condition, specifically the condition of those engaged in OD in organisations. He

did not provide theories about change. If scientific method involved testing hypotheses, this work was not scientific, he purveyed artistic rather than scientific truth. He did not report the response rates to his interviews and gave few details of his methods of data collection, beyond stating he used "long semi-structured interviews (sic) of company documents."[324] This underlined his non-scientific stance.

Pettigrew appeared to have strongly influenced what was later, by Pawson and Tilley[310], called "Realistic Evaluation", (described below in the methods chapter 4) the conceptualisation of research design in terms of context, mechanism (Pettigrew called it process) and outcome. Pettigrew sometimes called outcome "content" or "strategic content", meaning the purpose, or outcome aimed at, whether achieved or not.

Whittington said that the processual perspective radically downgraded the importance of rational analysis. This view was seen elsewhere, but it was not strictly correct, bounded rationality was the best we could do, in this perspective. It led to the first of Whittington's four distinguishing features of processualism – that strategy might be a

> "decision-making heuristic, a device to simplify reality into something managers could actually cope with;".

Secondly the processual view saw strategy as reassurance rather than guidance, and thirdly considered it emerged after action rather than preceding it. These fitted with nurses' view that guidelines and audit were a reassurance that they were doing the right thing (process), and with his fourth feature, that strategy involved cultivating internal competencies, a nurses' use for guidelines.

Individual clinical guidelines were technology rather than strategy, in a processual spirit, they did not just set goals, they very specifically laid out how to achieve clinical goals. They were also subject to continual revision. They were therefore perhaps processualist in spirit, and supported such a view of strategy. As a change instrument they might, at local level, involve innovation in the sense of doing something new, although the innovation was not a result of generative learning, it was a process of adaptation to the requirements, not of institutions, but of evidence.

A move from a classical to a slightly more processual perspective was shown by the NHS in hospitals' attempts to devolve strategy making to Clinical Directorates.[135] These were intended to be strategic business units (SBUs), but were hampered because chief executives often held on to financial power by retaining control of contracting arrangements with purchasers of health care.[135] For Ferlie and Shortell, this prevented the functioning of "microsystems" at the level of autonomy required to generate quality improvements locally rather than imitating best practice from elsewhere.[122]

1.4 Key themes about organisational context from the strategy literature that apply to guideline implementation in hospitals

Three central strategic management topics

A number of strategic management topics had important relationships to both guideline implementation and to OL. Strategic planning had, for Johnson and Scholes at least, transformed itself into an OL process. No longer, they said, did we have corporate planning departments doing strategic planning as a formal intellectual exercise, in isolation from the day to day running of the organisation, and often obsessed with finding one "right strategy", in a classical approach. Strategy making had become a more inclusive process involving face to face debate in, for example, strategy workshops for senior managers, but

increasingly also for other management levels.[206] The importance of an open learning culture (such as Argyris' type 2 culture) for the effectiveness of such events was obvious. The following three central topics were chosen from the strategic management literature and the guideline implementation literature combined. Each is examined from a number of strategic perspectives which were more fully explained earlier in the chapter.

Strategic Leadership

The classical view of the visionary charismatic and heroic leader was certainly not the whole story as far as OL was concerned. Processualists would be sceptical about the real influence of this type of leader, since as Whittington said, "heroic leaders need pernickety followers."[428] The pernickety followers were needed to implement the detailed changes to systems and processes which were always required. From the systemic perspective the concept of the heroic leader was "culture bound".[428] It was therefore itself a product of our Western culture and had worked only within it.

Leadership worked through business elites, for systemicists, said Whittington. This involved the collective advancement of self-interested social groups – managers in general or particular professions. To understand leadership we needed to understand these elites and how they operated to advance the interests of their own group in different societies. An organisational strategic leader would need first to be recognised as a leader within his or her own group, before being able to lead an organisation. This certainly applied to the SIGN guideline process, SIGN stood for Scottish Intercollegiate Guideline Network, the colleges were the Professional Royal Colleges, and the guideline groups were led by respected members of the colleges. These leaders had operational roles in some, but not all, hospitals. Representatives from each relevant profession were normally included in the national SIGN development group for each guideline, to ensure the guideline reflected the perspective of each.

Perhaps because there were often a number of professional or business elites in an organisation, organisational politics arose, where each elite vied for greater influence over the organisational strategic direction and a greater part in it.[206] The strategy development process was one of bargaining between these groups. The national development of SIGN Guidelines circumvented some of this at local level, but practical issues of implementation in each separate context remained. The processual (Whittington) or experience (Johnson and Scholes) views explained how different perspectives arose from different experiences and roles, and the ideas perspective explained how this conflict might to an extent have constituted a debating process good for innovation. Such a process might be more akin to Quinn's "logical incrementalism"[330], where small steps to a long term goal were taken by learning through experience. Whittington talked about "constant adaptive innovation" and seemed to mean much the same:

> "As products become more complex and knowledge intensive, the Processualists argue that it will be constant adaptive innovation rather than remote and inflexible plans that will win the day".[428]

The systemic perspective would encourage the use of whatever techniques were accepted in that organisation "for the sake of credibility".[428]

Innovation

Classical and Evolutionist perspectives placed emphasis on a close connection to the market for innovation. However, there was technology "push" as well as market "pull", and innovation could suppress competition and dominate the customer.[428] In the NHS, technology push was more important than market pull, so important that it needed a special process – Health Technology Assessment - to deal with and control its implementation. Innovation at hospital level was, from the institutionalist perspective, more likely to be incremental changes to

methods of service delivery than revolutionary new treatments. This was more accessible to the processual approach.

Johnson and Scholes said, in the context of the classical management approach, (design lens) that strong cultures were weak learners:

> "[an organisation that] tries to insulate itself from its environment for example by trying to resist market changes or by relying on a particular way of doing or seeing things – sometimes known as a 'strong culture' - will generate less variety of ideas and less innovation."[206]

Whittington argued that for the classic tradition, a strong "market orientation" was essential for successful innovation. In this view, effective innovation came from seeking out customer needs and matching them with appropriate product or service offerings.[428] For hospitals, this had the advantage of being an active strategy capable of implementation. The disadvantage was that patients were not customers, and particularly not consumers, in the usual sense[217;283] and it was not always possible to establish their preferences even if they were well informed enough to choose.

Evolutionists saw the market as selecting good innovations. It could be, however that markets selected good learners – firms with a processualist or perhaps a systemicist view. For Processualists though, innovation was uncertain and uncontrollable said Whittington, while systemicists knew that Anglo-Saxon assumptions of the rational and sequential processes that Classicists might have hoped would lead to innovation were not widely shared.[428] Some medical innovation arose from practice without being planned.

Johnson and Scholes set out the conditions they saw as encouraging innovation.[206] One was that there must be enough order to allow things to happen, without being too rigid a control to prevent innovation, an idea from

complexity theory. Too much control might also reduce variety, and so prevent learning. New ideas had to be allowed to compete. Selection mechanisms operated on a new innovation idea at the levels of the market, the organisation, - how it got evaluated by planning reviews, whether it fitted with the prevailing culture, - and the idea itself – how attractive it was to people.[206]

Whittington relegated OL to the status of a metaphor:

> "It too easily trivialises organisational change to the level of "opening up peoples' minds, and reduces organisational resistance to mere wrong-headedness (e.g. Argyris 1991). More sophisticated processual analyses recognise the entrenched political interests that also sustain existing organisational recipes and routines"[428]

This view did not take account of the fact that because OL could be about revising aims, it was a political process. It did not recognise the systems thinking element of OL. For Johnson and Scholes the distinguishing feature of the Learning Organisation was that it was an organisation capable of continual regeneration through a culture supporting continual mutual questioning around a shared purpose by individuals who had a variety of experience, knowledge and skills.[206]

The chosen strategic themes for contextual analysis

The themes listed below referred to particular elements of hospital structure including culture. They formed the framework for a contextual analysis to complement the comparison of guideline implementation between hospitals. The way they were understood and applied was mediated by the interpretations of organisational actors.[149] The three strategic themes were:

- Leadership – this theme focused on opinion leaders and figureheads and the invented/not invented here factor: compared between hospitals. Did

having the leader of the guidelines group in the hospital influence the methods of implementation for that guideline?

- The drive for uniformity. This theme was used in the discussion and interpretation of results rather than in primary contextual analysis. It focused on the likelihood of a protective reaction from professionals perhaps because there was safety for professionals in being part of a crowd doing the same thing, rather than because it was best practice, or because it improved equity of treatment for patients - mimetic behaviour as predicted by institutional theory. The similarity of environmental pressures, together with mimetic behaviour, explained why hospitals tended to be very similar to each other, but were guidelines likely to increase (or decrease) this uniformity, perhaps to the detriment of innovation and patient choice?
- The third theme was the perceived role of clinical audit and of clinical audit and guidelines implementation departments. These were not mentioned as such in the strategic management literature. They formed part of the organisational support function to the core business of delivering treatment and care. There were some parallels with Pettigrew's OD departments, which he studied in ICI, since clinical audit and guidelines implementation had implications for organisational change. As Whittington pointed out,[429] since Pettigrew's 1985 study there have been many case studies of strategic change but clinical audit and guidelines implementation departments generally implemented clinical audit and guidelines strategies rather than created strategic change. This implementation literature is a somewhat separate sub-specialisation of the strategy literature and is reviewed further in chapter 3 which specifically covers evidence based clinical practice guidelines and their implementation.

1.5 Conclusion to chapter - From Strategy to strategic change

I chose this topic as the most recent initiative in a series of at best partially successful attempts to improve practice in the NHS as a whole and hospitals in particular. Through expert help and reading around the literature on strategy, I came to see it as not just an attempt to improve services, but as an example of new NHS strategies in general, which to be implemented needed hospitals to plan strategically for the implementation of change. Hospitals needed to develop a capacity to do this, and this requirement led me further than the strategy literature, and into the theory of OL, and the measurement of OL capacity. Also pointing in the direction of a learning approach was my developing realisation that managing organisations was intimately connected to understanding organisational phenomena in suitable ways. The strategy literature remained relevant to the new OL perspective, especially when it was seen as a form of processualism, with its idea that strategy emerged from learning at the grassroots. Not only was this attractive because of its values of inclusivity, empowerment and democracy, it also justified my instinctive feeling that to assess what was really happening in the organisation, and find out why strategic initiatives so often failed at the last hurdle of implementation, it was more useful to interview clinical staff than the highest levels of senior management.

Chapter 2 - Organisational learning

Summary

This section of the literature review aims to summarise the main theoretical approaches to OL, indicate their relevance to the problem of how to implement evidence-based clinical practice guidelines in the NHS, and to indicate the state of current OL research on health services. Three central ways of conceptualising OL were identified. While one of these (the information perspective) was most appropriate for OL in connection with the implementation of clinical guidelines, the other two (the communication and the innovation perspectives) were also used in developing the coding structure for the interview data.

2.1 Background

Changing NHS culture is now considered by many to be a key to improving the quality of patient care, but little attempt had been made to specify the type of culture change needed or what its role might be. OL was one potential framework for the new values needed in the health service. At the beginning of the 21st century, learning was culturally a more acceptable aim in organisations and to independently–minded health professionals than was control. There was only a scattering of theoretical research articles about OL in the NHS,[49] and hardly any empirical or evaluative research.[191] There had been no attempts to implement an OL programme as such in NHS hospitals.

2.1.1 Theories about OL

Organisational Learning (OL) had been developed in the business world. It had intellectual roots from the convergence of a number of disciplines – psychology, sociology, cybernetics, economics, and ecology. Garratt summarised them well in a short paper.[143] Romme et al[346] distinguished four main approaches to OL. These were in brief:

1. OL was organisational adaptation to change,
2. OL was organisations creating their own frames of reference, [6]
3. OL was an information process, [294]
4. OL was about using systems theory to learn. [373]

A somewhat simpler classification was used for this study. Three main views about the purpose of organisational learning were identified. These were used to organise this part of the review. The following three sections consider them under the headings "managerial education", "organisational science" and "managerialist".

1. The "managerial education" approach included Argyris and Schon[6] and Garrat[142] among others. Learning as the creation of meaning by making assumptions explicit came under this head.[203] An emphasis on the importance of communication was the distinguishing feature of this perspective.

2. "Organisational science" saw organisational learning as data processing that resulted in the development of an organisational knowledge base. This was the creation, dissemination and use of knowledge.[60;290] The underlying assumption was that there was a two-way relationship between individual and organisational learning. This was intended as descriptive rather than normative. An information systems perspective was the underlying model here.

3. The "Managerialist" approach considered organisational learning as an institutionalised innovation process and as a means for achieving organisational flexibility in complex and turbulent market environments. This was a normative approach, likely to produce quick radical change, exemplified for example by Mills[280] and Senge. The importance of rapid innovation in response to rapid environmental change was emphasised in this perspective.

The latter two theories were especially influenced by management thinking, while the first was influenced primarily by social psychology.

Managerial education

Argyris' work concerned interpersonal relations and team learning in organisations from the perspective of his psychological theory of personality development. He saw formal bureaucracies as inhibiting the natural development of personality toward greater autonomy.[46] Argyris and Schon contrasted "espoused theories" of action which individuals publicly accepted as the reasons justifying their actions, with the "theory-in-use" which were the reasons deducible as actually justifying their action. They developed two contrasting theories about beliefs actually guiding action, which they called model 1 "theory-in-use" and model 2 "theory-in-use" (see table 2.1).

Model 1 "theory-in-use"	Model 2 "theory-in-use"
Four governing variables: • Strive to be in unilateral control • Minimise losing and maximise winning • Minimise the expression of negative feeling • Be rational Behavioural strategies Advocate your views without encouraging enquiry Unilaterally save face	Three governing variables: • Valid information • Free and informed choice • Internal commitment Behavioural strategies Share control with those who have competence and who are relevant to designing or implementing the action Combine advocacy and enquiry Illustrate attributions with directly observable data Surface (make public and explicit) conflicting views for public testing

Table 2.1 Models of "theory-in-use"[6]

For Argyris, model I created "conditions of undiscussability, self-fulfilling prophecies, self-sealing processes and escalating error."[6] It would appear that these statements (table 2.1) referred to individuals and to the short term. Most individuals in any organisation had unsatisfied needs below the top level of Maslow's hierarchy.[264] Satisfying lower level needs by winning individual material rewards was therefore the dominant model. To remind the reader, Maslow's hierarchy of needs was:

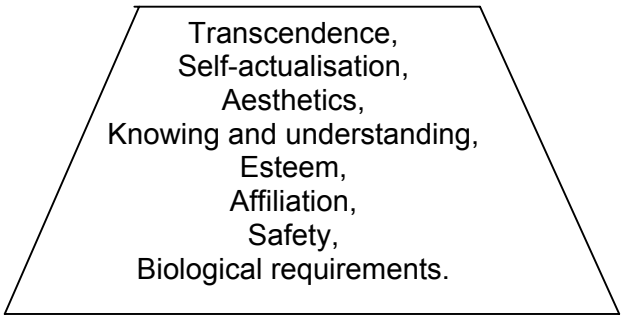

Fig 2.1 Maslow's hierarchy of needs

Model II was often espoused but rarely practised as a "theory-in-use". Model II, said Argyris, would surface issues and test and correct assumptions which had been made undiscussable by the self sealing processes supported by model I "theory-in-use". Only those at the top of an organisation had sufficient power and personal security to try model II. Winning in the long term for the organisation became their aim in model II. For everyone to try to maximise their individual wins meant a lose-lose situation overall. The example often given to illustrate this situation is that of the over use of common grazing, where increasing the size of their own flock is in the short term to the advantage of each individual owner but causes the eventual destruction of the common pasture. The tragedy of the commons was one of Senge's systems archetypes.[373]

Argyris distinguished two kinds of learning, single and double loop. He explained single loop learning using the analogy of the thermostat:

> "The thermostat is programmed to detect states of "too cold or "too hot", and to correct the situation by turning the heat on or off. If the thermostat asked itself why it was set at 68 degrees or why it was programmed as it was, then it would be a double loop learner."[6]

So, double loop learning occurred when goals were questioned and changed in some reasoned way. Data was needed for such informed reasoning. A third type was deutero-learning, or learning how to learn.[21] This sought to improve both type 1 and type 2 learning.

Improved communication was the aim, but good communication could block learning. Focus groups have encouraged participants to give defensive reasoning and management blaming. Participants expected management to take action, rather than encouraging double loop learning about the reasons and motivations behind objective facts and examining their own behaviour.[7] The blame culture had obvious parallels with Argyris's non-learning model 1 culture, skilled incompetence, defensiveness, fear of incompetence, a cycle of blame, and control by collusion between managers and employees. Fitzgerald[131] describes a situation very like the cultural failures mentioned in the report on the Bristol paediatric cardiology deaths:[220]

> "Employees collude with management to avoid blame and to not be accountable. Management colludes with employees to maintain control and create dependencies. The cycle was difficult to break because, as with all behaviours, it serves a purpose and was not the result of accidental patterning."[131]

> "One sign of a healthy organisational culture was congruence between the organisation's espoused values and the daily behaviour of its members. Conversely, one sign of an organisational culture in trouble was

> lack of congruence between the organisations espoused values and the daily behaviour of its members."[182]

Argyris's educational approach was confirmed by research on barriers to OL. For example Marsick and Watkins included in barriers to OL an inability to change mental models, learned helplessness, tunnel vision, a return to individualism, cultures of disrespect and fear, and entrenched bureaucracy.[263] The single and double loop distinction made by Argyris was also termed adaptive / generative by McGill et al.[272] Generative learning was also termed transformational learning and characterised by continuous experimentation and feedback in an ongoing examination of the way organisations go about defining and solving problems. Fidler, too, saw the learning community as inquiring about each others assumptions and biases, experimenting, risking, and openly assessing the results.[125]

Argyris defined learning as the detection and correction of error, but he included questioning the underlying values that defined the error.[6] When this took place double loop learning could happen. The discovery of penicillin was a medical example of an error being turned into learning. For Argyris the central problem preventing the development of innovative new goals was that people in organisations developed very skilled ways of protecting themselves and others from obvious conflict, while at the same time seeking to win. To do this, people would withhold their real opinions of the other's statements even where discussion was ostensibly two-way. Dyer extended this work.[108] Although people could recognise this behaviour in others they found it difficult to modify their own behaviour. They acted according to different rules from those that they espoused. In Argyris' terms, their "theory-in-use" did not match their espoused theory. A Stracathro breast surgeon who refused to follow guidelines he had agreed with his colleagues demonstrated this kind of behaviour, but was not very skilful at camouflaging defensiveness.[4;347]

Argyris [6] hypothesised a connection between five characteristics of information and whether the information would facilitate error or inhibit it, see box 2.1. Argyris said the combination of left column information (box 2.1) and model 1 "theory-in-use" created a primary inhibiting loop for learning. This reinforced both the original model 1 "theory-in-use" and left column information characteristics. It was clear that model 2 "theory-in-use" would produce information with the characteristics of supporting learning shown in the right column. It was also clear that explicit guidelines would, in theory, support learning, by allowing consistent, clear and comparable clinical audit.

Characteristics of information that:

Enhance probability of error	**Enhance probability of learning**
Vague	Concrete
Unclear	Clear
Inconsistent	Consistent
Incongruent	Congruent
Scattered	Available

Box 2.1 Cognitive features of information that enhance or inhibit the production of error[6]

Model 1 "theory-in-use" did not allow double loop learning to take place, and would hamper even single loop learning. In parallel with the two types of "theory-in-use" and the two types of learning, Argyris developed two organisational models, rules for organisations which supported each type of "theory-in-use" and each type of learning (see box 2.2).

Organisational learning type I (OI)	**Organisational learning type II (OII)**
An organisation with a learning system based on Model I "theory-in-use" and able to do Type I (single loop) learning, but not type II (double loop) learning	An organisation with a learning system based on Model II "theory-in-use" and able to do Type II (double loop) learning

Box 2.2 types of OL system[6]

In a model 2 organisation, espoused theory and "theory-in-use" would match, communication would be straightforward, and Organisational Learning would be quicker and more effective. From both the classical and operant conditioning behaviourist theoretical positions [45] there could be no distinction between Argyris' espoused theory and "theory-in-use", because there was no role for theory. In other words, the idea of reflection was not part of behaviourist learning theory. There could be no idea of mental models in behaviourist theory. OL was based in cognitive, humanist and constructivist theory rather than the behaviourist tradition. The individual mind was essential to Argyris' idea of social learning:

> "Individuals are walking social structures who cannot undergo double-loop learning without reflecting on their actions" [6]

Argyris said that individuals' espoused theories of action were their beliefs, attitudes and values. They were unaware of the theories they actually employed, but their actions were witness that these did not match their espoused theories. What, for example, led individuals to bad-mouth others even when they said they did not intend to do so?[8]

These "theories-in-use" existed at a tacit level below the explicit, received culture, and they were the same across hemispheres, and age, education, income, gender and racial groups. The "theories-in-use" which were so widely found all conformed to the same governing variables, called model 1 by Argyris. They are set out above. In organisations, model 1 "theories-in-use" became defensive routines preventing embarrassment or threat. A self-reinforcing process built these up. Individual strategies of bypass and cover up resulted in organisational bypass and cover up which reinforced individuals' model 1 theories in use. Misunderstanding and prevention of double loop learning resulted. To change this situation, both individual and organisational defensive routines needed to change. But individuals esteemed themselves in terms of

their model 1 theories in use. Double loop learning would often be seen as 'giving in' or making embarrassing revelations, and lead to lower self-esteem in terms of model 1.

To sum up, the managerial education approach to OL aimed to make interpersonal communication more useful for the organisation. Its main focus was cultural change to encourage this.

Organisational science

Checkland reviewed recent definitions of data and information in the information systems literature:

> "they represent at least a partial consensus that data was transformed into information when meaning was attributed to it.". [60]

The idea of learning as the generation of information, whether of local or more general application, was, like the managerial education approach, humanist, because information was itself a humanist concept, since meaning was attributed to data by humans. Clinical guidelines were an example of this. Recognised clinical guidelines were socially created and validated information. They could not be produced by one individual, so they were an example of organisational learning. Information creation was often involved in recommendations about the implementation of OL systems and culture. The separate theoretical traditions intertwined in the attempts to solve the practical problem of how to create a learning organisation.

For example, Kilmann[221] saw the key question for creating LOs, as defining the processes by which knowledge was created and acquired in OL. Nonaka, as part of his idea of the knowledge creating company saw the OL process as the transformation of tacit knowledge into explicit or explicit to tacit.[294] Although

guidelines apparently converted tacit knowledge to explicit,[294] at the same time they codified skills requiring thought to carry out, into routines carried out automatically and unthinkingly.[388] Nonaka also saw knowledge creation as a process of creating metaphor to create analogies and models. Like Burgoyne, he supported the idea of spare capacity – functional overlap (redundancy) spread explicit knowledge through the organisation. It created internal competition which accelerated implementation.[294] In the NHS acute sector there was little spare capacity, as bed shortages proved.

Garvin said the learning organisation was one skilled in:

1. systematic problem solving,
2. experimentation with new approaches,
3. learning from past experiences,
4. learning from the best practices of others, and
5. transferring knowledge quickly and efficiently throughout the organisation.[145]

The idea of rewarding learning as well as action was important. Jones outlined 11 guidelines to bring thinking back into the organisation. These included rewarding the thinking and not just the doing.[213]

All 5 common dimensions of OL found by Goh and Richards' review[151] were relevant to knowledge creation. Teamwork and group problem solving and experimentation generated data, transfer of knowledge helped to implement it and perhaps put it in more permanent codified form, clarity of purpose ensured it was the right knowledge, leadership ensured the knowledge was valid and was used. Similarly, the creation of protocols from guidelines created knowledge. Guideline-based audit generated better data than non-guideline based audit. Better data allowed the creation of more consistent information relevant to recommended clinical practice.

Another approach to implementation listed 12 building blocks for a learning organisation.[27] These were grounded in an examination of the practices of 25 successful companies who were committed to becoming learning organisations and had demonstrated as much by adopting practices to foster it. The elements demonstrated the interconnectedness of information, vision, trust and communication. They were:

1. having a strategy – a vision of where the company was going,
2. executives who supported the vision of organisational learning,
3. managers who supported their staff in their attempts to grow and develop,
4. nurturing an open and trusting climate,
5. open structures such as fluid job descriptions and flexible work teams,
6. good information flow, facilitated by IT,
7. sharing of learning and expertise,
8. use of work practices that supported learning, such as benchmarking, and problem solving techniques,
9. feedback on whether or not performance goals were being achieved,
10. formal training and education programmes,
11. developing teams simultaneously with individuals – communities of practice continuously reinvented their work,
12. rewards and recognition for learning.

In summary we can say that information systems were at the core of OL, and especially emphasised by these writers. The information was used to support most of the other activities, which without it have been difficult or impossible. Implementing guidelines was innovative in itself. It involved organisational learning because one individual or often not even one multidisciplinary team could implement the whole guideline alone.

Managerialist

Background

The learning organisation was defined influentially by Senge as one:

> "Where people continually expand their capacity to create results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration was set free, and where people are continually learning how to learn together."[373]

Argyris' work on uncovering defensive routines with OD consultants,[6] and on single and double loop learning was used by Senge to develop a theoretical framework centring around learning as the prime motivating force in individuals. He aimed to harness this for organisations. OL capacity was the propensity of an organisation to support learning useful to it. Senge combined the other approaches to OL. He did this using systems thinking. His approach emphasised innovation. Five disciplines were linked. Systems thinking or understanding the whole picture was central to managing complex organisations. The other four disciplines were:

1. mental models – the skill of surfacing personal assumptions, and understanding that people naturally have varying understandings of similar phenomena, and see different purposes,
2. personal mastery – an ability to continually develop a personal vision,
3. shared vision – an ability to surface the visions and mental models of others and develop shared pictures of the future that engender real commitment, not just compliance, and
4. team learning – an ability to suspend personal assumptions and think together as a team.[373]

Individuals in organisations needed to set personal goals to develop their own vision of their place in the whole and their route through it, this was "personal mastery". The next step was to awareness that others would see the whole

differently. Recognition of these differing mental models allowed much more complex and structured feedback, or as Senge called it, team learning. Team learning enabled the building of a shared vision or a common high level mental model. In practice these stages might happen at the same time.

Dialogue was one of the central skills for innovative learning. It has been seen as a technology at the root of all effective group actions.[355] Its key feature was to enable the challenging of others' views without causing withdrawal from valid debate. It was needed to build common mental models that transcended cultural differences and allowed common interpretations. One way of innovating was to create special groups to do so within organisations. These could include teams, committees, task forces, independent business units:

> "These high risk-high return organisational experiments may fail nine times out of 10, yet they are relatively low cost ventures and, when they fail, provide new information about technologies and markets."[409]

Taking this a step further,

> "Organisations that want to innovate or revitalise themselves need two organisations, an operating organisation and an innovating organisation." [141]

The purpose of an innovating organisation was to allow ideas generated from practice 'where the rubber meets the road' to be perfected before they were tested prematurely in an operating environment. It was separate from the operating organisation. Senge thought "theories-in-use" could be tested using computer-based learning environments (microworlds).[372] This allowed anticipatory learning. Mental models were "surfaced" that is to say they were made explicit and public, to facilitate the adoption of change by exposing unrecognised assumptions about the way things should be.[371] In focus group research Calvert et al reported Senge's approach was popular.[48] They reported a learning organisation as one where:

1. People continually expand their capacity to create results they truly desire,
2. New and expansive patterns of thinking are nurtured,
3. Collective aspiration is set free,
4. People are continually learning how to learn together.

As this list shows, harnessing individual motivation was important for Senge's followers. The link between individual and organisational learning was the central theme for this approach to OL.[280;346]. Kim, too, brought individual learning and OL together through the idea of sharing mental models.[222]

Learning systems

Learning systems were especially emphasised in the managerialist approach to OL. Their application to the NHS which had grown up organically and piecemeal was to provide a framework for designed healthcare, in the spirit of the Scottish White Paper of 1998 (Designed to Care).[401] A learning system needed to be supported by a suitable culture. An atomistic individualist culture was unsuitable because a learning system at the organisational level was a social process allowing a dialogue between theory and practice. In a hospital, clinical audit was one means for this. The clinical audit cycle was similar to a single loop learning system. If standards were set within the cycle, it could be a double loop learning system, addressing more complex problems. If any stage was missing the learning cycle was broken. There was a danger that clinical guidelines would break the double loop learning cycle by taking over the standard setting stage at a level out of the control of local health professionals.

Like Senge, Checkland used systems thinking as a problem-solving framework, unlike Senge he attempted to define a methodology - soft systems methodology (SSM) for understanding ill-defined human enterprises, just as 'hard systems'

thinking had done in engineering. In SSM, clarity that human systems were concepts and did not exist in the real world helped to free the action learning process from entrenched positions and defensiveness.[61] Motivation was not explicitly considered in SSM. Checkland developed and tested SSM rigorously by applying it to real organisational problems.[59;61] For SSM, human systems contained different hierarchical levels, having different emergent properties. Every level needed an input, which was transformed to an output. Communication links and control and monitoring systems were also essential.

This was the 'formal system model.[59] It could be mapped on to Kolb's better known learning cycle[230] which implied that monitoring and control (management) were integral to the learning cycle. Single and double loop learning could also be understood in terms of the formal systems model. If evidence based guidelines were indeed to function as a single or double loop learning system all the elements of these models would need to be present. Cavaleri examined three forms of soft systems thinking in terms of their ability to support organisational learning.[54] Positive results implied that clinical audit of guidelines could develop more in the soft systems direction to better support organisational learning from guideline implementation. The idea of an OL cycle was put forward by Dixon (fig 2.2).[97] This had four stages analogous to the stages of the individual learning cycle.[230]

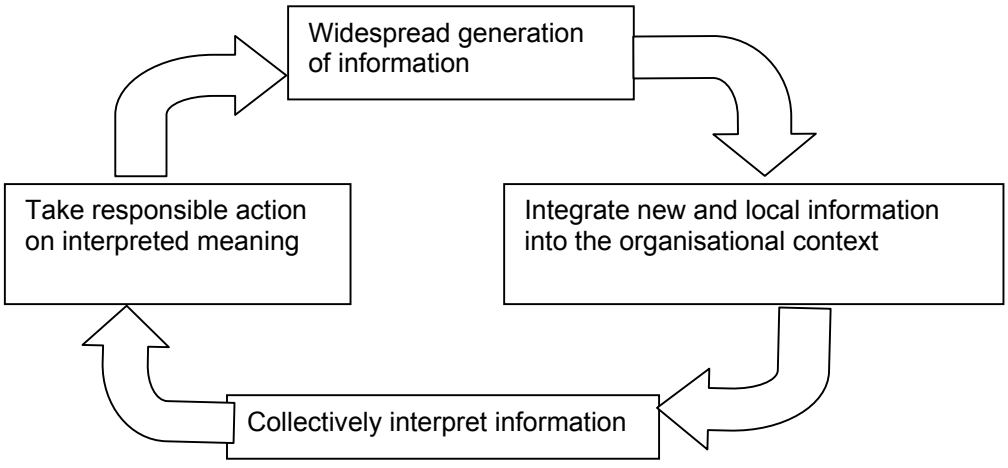

Fig 2.2 the organisational learning cycle (summarised from Dixon)

The concept of the OL cycle has not been further developed or applied. For the implementation of guidelines through OL and clinical audit it had some implications. The chief was that if any one of the four stages of OL was missing the organisation would not implement guidelines as effectively as otherwise, for both type 1 and type 2 learning. It would have a low chance of developing model II culture. Through her idea of the OL cycle, Dixon seemed to be arguing for a reintegration of knowledge of organisational functions in each member.[97] She even says this is to their benefit. Most were more effective learners if they relied on sharing learning strengths with others. To do even this, learners needed to understand the role of each learning style.

Another systemic approach to OL was the learning company. It was developed by Pedler, Burgoyne and Boydell in the late 1980s.[315] It was more complex than other models of OL. It had 11 characteristics, all related to a very neatly structured model of an organisation:

1. A learning approach to strategy – pilots, feedback loops, emergent strategy,
2. Participative policy making with key stakeholders,
3. Infomating – making information available to front line staff to empower them to act on their own initiative,
4. Formative accounting and control – structuring budgeting and accounting systems to assist learning about how money works in the business,
5. Internal exchange – all internal units and departments see themselves as customers and suppliers in a supply chain to the end user,
6. Reward flexibility – alternatives are available for both monetary and non monetary rewards to cater for individual needs and performance,
7. Enabling structures – all structures and processes can be changed as needed,

8. Boundary workers as environmental scanners – "Processes are in place for bringing back and welcoming the information into the company.",
9. Inter-company learning – learning from joint ventures,
10. A learning climate – managers primary task was to facilitate experiment and learning from experience,
11. Self-development opportunities for all – resources and encouragement to take responsibility for own learning and development.

These characteristics mapped onto specific information or energy flows between the parts of a four-part model. The model combined the information creation and systems thinking approaches to OL, but was less detailed than Argyris and Schon on communication and management education. It was based on the metaphor of energy flow, a difficult concept to relate to the practicalities of guideline implementation in the NHS. See fig 2.3:

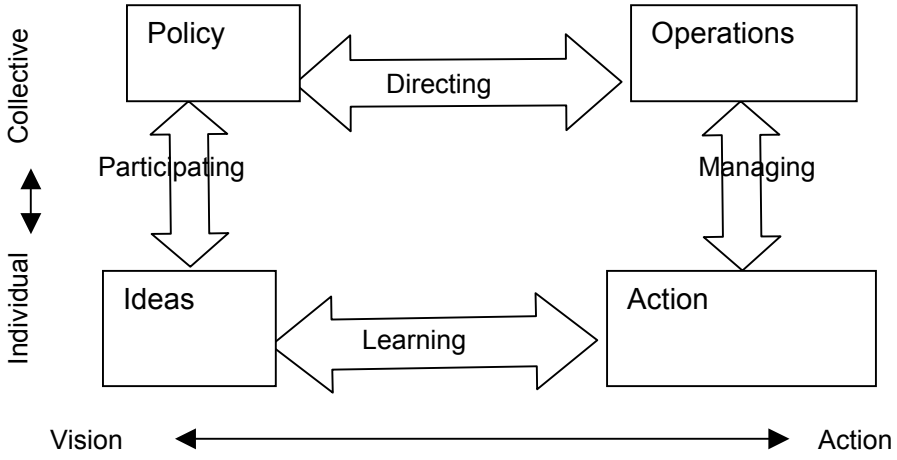

Fig 2.3 The E-flow model of the Learning Company (adapted from Pedler et al)

In a nutshell, the managerialist view of OL emphasised viewing the organisation as a system operating within a systemic environmental structure. If the rules governing the behaviour of both could be understood, the organisation could transform itself in a self-directed manner so as to survive and succeed in a rapidly changing environment.

2.2 History of OL in the NHS

2.2.1 Why OL was needed in the NHS

In the NHS, clinical audit needed support to enable more systematic and powerful OL. This involved inter-group learning between multidisciplinary clinical groups. To learn at this level, the groups needed to take account of organisational and management issues, as well as care delivery.[162] Few, if any studies supported a relationship between individual learning and organisational performance.[202] Clinical audit was not designed to address problems as complex as these. NHS professionals learned as individuals, but were not taught to transfer this to the organisation. The NHS needed to teach its employees how to transfer individual learning to the group.[222;280] Their belief systems (for example distrust of managers)[251] seemed to prevent this transfer. Managerial changes perceived as broken promises may have been to blame.[251]

Two cultures

Two different learning cultures existed between managers and clinicians, likely to block the transfer of learning between the clinical and the managerial sides of the organisation. A managers' workshop to develop a learning organisation in the NHS agreed the main activity needed was to develop a higher degree of integration between personal and organisational development. This was to help managers "become less rule bound and more capable of surviving in the increasingly turbulent NHS environment."[10] The somewhat later clinical drive to deal with turbulence in the development of professional best practice contrasted in its attempt to produce more, rather than fewer, rules (guidelines) to cope with the increasing turbulence caused by a greater volume of research.

NHS consultants all had a training role but were not trained to manage the learning of their junior medical staff. Training received by junior doctors varied as a result.[15] For OL, managers needed to learn to manage the learning process (deutero-learning) rather than the learning content, using others as their researchers and authorities and asking questions to which there were as yet no answers to stretch others' learning.[20] Everyday practice in using others to learn was presented by Stuart.[390]

Guidelines could be an aid to process benchmarking, for example to compare implementation processes and compliance levels. Benchmarking was one form of NHS OL activity. Attention to benchmarking quality of care issues, whether process or outcome, came after the benchmarking of costs.[3] Outcomes comparison was subject to wide error ranges.[75] To detect a difference of 30% in mortality rates between two hospitals would take at least one years' data. To detect a 15% difference would take more than 3 years' data.[75;259] Clinicians often had more sophisticated scientific research knowledge than managers and ignored benchmarking on these statistical grounds. When they knew more about the ways managers learned, clinicians were more satisfied with them. An occupational health study of physicians' views of their organisation found that those aware of the mission statement for their hospital were more satisfied with and informed about departmental goals.[9]

One cause of organisationally dysfunctional learning could be too close a link between an individual's pay or promotion and her manager's opinion of her because then the incentive was greater to say what the manager wanted to hear.[383] This particular problem may have applied to junior doctors, a possible important source of new and challenging criticism for hospitals.

Culture and evaluation

The importance of measuring culture as well as process was shown by a study which found "an association of detected nursing drug error rates with differences in unit properties."[113] The unit properties were organisational context, team leader behaviour, task design, resource adequacy and team composition. Unexpectedly (for the authors) "the primary influence on detected error rates was unit members' willingness to discuss mistakes openly."

Higher detected and intercepted error rates found by survey were associated with coaching, and direction setting by nurse managers, good unit relationships, willingness to report errors, a perception that mistakes were not held against you, and good perceived unit outcomes. Qualitative data supported the hypothesis that there were not simply more errors in these units, but more were reported. Authoritarian leadership styles suppressed error reporting, but did not eliminate error.[113]

Guidelines and OL

Guidelines were suggested as a way of improving clinical practice by increasing communication[437] and improving teamworking.[275] These were directly relevant to OL. Multidisciplinary involvement and involvement of the wider society in guideline development and use has been recommended in Italy.[156]

Guidelines stimulated the formation of heterogeneous implementation groups from a variety of professions. Hurst et al found that these had an enhanced performance in handling novel problems, while routine problems were most efficiently dealt with by a homogeneous group.[187] This implied that short term groups looking at easy to solve routine problems ought to have homogeneous membership while long-standing groups have heterogeneous membership.[187] For guideline implementation in the health service, this suggested that unidisciplinary audits should look at routine problems as short term projects.

In short, the literature suggested that concepts from OL were relevant to communication between managers and professionals, to the validity of comparisons of service quality, and to factors affecting the implementation of guidelines in the NHS.

OL and Guidelines

Many lists of OL factors or implementation requirements and steps seemed almost arbitrary. But most bore some relation to learning cycle or learning style theory. Many mentioned information[430] and measurement and so had some relevance to guidelines and clinical audit. Others, for example Rheem, had a bias more toward innovation.[335] Some business research on OL did not apply easily to the risk averse environment in the NHS. For example, Kline's ten steps to becoming a learning organisation included rewarding risk taking[228] but this needed more careful management when clinical negligence was so costly, and when health was at stake.

So, just as there was no one learning style for individuals, there was no one model for a learning organisation. Learning orientations varied. For research, the issue was to match the OL approach to the OL issue. For OL in relation to guideline implementation the information-based organisational science approach was the most appropriate. Particularly relevant was the belief of Nevis, Dibella and Gould that it was possible to identify learning styles that represented a distinct pattern of orientations to knowledge creation and use.[290] They used the acquisition, dissemination and use of knowledge as a three part structure to organise a framework of seven learning orientations and ten facilitating factors.

2.2.2 Learning styles and OL

The existence of different learning styles was potentially relevant to difficulties in NHS quality improvement activities, including the implementation of clinical guidelines. Incorporating the idea of feedback, Kolb developed the concept of a learning cycle with four stages.[230] The stages were direct experience, reflection on experience, theory creation and theory-informed action, which then gave rise to new experience. Meaning was thus created and recreated as experience and values were continually constructed and reconstructed. Earlier thinkers had seen this [94;412]. Kolb said that different abilities were needed to carry out each stage of the learning cycle:

> "Learners, if they are to be effective, need four different kinds of abilities - concrete experience (CE), reflective observation (RO), abstract conceptualisation (AC), and active experimentation (AE)." [231]

He found four main pairings of these abilities in 800 practising managers. He called them the converger, the diverger, the assimilator, and the accommodator.[231] These learning styles interacted with heredity, education, and career. In an organisation seen as a learning system, different functional units had different learning style norms. These needed to be integrated to maintain learning effectiveness, because "the most effective learning systems are those that can tolerate differences in perspective." For the implementation of guidelines involving more than one professional group the possible different learning styles of the groups needed to be taken into account.

Learning from experience (action learning) was classified into four other types by Mumford,[287;288] who developed Kolb's work. These were intuitive (unconscious), incidental (by chance), retrospective and prospective. The latter three labels mapped on to well recognised types of clinical audit – critical incident technique, retrospective using case notes, and prospective using special

data gathering instruments. Mumford showed how organisational performance was improved by working on real projects in workshops and integrating the results with learning from experience. He also criticised the emphasis on double loop learning by Pedler and Senge as being at the expense of incremental or single loop learning.

To harness individual learning for the organisation, individuals' learning styles needed to be taken into account. These in turn related to personality types and team roles.[25] Certain personality types were associated with particular team roles. To learn, teams needed to recognise, accept and utilise the different learning styles and team roles of their members.[287] Individuals needed to develop their own learning capacity to lead group learning, for example implementing guidelines.

Barrington saw leading and managing the learning process as a new form of leadership.[20] Senge saw the leadership role in learning organisations as radically different from the charismatic decision maker. He saw them as "designers, teachers, stewards."[374] An understanding of the value and role of each learning style was essential to leading a learning process. The continual reconstruction of experience by groups based on shared concrete experience enabled them to maximise learning by sharing reactions, and so to generalise, and apply the learning to new situations met soon after the learning.[230] Skills in these areas were recognised as necessary for clinical leadership.[32;33]

The need for change management skills in clinical leaders has been recognised elsewhere.[171] Those with different learning styles would adapt to change in different ways. OL capacity would be related to success in the implementation of change by each individual.

Learning styles of doctors and nurses.

Health professionals' learning styles were unequally distributed. This meant different professional groups had different learning cultures. A study in 1999 found for example:

> "In trainee surgeons the predominant learning styles (86.5%) were convergent (n = 31) or accommodative (n = 14) whilst only 5 (9.6%) assimilative and 2 (3.9%) divergent styles were detected."[104]

Another study in the same year found a majority of nurse trainees had converging[243] learning styles. A study in 1995 used the stages of the learning cycle to classify learning styles and found most nurses had concrete learning styles.[55] An earlier French study in 1993 showed a majority of nurses had assimilative learning styles, and that these did better than accommodators in baccalaureate exams.[167] The divergent learning style was the least well represented, but the four stages of the learning cycle were present in the three main learning styles found by this study in doctors and nurses. The least well represented stage was reflective observation (RO). RO was a component of both assimilative and divergent learning styles, but not of the convergent and accommodative learning styles. Since assimilators did better in exams they may have been more senior in professions and thus in a better position to prevent any risk of wild experimentation or ill judged organisational action by insisting on data gathering to support any case for change.

In organisations assimilators were likely to struggle in putting this perspective simply because of their low numbers. Reflective observation would be important for data issues such as assessing the quality of data in case records, and in calling patients for review consultations. This was found needed in GPs, for example.[387] Convergers were significantly more self-directed than either the accommodators, assimilators, or divergers.[243] Autonomous learning (convergent)

was important since autonomous learners were best able to develop new practice. Among public health trainees there was no clear majority type of learning style, but assimilators did the best in exams.[325]

To conclude, health professionals needed to ensure that the reflective observation stage was represented in guideline implementation groups.

2.2.3 Motivation and OL

The organisation motivated its staff by offering to satisfy their needs. The most effective motivating tool was, according to Skinner's behaviouralism, positive reinforcement. But, since human beings were learning animals, learning was intrinsically rewarding and required no additional motivation. There was no conflict, learning could be positively reinforced:

> " originality is a form of operant behaviour. Positive reinforcement increased the rate at which original responses were emitted." [295]

Positive reinforcement, therefore, could reward creative deviance as well as conformity. OL succeeded by giving individuals greater autonomy, power of self-determination, than they could achieve alone (Senge's 'personal mastery'). This was equivalent to ensuring social mediation led to an enhanced ability to create and achieve new individual goals. This could be achieved only in a context that supported the alignment of individual and organisational goals, since individuals' goals were dependent on others. Did clinical practice guidelines help to create this context? Learning of any sort was particularly important as a way of motivating professionals, who could be expected to have already satisfied more basic needs lower down Maslow's hierarchy.[264] For Maslow, self actualisation, and the need for knowledge and understanding, were personality needs just as much as the basic physiological needs.

2.2.4 Medical Education and OL

The traditional approach to medical education was called Continuing Medical Education (CME). This tended to use passive methods such as lectures, for knowledge transfer rather than knowledge creation. CME has been seen as deficient in that it:

> "blindly assumes that … medical professionals can intuitively match specialist knowledge to the demands of actual cases."[41]

While CME emphasised specialist knowledge and expert training, continuing professional development (CPD), had a wider perspective. In contrast to CME it focused on turning academic knowledge into professional knowledge by practical implementation in the delivery context, using the idea of knowledge construction by communities of practitioners.

> "The key to changing professional practice lies in bringing this practical knowledge to the surface and proceeding to refine and develop it in desired directions."[41]

For Fletcher,[132] professional education and development were not of sufficient relevance to need:

> " The focus is on subspecialty topics without considering needs. The guidance from the Colleges exerts little influence as a prompt. The methods chosen are personal choices and ignore what the colleges recognise as valid CME."... "least popular was non-clinical professional development"..."the danger of no regulation lies in whether consultants identify the CME they need."

The educational needs of clinicians were ultimately driven by patient needs. But guidelines produced by NHS clinicians ran the risk of providing what clinicians rather than what patients wanted. Therefore, the CPD approach was more likely to create a context for guideline implementation where individuals could

increase their self-direction and autonomy, and thus develop increased motivation to create and use knowledge in social action. This process might be best managed using incentives within an OL framework.

2.3 Recent developments

2.3.1 OL studies in the NHS

No applied studies of OL capacity in acute hospitals were found. In the report on the Bristol enquiry the systems perspective and culture were referred to,[220] but a full description of their role was not developed. References to, for example 'the blame culture' and 'the club culture' did not describe the workings of this culture or give a theoretical basis for changing it. Nor did the report provide any model of a culture that would support best clinical practice. The learning culture was the obvious candidate. Work already existed on OL theory in other settings, and individual learning was enthusiastically espoused by the health professions.

Burgoyne found NHS trust hospitals were more able to maintain historically derived patterns of service and co-operative relationships with other hospitals than the NHS reforms (the purchaser-provider split) implied.[47] From this perspective, hospitals were perhaps successful learning organisations that had broken through to a third level of learning – learning how to manage and change their own environment. This could equally be seen as the route to becoming a non-learning organisation, reducing the environment to fit organisational pre-conceptions. A more positive perspective on managing the environment was to educate patients so as to increase their autonomy.

Eddy[111] mounted a convincing argument for imitating a free market by using "willingness to pay" as a means for deciding whether to include treatments in

guidelines. However there was always a danger that this would subsume an individual who would be willing to pay in the same group as those not willing. It has been suggested that patients should be allowed to pay extra for their care,[336] but this too limited access for those willing but unable to pay. That taxpayers should be expected to pay for the care they actually received was also suggested in the popular press by a respected public figure (Lord Desai).[42]

So, from the perspectives of patients, professionals and polity there was a need to test whether the OL framework could usefully be applied to healthcare. Was it associated with success in improving the quality of services, and specifically, with successful guideline implementation?

The key measures relating to guideline implementation were likely to relate especially to the information system oriented "organisational science" perspective on OL (p.89-91 above). A tool to measure OL capacity was needed which captured the ways information was created and used. Examples of information creation included mission statements of purpose, which prioritised the information needs, and by experiments, which generated new knowledge. Examples of information use were the ways in which it was communicated or transferred to decide action at different organisational levels. Teamwork and appropriate leadership were relevant in facilitating both information creation and use in different ways. The methodology used for the selection of a tool meeting these criteria will be described in the next chapter, (pp. 186-188 especially). The pilot study confirmed the applicability of these key measures, and particularly of the information emphasis of the organisational science perspective to the evidence-based guideline adoption process (pp.201-203). The other perspectives on OL offered theoretical frameworks explaining some of the measurements made in the wider contexts of each hospital and in relation to differences in the guideline implementation activities and beliefs.

Chapter 3 - Implementation of guidelines

Clinical audit and clinical guidelines aimed to improve quality of patient care (including safety) by helping to ensure practice reflected the latest research evidence. Guideline implementation was also a means of getting research evidence into practice quickly. This chapter describes the history of the Scottish approach to guideline development and considers the research on the most effective implementation of clinical guidelines, since this is central to improving the delivery of health care. It then shows the relevance of work on the implementation of change in hospitals and OL theory for guideline implementation and finally refers back to strategic change theory to define the research questions.

3.1 Development and origin of clinical guidelines

National audits examined critical incidents such as surgical deaths within 30 days. They did not define standards for best practice. They used adverse outcomes as a measure instead, for example the Scottish Audit of Surgical Mortality (SASM) and, in England, the National Confidential Enquiry into Perioperative Deaths (NCEPOD).[67;93] In contrast, evidence-based clinical practice guidelines ("guidelines") offered guidance to clinicians about the accepted standard of clinical processes. A working definition from the Institute for Medicine (United States) was:

> "systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstances."[199]

Guidelines were pioneered by the American College of Physicians starting in 1976.[18] The Agency for Health Care Policy and Research (AHCPR) was created in 1989 by the United States government. Its aim was the quality improvement of health care, and it used an explicit structured methodology for guideline

development.[67] The broad interest in clinical guidelines stretched across Europe, North America, New Zealand, Australia and Africa.[436] The interest in guidelines originated in issues facing most health care systems: firstly, rising costs, owing to increased demand, more expensive technology, new treatments, and an ageing population, and secondly, variation in the quality of care.[436]

Only an increased rate of learning could ensure hospitals kept pace with the increased rate of change.[112] Evidence-based clinical practice guidelines were brought to the centre of the policy stage in the UK by Effective health care bulletin No 8,[297] produced by the Nuffield Institute for Health at the University of Leeds in 1994. This publication was widely disseminated and had credibility as part of a series of bulletins using input from respected researchers. Guidelines were a clinical attempt to reduce physician uncertainty and speed up learning. The uncertainty gave rise, at group level, to disagreement about what clinical policies gave the best clinical outcomes. Some clinicians were uncertain about the best application of policies to their individual patients in the light of emerging evidence.[339]

Bringing research quickly into practice was emphasised in this era,[172;426] for example using research based evidence to develop consensus on standards for clinical audit. Getting research into practice was also a non-contentious argument for the implementation of clinical guidelines. Medical-scientific literature was ineffective in diffusing new knowledge about medical innovation to physicians, for example a large number of articles about Magnetic Resonance Imaging appeared years before its widespread introduction to clinical practice.[331] Bero et al[28] produced a useful overview of 18 systematic reviews of interventions to promote the implementation of research findings in 1998. Although the generalisability of the studies to other settings was questionable, they concluded that three single strategy methods were consistently effective. These were educational outreach visits, reminders, and interactive educational

meetings. The other consistently effective intervention was multifaceted methods – a combination of two or more of audit and feedback, reminders, local consensus processes and marketing. The evidence about the effectiveness of audit and feedback alone, local opinion leaders (though evidence was insufficient here), local consensus processes, and patient mediated interventions was variable. Simply producing and distributing educational materials including guidelines was definitely ineffective, as were didactic educational meetings.

From the perspective of successful guideline implementation – which might not necessarily need to change practice – guidelines were unlikely to be implemented unless put in place as part of a strategy actively involving health professionals rather than treating them as passive recipients.

Audit of both policy and practice and feedback about compliance was logically essential for guideline implementation (to give evidence of implementation), and as many of the other effective strategies as feasible would need to be added to create a multifaceted intervention appropriate for the context. The development of audit indicators was therefore an important part of guideline implementation, and guidelines could help to provide the consistency necessary to allow comparison of performance with criteria and standards, and could underpin greater compatibility of computer databases, both of which were recommended for the derivation and implementation of evidence-based performance indicators in primary care.[269;270;432]

Guidelines were a component of the clinical effectiveness policy. The English Executive letters (EL) (96)45 and (96)110 retained the clinical effectiveness policy as a priority for 1997-8, and drew attention to a number of NHS Executive (English) publications about it as attempts to close the gap between research and practice.

3.1.1 Guidelines policy in Scotland

The following discussion of the main policy developments focuses on those relevant to the introduction of clinical guidelines in Scotland.

In early 1993, the Clinical Resource and Audit Group (CRAG) published the report of a working group on clinical guidelines headed by Derek MacLean,[255] which recommended CRAG co-ordinate and fund the Scottish Intercollegiate Guidelines Network (SIGN) to develop guidelines in Scotland. The report made a distinction between 'clinical guideline' and 'protocol'. According to the chairman of SIGN, too, 'Guideline' meant the general statement of principle:

> "broad statements which relate to an optimal level of care in which current knowledge and experience are balanced against the constraints of available staff and other resources."[320]

'Protocol' meant the more detailed development of these broad principles for local application, specifically their adaptation to the local context. Through protocols and audit, the MacLean report linked guideline implementation to other organisational processes. It recommended:

> 1. a very close association "between clinical audit and guideline development, monitoring and evaluation" and "mechanisms for encouraging this link should continue to be encouraged in Scotland.", and
> 2. guidelines "should not be looked on as training instruments to be used only by staff in training but they should be designed for use by all grades of staff", and
> 3. the beginnings of a notion of clinical governance (see below):
> "Incentives and sanctions are a major area of uncertainty in the application of guidelines which will need to be explored if clinical guidelines are to be brought into general use."

Clinical guidelines were discussed in relation to the institutional context of hospitals in chapter 1. The history and methods of guideline development and research on the effectiveness of different implementation methods are now considered in detail. The Scottish Intercollegiate Guidelines Network (SIGN) was created in 1993 in partnership with the Scottish Home and Health Department (SHHD).[376] Its aim was "To sponsor and support the development of national guidelines on a multi-professional basis".[319]

SIGN guidelines were developed according to an explicit, quality assured methodology.[375] SIGN produced guidance on its guideline development process and the most useful guideline structure. It drew heavily on the AHCPR methodology,[320] but unlike the AHCPR, did not itself produce guidelines. It catalysed and quality assured the guideline development process. (The AHCPR moved away from directly producing guidelines in 1996 for reasons including cost of production and criticism of lack of transparency in the development process.)[316] SIGN's role of quality assuring guideline development was important for implementation, as Health Boards, for example Lothian Health Board,[250] were beginning to evaluate the quality of available guidelines prior to selection as implementation priorities for their provider units. Consensus guidelines not transparently based on evidence resulted in variable compliance, for example from 37% to 73% in a sample of 31 Australian GPs.[387] It was generally agreed that if clinicians were to accept guidelines they must be confident of their validity and therefore the method of development must be transparent[392] and of agreed acceptability.[11] In addition to the problems of assessing research quality, economic bias and pecuniary interest needed to be declared and if possible eliminated.[13]

The main SIGN committee represented clinical specialties and professions through Scotland. There were about 30 members of this group, which met three times a year to consider proposals for topics for new guidelines. Topics

were submitted on a form asking for a description of the problem and for details of existing evidence about it. The forms were peer reviewed by specialist reviewers before consideration by the committee. In choosing topics the committee took into account the burden of disease, the potential for improvement, and the existence of other guidelines in the same area. Topics had to be multidisciplinary.

SIGN working groups researched and wrote guidelines on clinical topics. They were led by Fellows of the Scottish Royal Colleges and Societies. A decision was made with the proposer about who should chair the working group. Members were invited, trained in critical appraisal, the remit was defined, and a literature search was carried out by a qualified librarian. Studies were selected for review according to agreed criteria. Their methodology was evaluated and an evidence grading was given. The evidence was then synthesised and interpreted and draft recommendations were produced. The draft guideline was presented at a national open meeting, comments assessed, and the final draft was reviewed by the SIGN editorial Board. The guidelines were published free to health service organisations in Scotland (personal communication, Harlen 1998). The SIGN guideline programme had approved 73 guidelines by July 2003.

Guidelines were central in the Scottish NHS Management Executive guidance for 1998/99, which introduced Health Improvement Programmes in Scotland. Among other elements such as human resource strategies and information management strategies, these were expected to set out:

> "a rolling programme for the implementation of evidence-based clinical guidelines and clinically effective practice to be monitored through clinical audit." [399]

England did not have a national clinical guidelines initiative until the National Institute for Clinical Effectiveness (NICE) took this on.[332] NICE was set up on April 1st 1999 under the chairmanship of Sir Michael Rawlins. It was a Labour government initiative.[84] There had been calls for centralised guideline development for some years before. For example there was concern that the methods used to validate guidelines in hospitals locally were inadequate.[334]

3.1.2 Guideline implementation

The problem for this research was whether more effective implementation of SIGN clinical guidelines was associated with a higher OL capacity. To address this it was necessary to review previous research evaluating the effectiveness of the implementation of evidence-based clinical practice guidelines. If implementation methods with links to OL principles were successful, it would add strength to the research proposal and make the hypothesis worth investigating.

Research on guideline implementation in clinical professions other than medicine was virtually non-existent.[57] Findings applying to the medical profession may not have applied to nurses because of differences in cultural norms, particularly related to autonomy, peer review, and ability to influence practice.

Clinical practice guidelines had been applied in various forms to a set of interlinked problems. These included improving the quality of delivery of care, and containing cost.[107] OL theory was a potential framework for this co-ordinated approach, because it was a large educational exercise needing a systemic perspective for successful implementation. For example Haines (1997) saw healthcare as moving from a system of passive diffusion of research knowledge into the medical community to: active dissemination by bodies such

as the NHS Centre for Reviews and Dissemination and the Cochrane Collaboration. Prefiguring an OL approach, he stated:

> "The next stage will be the development of a co-ordinated approach to implementation using resources currently devoted to continuing education, audit and information technology to better effect..."[165]

There were suggestions in the era of the purchaser/provider split, and health care commissioning, that guidelines and audit would be used in the contracting process. Many influential commentators thought this too complex and data hungry a process to implement,[184] and it was in any case made irrelevant by the change of government in 1997.

While protocols adapted guidelines to local settings, they had themselves to give enough flexibility for practitioners to exercise the art of medicine and health care in treating individual patients. There were calls for guideline developers to state when patient preferences should play a prominent role in implementation of guideline recommendations. For example back pain was likely to be a more serious issue for a manual than a sedentary worker.[305] By strengthening the knowledge base, guidelines had potential to improve OL, but the orientation to the individual patient in some instances took priority over the stronger general knowledge base, and professionals needed to retain a sensitivity to this.

Guideline implementation methods

The important questions for evaluation of guideline implementation methods were:

1. Validity - could guidelines improve care?
2. Reliability - did guidelines create sustained change in real practice and improve outcomes?

3. Methods - which implementation methods worked best in which contexts?

1. Validity of guidelines

Clinical guidelines were found to improve care by Grimshaw and Freemantle et al and Grimshaw and Russell et al in meta-reviews of guideline implementation research.[157;159] They evaluated the evaluation methods of the projects reviewed.[159] The authors recognised the most reliable trial design as a "balanced incomplete block design" in which "each participating doctor simultaneously experienced both guidelines for some conditions and the status quo for others". Such a crossover design was used to evaluate the effect of self-audit on recording for cystitis and vaginitis.[296] The authors accepted that few studies used this design to reduce the range of biases to which randomised controlled trails were subject in behavioural research. Grimshaw and Russell concluded that RCTs ran the danger of contamination across groups in the same context in evaluation of guidelines, and to the Hawthorne effect (beneficial effect of taking part[267]) where the implementation was in separate contexts (for example separate hospitals), with the result that the evaluation might overestimate the true effects.[158] Five study designs that overcame these difficulties were then recommended. The study then reviewed 59 evaluations of guideline implementation meeting these criteria. The conclusion was that 11 of the 59 studies showed clinical guidelines effective in improving the outcome of care, and 55 showed improvements to the process of care.

Later research suggested that frequent time lags in adjusting medical guidelines to new scientific developments meant that scientific progress not recognised in clinical guidelines might improve the outcome of non-compliance.[179] Compliance with a low quality guideline would not improve outcomes, guidelines needed to be carefully developed and tested.[422] The SIGN process of course paid great attention to this.

2. Reliability of guidelines

Because guidelines were based on evidence created under research conditions, it was possible, perhaps likely, that the outcomes upon which they based their recommendations would not be achieved in the real world. For example, if they were based on published research the effect of the intervention was likely to be overestimated owing to publication bias. Population selection procedures and the use of research staff to enhance patient compliance and highly skilled clinical staff, were likely also to increase the treatment effect.[184]

So, guidelines had been shown effective in the context of evaluation studies, but in many cases these were artificial conditions. They did not test the effect in a real practice context. Guidelines that were too idealistic would be agreed with in theory, but not followed in practice. There was consensus that: "A considerable gap separates agreement with guidelines from action."[166]

Significant differences in compliance with guidelines were found among even the most dominant hospital providers of cancer services within the same medical community.[391] Strategies for enhancing compliance were recommended to be integral to the process of guideline development. No specific strategies were recommended. Continuous quality improvement was shown as a way of ensuring continued use of asthma guidelines.[148] This was an example of the use of the wider context to improve implementation.

Problems found in implementation of guidelines included physicians' tendency to over-treat. In a study of the impact of guidelines on practice patterns it was found easier to encourage physicians to do more for patients than less.[52] The danger of such defensive practice was that guidelines could be applied even when they were not in the best interest of the patient, and difficult cases not attempted.

3. Effectiveness of Implementation methods

The important question was widely agreed to be how best to implement guidelines, to ensure that they did change clinical practice where necessary.[166;214;320]

Intervention, instruction, and involvement

Simply sending out copies of guidelines to relevant clinicians did not work well as a method of getting the guidelines into practice.[161;165;166] This was seen for example in the implementation of venous thromboembolism prophylaxis policy in hospital practice,[268] and in the disappointing results of implementation of national guidelines for asthma.[312] Formal lectures of the sort often used in Continuing Medical Education (CME) were similarly ineffective.[78]

The calls for clinicians to develop a culture of constant update[136] already alluded to contrasted with numerous early efforts to test individual guideline implementation strategies from a stimulus-response perspective on changing behaviour, for example, reminders,[246;424] and reminders and feedback.[343] As multiple interventions began to be tested in different settings, the behaviourist model, where a one way stimulus was applied to a "black box", began to be seen as inadequate for the complexity of the problem. A more systemic and integrative perspective began to emerge, more in keeping with an OL approach.[333]

Interventions based on the passive receipt of information were generally less effective than educational interventions requiring more active participation. Active involvement was an important feature of much OL theory. Outreach visits (1:1 education in the workplace) could work. Reviews of guideline implementation strategies concluded that those operating directly on the consultation between the professional and the patient were more likely to be effective, for example patient mediated interventions, patient specific reminders and restructured medical records.[157;160] Although NHS patients were

not like business customers or consumers[217] in that they did not pay directly for care, the patient-clinician relationship remained important for clinicians' learning.

Participative methods were generally successful for development and implementation. For example, a small group consensus process increased influenza vaccination rates in primary care physicians by 34%.[216] In another example, consultants and GPs were involved in developing a local guideline about hypertension in the elderly. They were given direct feedback on drafts. Prescribing of bendrofluazide was significantly increased.[302] But insufficient evidence existed to reach firm conclusions about the relative effectiveness of different educational and implementation strategies in different contexts.[157;160] There was general support for the view that there was no one ideal implementation strategy.[161;307]

By 1995, a review from the Royal College of General Practitioners devoted a subsection to contextual factors influencing behavioural change.[349] OL aimed to change context, for example by improving communication, giving a systems perspective and developing a learning culture. Higher OL capacity was therefore likely to provide the right context for guideline implementation. SIGN itself recommended careful involvement of hospital staff in adapting guidelines for local protocols. With continuing review, this could provide a way around the credibility ('not invented here') problem. It was in accordance with both the CPD model of professional education, and OL theory:

> "Studies of organisational learning suggest that the lessons of evaluation are more likely to be acted upon if they are generated from shared knowledge, and are conceived as interpretations of or judgements about continuing professional education rather than descriptions of it."[41]

Single and multiple methods

Studies were carried out testing single and multiple methods of dissemination and implementation of clinical guidelines. Multiple methods of implementation and tailoring the methods to the context to cope with specific barriers were shown important in later research. Evidence to choose particular interventions for particular contexts was at first lacking.[157] Later work suggested tailoring the multifaceted guideline implementation strategy to deal with the different barriers identified. Where the barrier was cultural, social influence approaches (local consensus processes, educational outreach, opinion leaders, marketing etc.) were suggested.[119] Other problems and the relevant approaches were:

1. lack of knowledge (educational seminars and workshops),
2. unawareness of sub-optimal practice (audit and feedback), and
3. problems processing information in consultations (reminders and patient mediated interventions)

Single method comparisons

Examples of single methods of guideline implementation are given below to help the reader visualise what each method entailed:

1. Educational methods, if used alone, were found ineffective, for example in achieving compliance with guidelines for the treatment of depression by US primary care physicians.[242]

2. A comparison of educational programme and clinical recall interview found the interview more effective than factual communication on a group basis, in changing clinical practice on neonatal hyperbilirubinemia.[274]

3. Reminder cards alone were of only limited effect in enhancing the effect of audit of GPs use of benzodiazepines.[16] Peer review with feedback was tested for preventive care guidelines, and durably improved compliance among US resident physicians.[150]

4. Opinion leaders were compared to audit and feedback. Opinion leaders improved the Caesarean section rate for example, (reduced it) while audit and feedback had no effect.[246]

So, although some single methods were sometimes more effective than others, there was no single magic bullet that was 100% effective in all circumstances,[306] because there were no magic targets.[100]

Multiple methods compared with single methods

Multiple methods were generally found more effective than single methods[306] because of the variety of organisational situations and learning styles involved in dissemination and implementation. For example, practice guidelines were implemented using all of the following methods together:

1. Educational conferences,
2. written memoranda,
3. reminders /cues to physicians from nurses, and
4. opinion leader endorsement and public support.[423]

Length of stay for patients with low risk chest pain was reduced and there were no adverse incidents in the two weeks following discharge. A further study showed that concurrent (written and verbal) reminders and audit increased compliance and reduced length of stay for a guideline recommending a 2 day length of stay for low risk patients with chest pain.[424]

IT systems functioned in multiple ways. They were effective as reminders and for decision support. Computer assisted decision support was found to improve physician compliance with local clinician-derived antibiotic practice guidelines.[317] Antibiotic-associated adverse events decreased by 30%. In another study, electronic reminders within electronic medical records of HIV patients increased the response times of clinicians, ambulatory visits and hospitalisation.[352]

Co-ordination

Multiple methods of introducing and disseminating guidelines required co-ordination. This in turn implied a co-ordination role. To co-ordinate, feedback, and hence some form of evaluation of the implementation of the guidelines was needed. Co-ordinators improved compliance for only the duration of their involvement.[43;271;385]

There was an emerging literature at a more general level than audit and guideline implementation on the diffusion, adoption and implementation of change to clinical practice. A recent review of a group of related studies in the field by Dopson et al[100] attempted to aggregate analyses in seven separate studies, and drew some lessons. Dopson et al remark that, as noted in chapter 1 above, the rational models of the innovation process have been challenged, and they emphasise the importance of ten common themes across the 7 studies. In brief these were:

1. the strength of the evidence base was not related to faster diffusion into practice,
2. evidence was interpreted through social context – different stakeholders such as professions had different interpretations of the same evidence,
3. Evidence was scarcer for some professions (eg nurses) and more widely available for others (eg doctors),
4. Some forms of evidence (eg randomised controlled trials) were accorded greater credence than others by clinicians
5. Clinicians especially surgeons and physiotherapists placed a high value on other sources of evidence – eg knowledge and skills rooted in experience,
6. Professional networks provided a source of mentors and trusted colleagues who professionals relied on for guidance in the large areas of practice where limited current evidence was available,

7. Evidence did not flow easily across professional boundaries, and there were few regular multidisciplinary fora for sharing and debating recent evidence,
8. Context, which Dopson et al conceived as resource availability affected the success of implementation. It included the quality of local relationships within and between organisations, and the presence of local opinion leaders,
9. At least two different types of positive opinion leaders were identified,
    a. expert opinion leaders, seen as higher authorities, leaders in their field, and important in the early stages of implementation, and
    b. peer opinion leaders, with experience of the application of the innovation in their own field, perhaps more influential in the later stages of implementation,
10. Interaction and debate about the specific evidence and patients needs for each particular innovation, which Dopson et al termed "the enactment of knowledge".

For an implementation exercise in a particular context it would seem essential to diagnose supports and barriers to implementation under each of these themes, and develop an implementation plan to take account of them. The role of opinion leaders was closely examined by Locock et al[245], who were also the authors of one of the research reports[102] examined by Dopson et al.[100] They found that the definition of an opinion leader remained problematic. In their evaluation of the Promoting Action on Clinical Effectiveness (PACE) programme, which sought to implement clinically effective practice in 16 local sites, Dopson et al found a mutually reinforcing relationship between opinion leaders and evidence.[102] They defined opinion leaders as those who influenced "the beliefs and actions of their colleagues in any direction whether positive or negative."

Ferlie and Shortell[122] developed a framework for change based on a comparison of common areas between the UK and the USA healthcare systems. They covered a multilevel approach to change, and emphasised the individual, "microsystem" or team level and the organisational level for the UK, where change was driven mainly at national level by national policy. Ferlie and Shortell identified important core properties underlying quality improvement as follows.

1. Leadership, seen as an ongoing conversation among people who cared deeply enough about something of great importance. It was important to distinguish between transactional leadership concentrating on single loop, or adaptive, learning, and transformational leadership (double loop or goal changing learning). Policymakers needed to decide whether new rules and assumptions were required to improve health service quality, in which case transformational leadership would be needed, as would training for it.
2. Organisational culture needed to be conducive to quality improvement, and able to support double loop learning. The separate cultures within the NHS needed development to enable the different professional and managerial groups to learn together with a patient centred focus.
3. Development of teamworking skills to work together and share knowledge in clinical teams (for example clinical directorates) was an obvious corollary of this.
4. Information technology was another core property of organisations underlying quality improvement in four ways –
    a. providing real-time information about the results of patient treatment to enable corrective action to be taken quickly,
    b. using the internet to connect patients to their health care team,
    c. providing epidemiological information to facilitate tracking of patients over time, and
    d. providing accountability information to external agencies.

Ferlie and Shortell concluded by suggesting that clinicians in the UK had begun to lose control of the definition of quality in the NHS at strategic level, while retaining control at the operational level. Practice within the confines of written protocols would potentially contribute to "a serious erosion of the traditional autonomy of the medical profession and an increase in the powers of government.". They finally suggested that in the UK the state might, to encourage a more bottom-up approach to innovation and acceptance at local level, need to develop "a new relationship with the medical profession based on examining the evidence and sharing accountability."[122]

Wood et al argued in 1998 from a poststructuralist perspective, that the distinction between research and practice should not be thought of as absolute, and that key academic researchers were important in connecting the two. There would always be different perspectives on and interpretations of the evidence base.[435] Ferlie et al used Pettigrew's processual perspective on change management rather than one of formal rationality in their examination of four clinical change issues.[123] One of these became a more detailed case study of the implementation of evidence about prophylaxis for deep venous thrombo-embolism in Orthopaedics.[124] They concluded that implementing evidence was not simply a question of finding and applying the right levers for change. Clinical policy was negotiated in a loose way among senior consultants to build consensus. There was a range of views about the status of formal science. Although some consultants insisted RCTs remained the gold standard, other (perhaps more experienced) consultants put forward a different model based on "tacit and experiential craft knowledge." One felt for example that what worked for one practitioner in his or her own situation might not work for another in theirs. This implied an alternative model of encouraging good practice involving "continuing professional development and individual learning and reflection rather than the use of formal EBM principles."[124] The

development of hybrid researcher-practitioner roles and identifying contexts ripe for change rather than change levers were recommended. They left open the question of how long it was reasonable to wait for readiness for change.

Both the research on guideline (and audit) implementation and the recent research reviewed above on the implementation of strategic change led inexorably to the conclusion that, for guideline implementation, not only were multiple methods required, but all relevant contextual aspects of the health care organisation needed to be included and staff involved. These included leadership, information, cultural issues,[100] patients' views about guideline content in development stages[356] (the usefulness of innovations) and teams' readiness for change. A qualitative examination of these contextual issues and how they affected guideline implementation in each hospital was needed, as well as the measurement of OL capacity.

Barriers to guideline implementation

Context

Different barriers applied in different contexts. Involvement of staff increased their motivation and helped in identifying barriers to be overcome. Team building across professions has received attention as needing to be developed to enable planned care and successful implementation of guidelines.[275] An international group discussing the relationship between clinical audit and CME at a conference in 1996 reported that local guidelines were developed as a method of agreeing audit criteria. It said individual and team learning needed to be supported by a learning organisation because changes to clinical practice had "a whole series of knock on effects" which might mean the organisation needed to change before the team or individual could do so.[22]

A psychological framework for changing the behaviour of doctors suggested matching the individual obstacles resulting in a doctor not following a clinical

practice guideline to a choice of an effective behaviour change strategy.[340] Each barrier was related to a psychological theory to explain why it prevented change, and to identify the strategy needed. This clinical approach to an organisational problem recommended cultural change when failure to implement national recommendations about the use of an equally effective but less expensive drug resulted from doctors not appreciating the consequences of expensive treatment for the service or colleagues. The more effective cultural change was to help doctors perceive the problem from colleagues' and managers' perspective, the less effective was management edict. This was clearly an OL type approach involving the explicit recognition or "surfacing" of tacitly held mental models.

The need to tailor clinical behaviour change projects to local needs and cultures was the main finding of the Framework for Appropriate Care Throughout Sheffield (FACTS) project in Sheffield, England.[183] This project applied especially to primary care. Here cultural issues also affecting hospitals were perhaps more clearly demonstrated because there were fewer organisational constraints on clinicians' behaviour.

The problem with centralised guideline development was that although more scientifically valid in terms of theoretical treatment effectiveness, local educational benefits were lost. Guideline development, for example by focus groups, was a valuable educational process itself.[116] Hence the SIGN methodology of developing general statements and leaving it to local teams to adapt them to local circumstances.[255] Even here, it was often possible to involve only a sub group of staff in post at the time of implementation of a particular guideline. Staff joining later had fewer opportunities to influence implementation. A study of the attitudes and behaviour of GPs to guidelines found that those who were members of the Royal College were more positive about the college guidelines than those GPs who were not.[379] This supported the

idea that in theory at least, an OL culture of continual learning through continual review and audit of guidelines would make guideline implementation more permanent by increasing ownership.

Putting audit implementation into a wider framework - tending toward an OL approach - was indeed effective in getting hospitals to incorporate guidelines into their routine procedures - quality initiatives and use of quality tools were shown to link well with audit projects.[333] In the contracting environment, it was suggested that linking the implementation of change to the business cycle would allow optimal allocation of resources.[23] The guideline implementation research influenced practice and policy. The clinical effectiveness policy was based solidly in this trend toward recognising, utilising and enhancing the local learning culture. For example, four requirements stated for the acceptance of change were:

1. a knowledge base that was widely agreed on in the organisation,
2. lessons not requiring changes in role definitions,
3. recognition that changes in methods and relations could be required beyond the immediate audit task, and
4. a learning culture in the organisation as a whole to support participation in audit and facilitate the early adoption of new methods.[420]

The OL perspective was endorsed by the NHS Centre for Reviews and Dissemination in a review of 44 published systematic reviews of methods and approaches for the implementation of evidence-based practice.[291] This emphasised the importance of choosing appropriate change implementation methods for the context. The review recognised learning theory as one theoretical model for getting evidence into practice. Audit and feedback were mentioned under this heading. Organisational learning was not considered per se in the review. The review concluded by endorsing the idea that there were no

magic bullets[306] (see above) and recommended a diagnostic analysis of the situation "to inform the design and content of the dissemination/implementation strategy.".

The LO was included as part of a conceptual framework put forward in 1998 by Kitson et al for enabling the implementation of evidence based practice.[225] The framework consisted of the evidence level, context, and method of facilitation. Other dimensions of context were leadership and measurement. These had commonalities with accepted OL dimensions. The Kitson framework was static rather than dynamic. It had obvious similarities with the context, mechanism and outcome framework of realistic evaluation.[310] Kitson used four case studies. The four cases all had good evidence but either high or low context or facilitation. A positive context and good facilitation were found to be important factors in achieving improvements to patient care. Facilitation was found to be possibly the key element. In the facilitation model used, external facilitators trained internal ones. This facilitation role could be seen as a leadership role passing on a culture of OL. This reflected real situations – the distinction between facilitation and context was perhaps not very pure. The Kitson framework was revisited in 2002,[351] in the light of further theoretical developments by others including Ferlie et al,[123] to include a more interpretive perspective on the nature of evidence, to include the idea of the learning organisation as part of context, to replace the idea of measurement with the broader concept of evaluation, and to more tightly define the concept of facilitation, while admitting, as previously mentioned, that this concept was still not fully distinguished from that of opinion leaders and other change agents.

Specific barriers

A number of studies found specific difficulties implementing clinical guidelines, for example among GPs.[242;379]. Time for education, information problems, and low quality guidelines, and suspicion of the intentions behind guideline implementation were the main problems. For example, a sample of 409 hospital

clinicians in the Oxford region espoused a welcoming attitude toward guidelines. But clinicians generally believed their own attitudes were more positive than those of their colleagues. In implementing a guideline they were influenced by encouragement from their peers and senior clinicians.[258] Barriers to implementation were firstly, lack of awareness of guidelines, followed by low quality of guideline and impracticality of recommendations. Clinicians' perception of barriers was thus mainly focused on dissemination. This was not in accord with the research showing dissemination alone was not enough to bring about adoption of guidelines. It pointed to a potentially interesting difference in espoused theory of action and "theory-in-use" among these clinicians.

Comparison of outcomes was too complex for routine use in measuring performance. Most difference was accounted for by chance variation.[185] Problems included the uncertain nature of prognosis itself, practical difficulties in collecting and quantifying data, and adjusting for risk factors such as severity.[303] The difficulty of validly and reliably measuring outcomes,[75] meant that process measures still had advantages, for example in directly indicating deficiencies of care that needed to be improved.[70]

Clinicians well knew that outcome variations had to be treated with caution as indicators of the quality of care. For example variation in one month survival after acute myocardial infarction in Scotland could be explained by variations in referral, admission, diagnosis, definition, and coding.[50] Clinical audit showing process variation was less subject to these biases. When using outcome measurement for performance management, Davies and Lampel commented there was also the problem of how to involve all staff, and how to reduce the threat to self esteem and potentially to job security it posed for some.[74] They recommended greater trust in professionalism as a basis for quality enhancements. Evidence-backed process measures in guideline-based audit sat

well with this, as they allowed some – but not too much – professional flexibility in both implementation and interpretation.

The MacLean report, published in 1993[255] considered barriers. It identified implementation of guidelines as the key issue for their success. MacLean identified factors hindering acceptance as including culture, which was defined as:

> "the belief system of a group", incorporating "attitudes, role perceptions and ethical framework … and reflected in the language, images and concepts used…". "The current medical culture in Scotland was judged now to be ready to accept the guideline approach."[255]

Other factors hindering acceptance included lack of resources, especially time to develop local protocols, to train for their implementation and to evaluate and monitor them. Lack of evidence was another hindrance "It has been estimated that only 15% of medical practice can be justified on the basis of sound research.".[255] Where experience rather than evidence backed a recommendation MacLean said this should be clearly stated. Inadequate dissemination was a problem too, with 50% of practitioners unaware of the existence of a relevant well researched guideline in one study.

The problem of clinical freedom as a barrier to guideline implementation was addressed, because:

> "It cannot be assumed that because a guideline has been shown to be highly effective and efficient it will be acceptable to all relevant health care professionals." [255]

MacLean said that clinical freedom carried an obligation to take account of evidence-based guidelines. At the same time guidelines had to give scope to do

what was best for the individual patient, and had to be used with discretion in each individual case.

Guidelines, managerial control of resources and better accountability for clinical quality meant clinical freedom had to be defined. MacLean defined clinical freedom as, not clinical carte-blanche, but:

> "the obligation to do what was best for the patient" ..."In any guideline the balance between clinical freedom to do what was best for the individual patient and the need to ensure optimal care more generally should be considered and the scope for variation indicated." [255]

MacLean identified factors promoting acceptance of guidelines, including credibility, education and feedback of information as an integral part of clinical management.

As with clinical audit, unforeseen hidden costs of implementing guidelines appeared. There was a danger that the replacement of some professional discretion by explicit thresholds for treatment could lead to an overall increase in the volume of treatment through individual doctors adopting a 'safety first' policy to prevent litigation.[176] An OL culture aimed to generate the trust required to combat this. So some clinicians continued to doubt of the utility of clinical guidelines.[184]

In spite of the implementation and audit of guidelines, clinical errors recurred. Doctors were under great pressure to reduce waiting lists without compromising quality. At Bristol, senior surgeons were eventually found guilty of bad practice in 1991-95 leading to the deaths of 30-35 more children with heart problems than predicted by average levels.[220]

In Scotland the strain was demonstrated at Stracathro Hospital where a senior consultant who was also medical director did not follow guidelines he had himself developed with colleagues for breast surgery. He was being pressed by GPs and patients for treatment. He did not carry out prior X-rays or tests. The acting medical director brought in from Grampian Health Board was reported as saying that:

> "There was still a belief with some clinicians that guidelines reflect something which was almost purist or esoteric and not for the average doctor."[347]

Other examples came from the Victoria Infirmary in Glasgow. These included patient abuse[2] and deaths of young people, for example from blood poisoning.[237] Hospital staff did not seem to be able to learn at the requisite organisational level to prevent repetition of similar errors. Improving the quality of care delivery became a political aim in its own right as successive clinical errors were recounted in the press.

To summarise, improving care and preventing error became focused on improving the implementation of guidelines. Making staff aware of guidelines was important, but blindly following protocols could be ineffective, for example reducing staff motivation through boredom. It could prevent criticism and local development. Focus group research with British hospital health professionals confirmed that successful guideline implementation depended on achieving the right balance between standardising practice and allowing professionals to use clinical judgement.[238] Just as the need to adapt guidelines to the local context meant redefining some goals, the need to interpret them for the individual patient could also mean redefinition.[255]

3.2 Recent developments

3.2.1 Clinical governance

Central initiatives and legislation

The political concept of 'governance' introduced a new legal power for health service managers in addition to their resource power. With clinical governance, the core idea was to make health professionals accountable for clinical quality through the chief executive of their organisation rather than solely their professional bodies.[84] Chief executives retained their responsibility for efficient resource use, and gained a new legal responsibility for the quality of care. With this underpinning the chief executive now had a duty to ensure all staff performed adequately. A positive and open culture was accepted as the distinguishing feature of the best health organisations, but there was uncertainty about how to define a good culture and how to promote it.[354] The implementation of guidelines remained patchy and impermanent, and needed improvement.

Because of the early inception of SIGN, clinical guidelines were especially central to the clinical effectiveness initiative in the Scottish health service.[401] This charged Health Boards to consult with trusts in creating Health Improvement Programmes. These programmes had to set out:

> "a rolling programme for the implementation of evidence-based clinical guidelines and clinically effective practice, to be monitored through clinical audit;"

Divergences between the Scottish and English legislation became apparent. In the Scottish White Paper of 1998, "Designed to Care"[401] there was no explicit statement that all hospital doctors must be involved in audit. There was such a statement in the English "A First Class Service".[85] In Scotland guidance on clinical governance was given in a Management Executive Letter (MEL)

(1998)75[363] and further guidance in MEL (2000)29.[365] The Scottish approach was distinguished from the English by the different bodies developing and monitoring national guidelines and standards. There was a difference in language. The Scottish MEL insisted that Clinical Governance (CG) committees in Trusts were responsible for overseeing rather than delivering clinical governance. They were to "assure the board" that appropriate and effective structures were in place for the trust to support CG. In "A First Class Service" a senior clinician was to be identified to "ensure systems for CG" were in place.

To sum up, the early setting up of a CG support network and web site showed a more supportive style in Scottish than English guidance. Further evidence of support from the central NHS administration in Scotland was the inclusion in the later MEL of a checklist for trusts' use in monitoring and reporting on clinical governance. A sample of a clinical effectiveness strategy from South Glasgow NHS trust was included with the MEL. Clinical effectiveness (CE) and CG further integrated clinical and managerial efforts to improve the efficacy of health care. They widened the debate to the whole organisation.

Clinical governance implementation

The adequacy of the consultant led medical or surgical firm to meet the requirements and especially the risks of modern multidisciplinary health care was questioned in the mid 1990s.[15;286] Consultants were thought to have too much responsibility, and doctors in training too much routine work. Role conflicts caused personal stress.[260] A rethink of the consultant's role was seen as fundamental to developing new organisational models better suited to training, including evaluation of clinical evidence and team working.[286] Clinical directorates were still evolving after their introduction in 1990 as part of trust applications. The clinical director's role was central to CG. It was particularly stressful, but more like a stool-pigeon (or decoy) than a scapegoat:

> "Professionals want a colleague who would defend them against hostile purchasers and managers by operating as a buffer between them. Executives and managers want clinicians who will lead and influence their colleagues to go in the right direction for the Trust and be accountable for the delivery of contracts and external directives over which they may have little control." [405]

However directorate development was only the first stage. Clinical directors had to encourage a culture where managers and clinicians learned together: "doctors need to develop effective management and policy boards to add value to corporate decision-making processes." [405] This was a task for which they were not often actively prepared. As for the implementation of guidelines, the role of culture became central for CG. The BMJ reported government guidance recommending an open culture for successful clinical governance. This culture sounded very like a learning organisation:

> "education, research, and sharing of good practice are valued and expected; a commitment to quality that was shared by staff and managers; a tradition of active working with patients, users, carers, and the public; an ethos of multidisciplinary team working at all levels; and regular board level discussion of all major quality issues."[24]

Clinical Governance and Guidelines

Up to the mid to late nineties, the prevailing medical culture of professional loyalty[76] and also lack of time, meant doctors would not (perhaps could not) publicly criticise each other. Because of this, they found it difficult to take responsibility for learning in their organisations, including the organisation-wide implementation of best practice from research. After the paediatric heart patients died in Bristol, the emphasis in clinical quality improvement moved to the prevention and detection of error, which became publicly discussable. Other cases of medical error showed Bristol was not an isolated incident. For example, the report by Jean Ritchie QC, on the case of Rodney Ledward, a

gynaecologist who damaged hundreds of women with badly carried out surgery, and styled himself 'the fastest gynaecologist in the South East' concluded:

> "Failures in senior NHS management, a culture where consultants were seen as gods and where there were powerful inhibitions against 'telling tales' were among the factors which led to serious failures in this doctor's practice not being identified at an earlier stage."[138]

For much managerial activity speed was more important than accuracy for a variety of reasons.[421] For example:

> "speed often reduces the necessity for accuracy in the sense that quick responses shape events before they have become crystallised into a single meaning."[421]

In health care, by contrast, accuracy was often more important than speed. A managerial culture of speedy sensemaking did not make up for clinical errors, and may have increased them if it influenced some clinicians to value speed too much. In OL terms, the most radical feature of clinical governance was its insistence that accuracy (quality) was as much a management concern as speed (efficiency). Guidelines too, emphasised accuracy. They provided grounds for professionals to query the accuracy of their colleagues' practice. Because of limited resources speed had some clinical value since patients died, suffered, and deteriorated on waiting lists.

Before Bristol, nurses had been unable to criticise medical practice effectively because their evidence base was seen as less valid from the medical perspective of natural science. Indeed, an English attempt to produce mainly nursing led guidelines foundered because of this.[218] That hospital trusts were expected to compete with each other in the era of purchaser-provider contracting only encouraged trust managers to collude tacitly with the suppression of critical debate. A culture of blame and fear where staff were

afraid to speak out against bad practice grew in the era of artificially competitive contracting.[358] Dr Don Berwick mentioned the blame culture as preventing communication in a television series later in 2000.[34] He recommended treating medicine in the same way as other high risk industries, and looking for areas where communication might break down.

Explicit care guidelines were likely to support this systematic approach. But, with the ending of the purchaser–provider split in 1997, contracting and competition, a lever to give incentive for change (however misplaced) had gone. Other incentives to motivate staff and drive improvement were needed. The defensive culture of blame and fear had to go. Replacing it with an OL culture was suggested,[76;77;144] but how this could be done was not addressed. Some saw the blame culture as associated with a culture that rewarded 'doing brilliantly' where the shapers or champions of new initiatives received most help, while the laggards who most required support and encouragement were ignored. They were not to be blamed for their slow response to clinical effectiveness initiative.[127]

The Bristol case, taken to the General Medical Council in 1997, exemplified the difficulty for health professionals in being heard when speaking out. An anaesthetist, Dr Steve Bolsin, raised the alarm on the results of a clinical audit he carried out.[350] Despite his eventual vindication, Dr. Bolsin was forced to seek work in Australia, after threats and discrimination from professional colleagues.[350] The Bristol Inquiry, reporting in July 2001, emphasised failures of the systems and culture in Bristol Royal Infirmary. It saw the failures as owing as much to general failings in the NHS as to individual health professionals. The report implied a culture of OL was the main factor in preventing error when it said:

> "Learning from error, rather than seeking someone to blame, must be the priority in order to improve safety and quality" [220]

The report highlighted lack of communication, lack of effective working together, lack of (clinical) leadership and lack of teamwork. These were all well accepted dimensions of OL. The report commented on the changing NHS between 1984 and 1995, a time when:

> "there was no agreed means of assessing the quality of care. There were no standards for evaluating performance. There was confusion throughout the NHS as to who was responsible for monitoring the quality of care."

The report's reference to the "'club culture', an imbalance of power with too much control in the hands of a few individuals" was a perfect description of a non-learning organisation. The priorities were exactly those of Argyris' model 1 "theory-in-use", aiming to put the club in unilateral control, discourage enquiry, and save face.

The key recommendations, too, had great parallels with Argyris's model 2 "theory-in-use" – for example sharing control and creating valid information. The complete list follows.

> 1. to make a child-centred environment for the care of sick children,
> 2. to improve safety by promoting openness, and preparedness to acknowledge error, to learn lessons, to be candid with patients,
> 3. to abolish clinical negligence litigation as it created a barrier to openness,[83]
> 4. to make consultant appraisal part of their contracts,
> 5. to treat consultants the same as other employees, with similar terms of employment, and lines of accountability,
> 6. to create agreed and published standards of care for health professionals, and hospital standards for hospitals as a whole,

> 7. to be open about clinical performance, with information on hospital, service or consultant unit performance available to patients, and
> 8. to put in place effective hospital systems to monitor clinical performance, and to have an external performance monitoring system.

Especially telling for guideline implementation was the statement:

> "Bristol was awash with data. There was enough information from the late 1980s onwards to cause questions about mortality rates to be raised both in Bristol and elsewhere had the mindset to do so existed."

OL clearly had a role in both creating information from the data and engendering the motivation to act on it. Recent research identified guidelines and protocols as now the main method for changing clinical practice, but they were ineffective in about half of trusts. Only performance feedback was significantly worse - 74% said it was ineffective.[414] If possible therefore, the implementation of guidelines needed improvement.

SIGN Guidelines were seen in Scotland as the main route for setting up procedures to deliver clinical governance.[321] Coverage of the Bristol enquiry in the Scottish press was influential in Scotland. For example, following the difficulties in guideline implementation at Stracathro hospital, a proposal from the Royal College of Surgeons of Edinburgh suggested sending teams of troubleshooting doctors to hospitals 'as soon as suspicions are raised about poorly performing staff.'[408] There was a growing awareness that the problems were with teams and organisations as much as individuals. Quoted in the same article, the late Professor Jim Petrie, the President of the Royal College of Physicians of Edinburgh and chairman of SIGN said:

> "After Bristol, and the suspension of several colleagues, there was a demand to put in place systems which will reassure the public about monitoring and maintaining standards by the professions. Such systems

should also have the potential to detect organisational, team or individual problems at an early stage and avoid sanctions or suspensions which undermine public confidence and threaten clinicians and their teams."[408]

3.3 In conclusion

Professor Petrie's statement made a good starting point to draw together the threads of this review. It showed how far clinicians had moved since the late 80's when many resisted the introduction of clinical audit. They were now starting to take responsibility for implementing error prevention systems. Clinical effectiveness attempted to provide a framework to get the best value for money, and clinical governance gave the legal sanctions needed to ensure this. Culture had recently been much mentioned as the key factor in improving performance and healthcare quality, but there was only limited evidence in support of this.[359] The consequent need for research on the relationship of specific aspects of culture (especially learning) to specific aspects of performance continued to be increasingly recognised.[73]

In relation to my three themes about the hospital OL context (see chapter 2) the Rycroft-Malone development of the Kitson framework (see this chapter above) explicitly included:

- communication, this was interpersonal sharing of information and points of view, and factors affecting the benefit of the organisation from this, and secondly
- information systems and procedures. This was methods of dissemination, and audit data collection, analysis and interpretation. It included dissemination and feedback of audit results and how they were used.

These were both part of the Rycroft–Malone framework's context sub-element and part of the evaluation sub-element. The third of my themes was innovation, Rycroft–Malone included at least an indirect reference to this in the idea of transformational leadership (part of the leadership sub-element).

Two of my chosen contextual themes related to strategic understandings of change (see chapter 1) were directly reflected in the sub-elements of the Rycroft–Malone framework. Firstly,

- audit and implementation structures was a very similar idea to the framework sub-element of evaluation. Secondly,
- leadership was included in the framework per se.

The last strategic change theme, institutional context, was not reflected in Rycroft-Malone et al's framework. This was probably related to the absence, as mentioned above, of a view of the external context for the organisation. Without such a context and the related theory of institutionalisation it is hard to explain why hospitals in general are so similar on their internal contextual dimensions.

The Rycroft Malone framework provided a rationale linking OL score and context, high OL score was likely to be associated with 'high' context.

Clinical governance did not address the creation of an open culture as a pre-condition for successful error reporting systems without which even single loop learning could not take place or be evaluated. In the business world, Organisational Learning (OL) helped organisations deal with such increasing turbulence, complexity and competition. Guidelines were one approach to coping with increasing complexity and resource pressure in the health service. Besides error prevention, there was a need to develop innovative ways of delivering services and ways of deciding which of competing effective treatments gave

best value for money to the local population in any given health area. OL concepts had a potential role in creating and structuring the dialogue needed. The process of guideline implementation was an opportunity for these debates.

In order to show whether such a dialogue could support guideline implementation in tandem with innovation, it was necessary to show whether and how guidelines could function in double-loop OL processes in hospitals. Could guidelines support groups of health service professionals in developing the focus to do double loop learning?

No previous work related measurement of OL capacity to staff views on guideline implementation, although there had been calls to change to a more open and questioning hospital culture.[253] This knowledge was needed in order to show whether the development of their OL capacity could have practical benefits for NHS hospitals.

> "There is precious little empirical work specific to the NHS to inform strategic and managerial action in these areas, and this lack should be attended to urgently if the Government's ambitions for the NHS are to become reality rather than rhetoric."[298]

The hypothesis suggested that interviewees from the hospital or group reporting lower OL capacity would emphasise the referencing process, and those from the one reporting higher OL capacity would mention the information creation functions as well, since learning was both information creation and use. In the NHS, formalised routine and service delivery on the one hand and innovative ability and learning on the other, were equally necessary for high quality care. Patients were not standardised, so NHS work could not be entirely routinised. Curiosity was needed to motivate investigation of individual cases.

Because all service delivery staff needed to do adaptive learning in any case, to conform to existing goals, the test of the hypothesis in practice was whether

those mentioning implementation activities with at least the potential to be goal changing achieved higher learning capacity scores than those not.

The information set out in this review points firmly to the idea that guideline implementation activities may exist along an OL capacity continuum with purely single loop activities existing in an entirely model 1 organisation with model 1 "theory-in-use" at one end, and purely double-loop in an entirely model 2 organisation with model 2 "theory-in-use" at the other. The question was at what point along this implementation continuum was guideline implementation most effective.

3.4 Specification of rival theories about guideline implementation

The rival theories were about the connection between two guideline implementation patterns and the two forms of OL (see box 2.2, chapter 2, section 2.1). Theory 1 was that joint (single and double loop) learning modes of guideline implementation were associated with similar levels of OL capacity to using either one alone.

Theory 2 said that joint (single and double loop) learning modes of guideline implementation (Box B fig 3.1) were associated with higher levels of OL capacity to using either one alone (Boxes A or C fig 3.1).

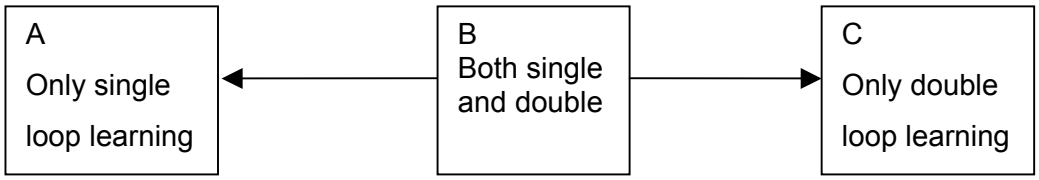

Fig 3.1 Possible organisational learning mixes and modes of guideline implementation in real organisations

Interview data was coded as single or double loop guideline implementation using the following pre-specified features:

Features of single loop guideline implementation:

1. Guidelines were seen only as a system for reference to formal rules,
2. Type 1 learning only was appropriate in some groups,
3. There was a finite learning process for individuals and organisation. This resulted in behavioural modification by simple conditioning not encouraging creative responses or understanding or curiosity.
4. Health professionals were encouraged to give a uniform treatment process. There was little room for discretion, little patient choice.
5. Service delivery and learning was team based in name only
6. Educational inputs were delivered often only by lecture, for example continuing medical education (CME).
7. Clinical and management learning were seen as separate

Features of double loop guideline implementation:

1. Guidelines were seen as an information system informing judgement and providing data used in fuelling further learning, (valid answers to valid answerable questions created new information to justify changed actions)
2. Type 2 learning was recognised as possible in all groups,
3. A continuous developing learning process was recognised for individuals and the organisation. This resulted in understanding of reasons for action and the links between process and health outcome. This in turn was intended to stimulate curiosity, and hence innovation to process.

4. Health professionals were empowered to use their judgement, and to know the boundaries for judgement. This encouraged diverse processes and allowed patients a choice.
5. Service delivery and learning was team based with real dialogue
6. Educational inputs were delivered usually as an integral part of the work situation involving reflection on current practice, for example continuing professional development (CPD).[41]
7. Clinical and management learning were seen as part of a whole system of service delivery, service improvement and organisational learning.

These theories were tested against the data. Type 1 (single loop) implementation was 'adaptive', ensuring compliance. It was a necessary but not sufficient condition for type 2 organisational learning. Type 2 (double loop) implementation was 'generative' in the sense that it allowed the possibility of new goals.

The rival theories in practice came down to whether double loop learning was supported, because single loop learning always existed to some extent, as a necessary (but not sufficient) condition for double loop learning.

3.5 The research question

The broad research question was whether the two theoretical activity and belief patterns surrounding guideline implementation A or C – (in practice this meant A) or B (see Fig 3.1 above) actually existed, and if so, were differently associated with a culture of organisational learning. Since OL capacity was the measure used to assess the degree of double loop learning capacity, the null hypothesis was:

"There are no differences in the SIGN guideline implementation process between acute hospitals of different OL capacity."

Conversely, the hypothesis was:

> "SIGN guideline implementation would have more of the features of generative guideline implementation in the hospital with the highest OL capacity."

The analysis by hospital was the focus of the study. The hospitals were the cases studied, professions were taken as nested cases within hospitals.

The research questions were divided into preliminary and main or hypothesis testing questions because some preliminary selection processes needed to be carried out to find hospitals and guidelines that were likely to be associated with different OL capacity. The questions were as follows:

Question 1 (Preliminary) - OL Capacity

1a - Was the OL capacity scale valid in the acute NHS hospital environment?

1b - Were the OL capacity scores of the hospitals significantly different as theoretically predicted?

Question 2 (Preliminary) - Guideline adoption

Was it possible to identify different guideline adoption patterns (reflected in dissemination, implementation and audit activities and beliefs) as theoretically predicted?

Question 3 (Main hypothesis testing) - Types of guideline adoption and OL

3a – Did the hospital of higher OL capacity have significantly more emphasis on generative guideline implementation patterns than the lower OL capacity hospital?

3b - Were potentially goal changing (generative) guideline implementation/dissemination methods and beliefs connected to significantly higher OL capacity from adaptive beliefs encouraging compliance?

Question 4 (Hypothesis testing) - Substantive activities and beliefs involved in guideline adoption and OL

Were the main specific guideline implementation activities and beliefs connected to significantly different levels of OL capacity from others?

Context

A final analysis described key aspects of context (from interview material) within each hospital, under a small number of general headings. The headings used to organise the contextual material came from the theoretical background on OL and the strategic management theory. For OL, they were the three approaches to OL distinguished in chapter 2:

- communication,
- information systems and procedures, and
- innovation

For strategy, the three organising themes were:

- leadership
- clinical audit/guideline implementation infrastructure
- institutional context and the pressures for uniformity

A separate results chapter (7) examines the first five of these themes for each hospital. The last theme is used as a theoretical perspective linking the discussion to the literature review.

The analysis by hospital was the focus of the study because organisational learning was about organisations per se, not professions or guidelines. The professions were analysed to find out only if who implemented a guideline and had a particular and different role affecting implementation in each hospital.

Section 2 – Methods

Contents of section 2

This section contains two chapters. Chapter numbering follows on from the preceding section.

Chapter 4 – Chronological account of method

Chapter 5 – Pilot study

Chapter 4 - Methods

4.1 Research Strategy and Design

Using the classification of research strategies proposed by Robson[344] the research strategy was case study of two hospitals, and two cases nested within these, which were doctors and nurses. This section gives the rationale for their selection and describes the actual process. The samples within the cases are referred to as the study samples. There were two sets of data:

1. validated scales measured aspects of organisational learning (OL) culture, and

2. structured interviews investigated the guideline implementation process and results.

4.1.1 Overview and rationale for research strategy

The research design was case comparison. OL capacity scores and guideline implementation were compared between two acute hospitals and two clinical professions in each hospital, to see whether the types of guideline implementation differed between higher and lower OL capacity hospitals, and between professional groups within them. For the purposes of this quantitative side of the analysis, approaches to guideline implementation were chronologically the dependent variable, as guidelines were introduced into a pre-existing hospital culture with a particular OL capacity. However, this was not an experimental study, only the existence of an association, (and not proof of causality) was being tested, so the experimental concepts of the dependent and independent variables did not apply.

In addition, selected contextual issues were compared between hospitals to explore context-mechanism-outcome relationships in order to capitalise on the diversity between the hospitals resulting from the case selection method. This

analysis was potentially able to give logical pointers to possible causal relationships.

Research stages

The following steps were needed to test the four hypotheses stated at the end of section 1:

1. Identify contrasting pairs of high and low OL capacity hospitals and professions (study samples).
    a. Develop method for selection of study samples,
    b. Select and validate OL measurement scale for NHS acute hospitals,
    c. Compare study groups using OL capacity scores to confirm whether initial selection was valid.
2. Describe guideline adoption methods, and perceived effectiveness.
    a. Develop and carry out interviews,
    b. Code interviews about guideline adoption to identify guideline adoption patterns.
3. Compare the guideline adoption patterns.
    a. Compare the guideline adoption patterns between study samples,
    b. Compare OL scores for type 1 and type 2 guideline adoption,
    c. Compare OL scores for the main substantive activities and beliefs about guideline adoption.

A timeline diagram follows (fig 4.1 next page).

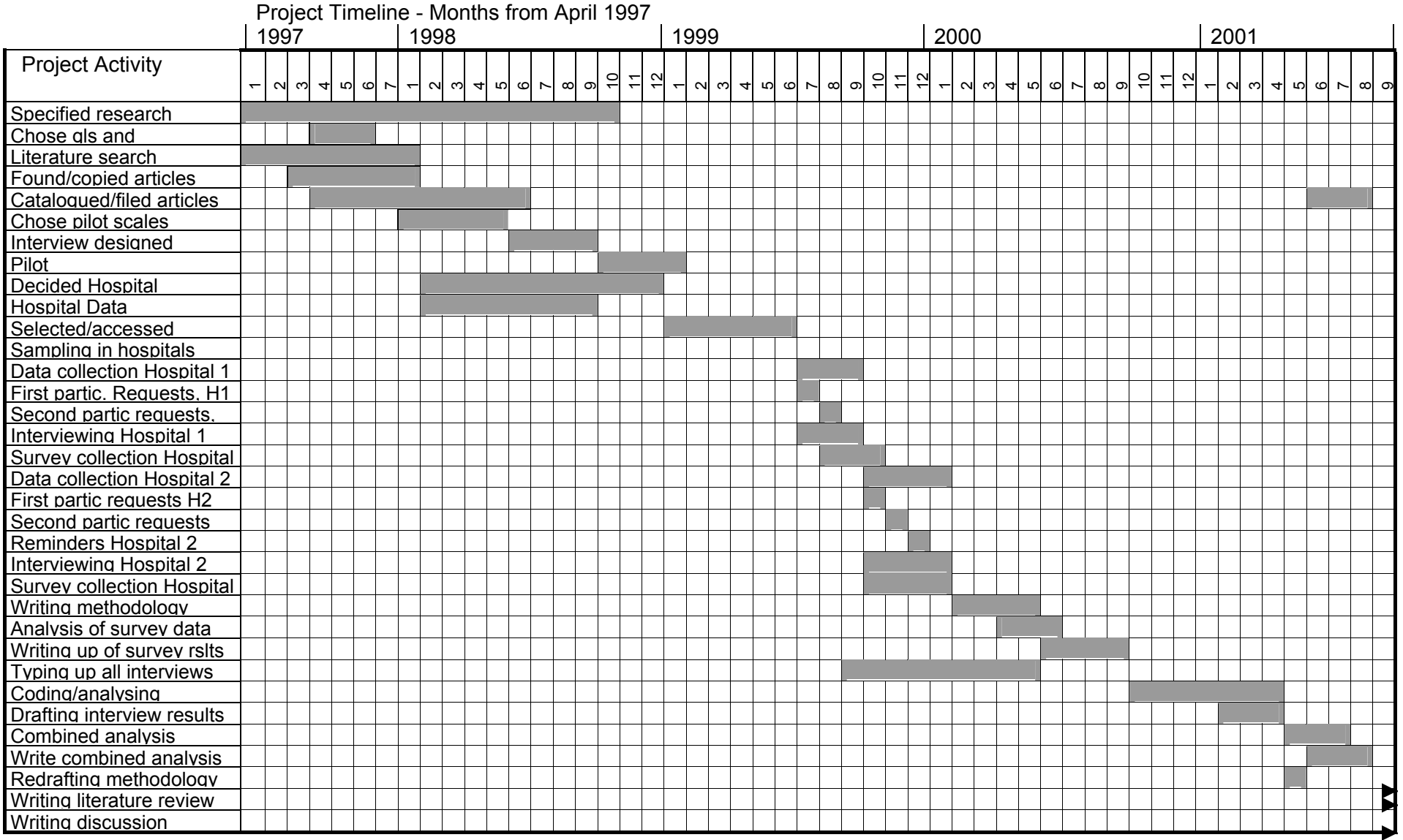

Fig 4.1 timeline of project

Case study

The type of case study to be used needed further definition. Yin,[438;439] reviewed the field and provided a useful classification. He identified three types of case study:

1. Exploratory - establishing the unit of analysis, finding out what features to compare cases on - building theory.

2. Causal

    1. Factor theories – hypothetical causes were used in case selection to see if cases with the hypothesised factors met criteria for effects. There was no theory of how the factor caused the effect.
    2. Explanatory theories- rival theories of how or why the phenomenon happened were tested against cases. Patterns of support or refutation for each theory resulted. Yin gave an example of three rival theories about how research findings got into practice, (1) knowledge driven, (2) problem solving, (3) social interaction. Of nine cases of exemplary research on the same topic, the six with good utilisation "were all found to have key ingredients of the social interaction theory."[439]

3. Descriptive - asked what the phenomenon should be like and developed a descriptive theory to test whether it was so in practice. Descriptions focused on describing critical differences between cases for use in multiple case studies.

For Yin any of these types of case study research could be based on single or multiple cases. Yin's pithy definition of case study showed the difference between it and other research strategies (surveys and experiments) was more than collecting data about the setting and using triangulation. He defined case study as: "An empirical inquiry in which the number of variables exceeds the

number of data points."[439] For Robson, following Yin's approach, a unique feature of case study was its attention to the context in which the subject of the research was set:

> "a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence."[344]

Case study was appropriate where boundaries between the researched phenomenon and its context were blurred (as so often in organisations). Case study used different methods of analysis from the experiment or the survey, and justified them in different ways. For example, patterns based on complex rival theories were developed and tested using rich and extensive data collection. Triangulation was an important concept for the cross-validation of data collected. Triangulation, aimed to ensure, through the constant use of as great a variety of different kinds of data as possible, that the research reflected the full range of interests, ideologies, interpretations and achievements in each case.[380] Like any organisational research, qualitative research of organisational behaviour in hospitals needed to deal with the different perspectives held by different groups of respondents. Smith and Cantley (1985) discussed triangulation in relation to this issue, which also occurred in evaluation research:

> "Denzin[81] has argued that any study dependent upon a single data source is "method bound". The point of particular relevance to evaluation research is that each data source is interest bound (as tied to the perspective of one group rather than that of another).[380]

To help to test any connection between guideline implementation and OL capacity explanatory case study was used: patterns of guideline adoption beliefs and activities logically or statistically related to either or both single and double loop organisational learning were compared between study samples.

The case study comparison approach used two distinct methods. One (chapter 7) was a humanistic one still seeking validity, but which as Donald Campbell recommended in the Foreword to the third edition of Yin's book, "although making no use of quantification or tests of significance […] still work[s] on the same questions and share[s] the same goal of knowledge."[438] This humanistic analysis aimed to analyse hospital context to develop hypotheses of possible relevance in explaining differences reported in the later results chapters. The second approach was more quantitative, following Yin in reducing the qualitative data to thematic categories which were compared quantitatively across the two cases. The results of this approach are given in chapters 8, 9 and 10.

Reasons for using a case study strategy

Different methods of guideline implementation both individually and in combination had been researched, sometimes by randomised controlled trials, more often using weaker designs. These typically assessed compliance with the guideline recommendations retrospectively through case note review. Problems included incomplete record keeping in the clinical case notes from which the data were gathered, and the Hawthorne effect, where the participants' knowledge that they were being researched changed their behaviour.[267] There was no research on the effectiveness of the guidelines in changing organisational behaviour. The research question asked whether better guideline implementation was associated with a culture of organisational learning. A case study strategy was appropriate to address this in hospitals because:

1. Each hospital was a different setting for guideline implementation,
2. Case study was capable of identifying implementation patterns
3. Case study allowed multiple sources of evidence

The case study strategy allowed a theoretical framework to emerge partly from the data (primarily the pilot), rather than being fully pre-specified. This

gave more valid information about a complex topic than a precise but narrow pre-specified theory. The multiple sources of evidence helped to illuminate the multiple facets of guideline implementation and organisational learning in hospitals. To use an analogy, light shone on the topic from many directions, giving better illumination than a single light source.

The analysis framework for the interview data applied the distinction laid out at the end of Chapter 3 between two types of guideline implementation to the different stages of guideline adoption as a basis for two rival theories (see Chapter 3). Theory 2 was more likely than theory 1 to motivate people at work, because all participated in both learning behaviours, and learning was motivating.[97] The rival theories in practice came down to whether double loop learning was supported, and to what degree.

The rival theories connected cause and effect through logic rather than by statistical association. This distinction was explained by Pawson and Tilley in their discussion of generative and successionist causality.[310] Generative showed a logical connection (the smoking gun), an explanation of the causal mechanism, which did not use (or need) statistical proof. Instead it linked context, process (or mechanism) and outcome.[310]. Successionist causality showed a statistical connection between cause and effect with no explanation of how.

4.2 Data collection

The data were gathered by survey and interview direct from doctors and nurses in two acute hospitals. Surveys and interviews were separate phases of data collection.

4.2.1 OL capacity surveys

Following piloting, the OL survey[151] (see appendix 1.1) was selected to measure OL capacity. This instrument included job satisfaction scale and a scale measuring the degree of formalisation of the hospital. The OL scale provided an index to identify high and low OL capacity groups for comparison. The scale measured five dimensions of organisational learning within each hospital and profession:

1. Clarity of purpose / mission
2. Leadership
3. Experimentation
4. Transfer of knowledge
5. Teamwork and group problem solving

The OL capacity survey measured generative learning capacity. There was no example of a single loop learning item in the scale such as: "We are given clear instructions about what to do." In lower learning capacity groups fewer elements of double loop learning in guideline implementation were expected. The formalisation scale was separate from the OL capacity scale, though included with it on the research instrument. It had elements of theory 1 learning, including item 23: "Most of our work must adhere to formal rules and procedures". Another separate instrument, the hospital culture scale [229] measured the strength of a culture of collaboration as a validating measure for the OL scale (see appendix 1.2).

4.2.2 Interviews about SIGN guideline implementation activities

A semi-structured interview schedule was developed and piloted (see appendix 1.4). This asked about methods of dissemination, implementation and audit of the guidelines. The relationship to the OL scale scores was investigated to illuminate the implementation of the clinical guidelines in high and low learning

capacity groups. The qualitative data from the interviews was coded and analysed from two perspectives:

1. Deductive - coding used prior theory about learning in organisations and guideline implementation.

2. Inductive - coding used thematic categories built from the data.

The interviews focused on the implementation of SIGN guideline 2, prophylaxis for Deep Venous Thromboembolism (DVT), and SIGN guidelines 4, 9,11, 12, and 19 on Diabetes.

4.2.3 Selection of Hospitals included in the study

Aim

The aim was to select acute hospitals of different OL capacity for comparative case study. Two were compared to give the required numbers to reveal the main patterns of guideline implementation and compare OL scores statistically. To cover more hospitals would have meant fewer surveys and interviews in each.

Rationale for hospital selection method

Routine data indicators showed only type 1 attainment of pre-established goals, for example reduction in waiting lists, reduction in unit costs, procedures carried out, size and complexity of the organisation. Routine data collection about type 2 OL was almost a contradiction in terms. This was implied by the Argyris's richer description of the distinction between single and double loop learning:

> "One might say that one of the features of organisations as a social technology is to decompose double-loop issues into single-loop issues because they are then more easily programmable and manageable. Single

> loop learning is appropriate for the routine repetitive issue – it helps get the everyday job done. Double loop learning is more relevant for the complex non-programmable issues – it assures that there will be another day in the future of the organisation."[6]

'Programmable' meant a codifiable procedure that could become a routine. There were no direct indicators of active re-evaluation and changed goals (double loop learning) in routine statistics, because they were difficult to codify. Possible reasons for this were firstly, it would be differently interpreted in each organisation, and secondly the examples found would vary widely in scope and would not be easily comparable. This dimension of the organisational learning process was accessible only through data collected in discussion or interview. Routine statistics measured performance and activity using pre-specified data fields. The data collected could arrive in those fields for a variety of reasons – including accident, clever manipulation, and genuine attempts to follow guidance. In only a small minority would changes in pre-specified data reflect autonomous local learning. As there were no direct indicators of type 2 OL, cases were contrasted on their complexity. The logic was that more complex organisations would need to develop more type 2 learning capacity than less complex ones. This method was only a best guess at selecting contrasting cases, and not of high validity. Routine data was used to indicate high and low complexity.

Complexity as a dimension relevant to OL indicators in hospitals

Introduction

The more complex an organisation the greater was its potential to make mistakes, its need to correct them, and to react to and act on its environment. The degree of complexity was the amount of heterogeneity between the composite parts, rather than simply the number of parts. The Oxford English Dictionary defined complexity as:

"1. Comprehending various parts connected together, composite; compound. 2. esp. consisting of parts involved in various degrees of subordination; involved, intricate."[244].

Three types of complexity were distinguished, based on a systems approach modelling hospitals as clinical process, resource use, and monitoring and control structures which joined the two together to deliver.[59] The three part clinical, managerial, and organisational classification of types of complexity was the author's own method of tailoring these ideas to acute hospitals. Chart 4.1 illustrates the classification. The discussion below briefly relates this classification to wider theory about complexity.

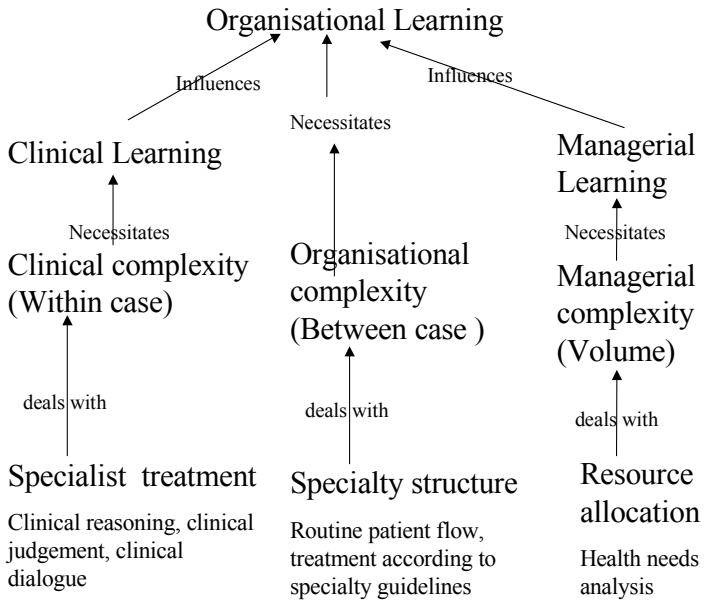

Chart 4.1 Organisational learning and complexity (original diagram)

Managerial complexity and guideline implementation

Resource limitation and rising expectations from patients and staff meant managerial learning about new ways of simplifying delivery structures was needed. The discussions of rationing by Harrison and Hunter and Eddy

exemplify issues and approaches to dealing with this type of complexity.[111;173] Clinical guidelines could help costing by standardising care.

Clinical complexity and guideline implementation

Clinical guidelines made the clinical process more explicit and so more consistent. They also made it more valid by basing it on agreed and evaluated evidence. The greater the number of treatment options the greater the number of issues informing the eventual choice and the larger role for clinical judgement. In clinically complex cases, complexity science originally developed in a management context could help. For example in glycaemic control in diabetes, where diagnostic uncertainty was high and diagnostic agreement was low, uncritical adherence to guidelines encouraging too rapid reaction to short term variation may have done more harm than good.[434] Where clinical evidence was not available or was too detailed to codify, the reasoning and judgement skills needed were part explicit, part tacit. To avoid becoming too complex to use, guidelines had to support rather than replace the tacit.

Organisational complexity and guideline implementation

Organisational complexity increased as organisational structures needed to react to environmental changes[105] including changes to demographics and casemix. Technological change creating new working methods, and increased clinical complexity also made new organisational structures necessary, so-called technological determinism.[45] Reorganisation of specialty groupings, into directorates or clinical networks for example, delivered care and used resources more effectively. Resources could be reallocated between specialities using cost-effectiveness criteria based on evidence in clinical guidelines, instead of giving them to the specialties led by the most persuasive personalities.

Indicators of hospital complexity

Introduction

In selecting hospitals for the study, indicators relating to clinical, organisational and managerial complexity were included. In a DGH the most important aspect of complexity was likely to be organisational - between cases, rather than within case. These three types of complexity fed into an integrated organisational learning process in an ideal hospital. A schematic and simplified view is given in chart 4.1. In real situations there was likely to be interaction between all components of chart 4.1. For example, greater organisational complexity led to more complex decision processes about the most effective allocation of resources within the hospital, or greater "managerial" complexity.

Having set out types of hospital complexity, and argued that they were related to OL capacity, what were specific likely OL indicators? Potential indicators were considered for the three types of complexity: managerial, clinical and organisational.

Indicators of managerial complexity in hospitals

Managerial complexity was about both the volume of potential cases and the resources available to treat them. Volume necessitated managerial learning about the most efficient use of resources. Higher volume caused more competition for resources, and so more complex resource allocation decisions. It reflected organisational complexity because the more cases, the more differences between cases were likely. The number of inpatient cases treated in a year was the measure of volume used. Outpatient and day cases were excluded as they were smaller groups with less impact on cost per case. The university hospitals generally treated more inpatient cases than the district general hospitals (DGHs). Selecting one of each of these types of hospital therefore gave a contrast on volume. Higher volume meant increased work on referral, assessment, booking in, discharge and follow up.

Indicators of clinical complexity in hospitals

On the assumption that hospitals were generally efficient and did not waste money, cost per inpatient week gave an indication of clinical complexity. The assumption was that more clinically complex cases were more expensive to treat. The extra teaching funding to university hospitals was included in the cost per inpatient week because it supported learning activities. The rationale for assuming clinically complex cases were more expensive than clinically simpler cases was:

1. The main cost of treatment was the staff cost.
2. Specialist clinical consultants treated complex cases.
3. Specialist clinical consultants were more expensive than generalists, although there might be some variation between organisations.

Cost per inpatient week was a better measure of clinical complexity than cost per case because some long stay patients were hospitalised for continuing care rather than treatment. Their cost per case would be high because of the length of stay, but they would receive mainly nursing care not expensive specialist treatment. Their cost per inpatient week would reflect that.

Indicators of organisational complexity in hospitals

There could be two cases of the same clinical complexity in different specialties. The qualitative difference entailed different clinical skills, equipment, bed usage, and different external relationships for the organisation This differentiation created organisational complexity. The number of specialties in a hospital reflected its complexity. Clinical guidelines could not be implemented in an undifferentiated structure if there were too many to apply at once.

Process and outcome indicators relevant to OL in hospitals

All indicators were of organisational processes and outcomes rather than indicators of learning. They were at best proxy indicators of possible

organisational learning. It was recognised that all items were subject to uncontrollable bias. None gave proof of different learning capacities in the hospitals chosen.

Organisational support for learning in hospitals

The inclusion of a university hospital was a prerequisite because the extra funding for teaching medical students was likely to benefit organisational learning. The other hospital therefore was a DGH without this funding. There were six recognised university hospitals in Scotland.[197] They were Edinburgh Royal, Western General, Glasgow Royal, Western, Dundee Ninewells (Dundee Royal included), and Aberdeen Royal. They received this funding. Most of these hospitals also received more research funding than others from the research support fund bidding process.[62] They were the only trusts to receive over £2 million each from this research allocation.

Routinely collected data items – strengths as learning indicators

The data items considered are listed below

PROCESS

- Reduction in planned procedures not carried out
- Waiting time reduction
- Increasing day surgery rate
- Increasing bed usage rate

OUTCOME

- Increasing complaints
- Decreased wound infection rate
- Decreased readmission rate

Strengths and weaknesses for each data item are given are given in tables A3.1.1 and A3.1.2 in appendix 3.1. In summary, each indicator could have been

affected by a change in OL capacity, but also by other factors unrelated to OL capacity. They were therefore separately all only "partially valid", but combined, were more valid. The indicators are further described below, as part of the results of hospital selection.

Hospital selection process

The population of acute hospitals in mainland Scotland was defined using four CAMO/DPH functional classifications as follows:

01 Large general major teaching hospitals covering a full range of services (other than maternity in some cases) and with special units.

02 General hospitals with some teaching units but not necessarily wholly teaching.

11 Mixed specialist hospitals with maternity. No special units. Consultant type surgery undertaken.

12 Mixed specialist hospitals without maternity. No special units. Consultant type surgery undertaken.

There were 31 hospitals. Six were excluded. Five of these were ineligible for the study because they were in integrated trusts (Woodend, Stracathro, St John's of Howden, Eastern General, and Perth Royal hospitals). They were excluded because, being integrated with community and mental health hospitals, their learning processes may have been encouraged or discouraged by this. The remaining exclusion was obviously classified as 12 by mistake, since when cross checked in the NHS in Scotland Directory for 1996,[257] it did not fit the description (Randolph Wemyss).

For ease of access, Glasgow hospitals were targeted. The two acute hospitals selected were in Greater Glasgow. They were not intended to represent Scottish hospitals in general. The selection group provided a context for the

two hospitals selected. Each hospital was scored on a number of selection indicators based on measurement of complexity and volume, as discussed above, and the results are described below. Rates as well as absolute levels were compared to allow for different denominators. Trends were also compared. Changing rates in an appropriate direction over a number of years indicated a possible learning hospital. The use of multiple indicators was a means of data triangulation where each indicator functioned like a filter. The rationale behind this was that although each indicator alone had flaws, if used together each would make up for defects in others.

Filtering

Because each indicator had weaknesses, all were applied. The aim was to select a clinically and organisationally complex hospital and a simpler hospital to compare. The complex hospital was expected to have a greater OL capacity than the less complex. The method tested whether, of the two hospitals, one was higher than average on all the indicators and one was lower than average. The higher was then taken to be of possibly higher OL capacity than the lower.

Results of hospital selection process

Introduction

There was no one indicator of organisational learning for hospitals. The hospital selection process was better than a random pairing, but its validity was not claimed to be high. It provided a context for the hospitals finally chosen.

A preliminary process of elimination based on practicalities of access arrived at the likely acute trusts for the study. The elimination resulted in two Glasgow hospitals. These were then tested through the filter indicators as outlined above. There were advantages in comparing Glasgow hospitals as they had in common the same health board and the same city council, thus reducing bias from variations in these factors. Glasgow hospitals were more accessible for

the researcher, both geographically and through professional links. There were two university trusts in Glasgow, and three general trusts with DGHs. This excluded the childrens' hospital. One of the DGHs received elements of university type funding so was ruled out. It was known that one of the university hospitals was already heavily researched, which would have affected response rates to the survey. The remaining university hospital became hospital 1 for the study. Of the two remaining DGHs, one had some connections with hospital 1. As the data collection in hospital 1 ended, its administrative structures began to merge with this other hospital. The remaining DGH became hospital 2 for the study.

The selection indicators for OL capacity tested post-hoc whether the two Glasgow hospitals remaining after the elimination process were likely to give a contrast, one of high and one of low OL capacity. The five indicators already identified and potentially related to clinical, organisational and managerial learning, were used to compare the likely acute trusts in Glasgow with the Scottish average for the university or the DGH group as appropriate. In some cases the data related to a trust rather than an individual hospital. There was always a main hospital in a trust. The largest acute hospital in each trust (on the criterion of average available beds) was the eligible candidate for inclusion in the selection process. In addition to these five indicators, the number of cases and inpatient weeks were included as they showed volume of cases treated, relevant for organisational learning and managerial learning. The figures for each hospital are shown in table 4.1.

Year	Hospital	Median days to deal with Complaints[1] for trust	Percent Cancell-ations [3] for trust	Cost per inpat'n't week [2] for trust (1000s)	Inpatient cases [4] (1000s) for trust	Inpatient weeks per year [5] (1000s) for trust
1995-6 (Univ mean)	Hospital 1	35* (25.7)	2.3 (1.9)	1.71 (1.70)	50.8 (54.6)	53.0 (48.6)
(DGH mean)	Hospital 2	19* (19.5)	4.2 (1.6)	1.13 (1.49)	34.0 (25.4)	40.4 (23.6)
Average for all University and DGHs combined		**21.1**	**1.7**	**1.55**	**33.0**	**30.1**
1996-7 (Univ mean)	Hospital 1	16 (14.8)	2.1 (2.5)	1.94 (1.85)	50.3 (51.4)	50.7 (45.7)
(DGH mean)	Hospital 2	19 (14.3)	4.2 (1.8)	1.25 (1.54)	34.0 (25.4)	38.6 (23.0)
Average for all University and DGHs combined		**14.5**	**2.0**	**1.62**	**32.0**	**28.6**
1997-8 (Univ mean)	Hospital 1	15 (14.5)	Not available (2.9)	1.86 (1.99)	50.1 (53.2)	52.2 (43.8)
(DGH mean)	Hospital 2	19 (14.5)	Not available (1.9)	1.30 (1.61)	32.9 (26.1)	37.9 (22.6)
Average for all University and DGHs combined		**14.4**	**2.2**	**1.71**	**33.2**	**28.2**

Table 4.1 Indicators for comparing hospital trusts.[1 193 3 198 2,4,5 192;195;197]

*Figures are average for quarter to end March 1996
Costs are rounded to the nearest 10; Cases and inpatient weeks are rounded to the nearest 100. (5's rounded down)
Brackets show means for university hospital trusts or district general hospital trusts as applicable. These are based on the taxonomy used by the ISD in table N1.5. It excludes Dental and Paediatric hospitals.
Overall averages are for all acute trusts

Time to deal with complaints

Average time taken to deal with inpatient complaints was a partial indicator of organisational complexity and clinical complexity and their mismatch with health

and patient needs, and associated potential learning process. There was an anomaly in the longer time shown in 1995-6 figures for hospital 1. A possible reason for this was given by the complaints manager in post in 2002, as the introduction of a new method for recording complaints in April 1996. The figure was confirmed in the minutes of the relevant trust meeting.[95] In two of the three years, hospital 2 (DGH) took around 20% longer than hospital 1 to deal with complaints. Although other DGHs improved on average over the three year period, hospital 2 did not. On this test, hospital 2 was less good at OL than hospital 1

Percent cancellations

Percent cancellations of planned inpatient or day case admission was a partial indicator of organisational complexity and associated potential OL process. Hospital 1 had almost half the percentage cancellation rate of planned admission for inpatient or day case treatment of hospital 2. The rate fell in hospital 1 in the second of the two years for which data was available, but there was an average rise for university hospitals. The rate in hospital 2 remained the same, as did the DGH average. On this test hospital 2 was less good at OL than hospital 1.

Cost per inpatient week

Cost per inpatient week was an indicator of conditions supporting learning, a partial indicator of clinical complexity, and of an ongoing learning process to deal with it. Hospital 1, the university hospital, had consistently nearly 50% higher cost per inpatient week than Hospital 2 for each of the three years. University hospitals were generally more expensive than DGHs as they had higher training costs. Hospital 1 had average cost per inpatient week comparable with other university hospitals. On this test hospital 1 was more clinically complex and had greater support to clinical learning than hospital 2.

Volume

Volume (inpatient weeks per financial year) was a partial indicator of managerial complexity. Hospital 1 treated around 50% more cases than Hospital 2 and the average acute trust (table 4.1). Hospital 2 treated an average number. In both the number of inpatient weeks was around 10,000 greater than the Scottish average. On this test hospital 1 had greater need for managerial learning than hospital 2.

Number of clinical specialty groups

The final indicator was the number of clinical specialty groups offered by individual hospitals. It was used as an index of their organisational complexity. Clinical specialties were concerned with the different physiological systems of the body. They were grouped and tabulated for each hospital by the Scottish Office in the hospital/specialty group table.[197]The specialty groups were groups of related specialties combined on a consistent basis. Information and Statistics Division (ISD) provided a table showing how this composition of specialty groups was done.[197]

These tables were used to find the number of specialty groups for 5 of the 6 university hospitals and the 17 DGH's. The missing university hospital (Edinburgh Royal Infirmary) did not appear in the table of hospitals. The number of specialty groups for this hospital was found using the relevant entry in the NHS in Scotland Directory (1996).[257] This listed the specialties at each hospital. The specialties were coded to specialty groups using the table of specialties and specialty groups from ISD. The range, average, median and confidence intervals are shown in table 4.2.

	Number of specialty groups		
	University Hospital group n=6 (containing hospital 1)	District General Hospital group n=17 (containing hospital 2)	All 23 Hospitals combined
Mean	20.3	20.8	20.7
Median	20	22	21
Range	5	13	13
Minimum	18	14	14
Maximum	23	27	27
Count	6	17	23
Confidence Level (95.0%)	18.3-22.3	19.3-22.3	19.6-21.8

Note. Hospital 1 = 20 specialty groups, Hospital 2 = 18 specialty groups.

Table 4.2: descriptive statistics on the number of specialty groups in the 23 hospitals in the population. [197] (NB Stonehouse hospital and Dundee Royal hospital were excluded from this table as they were secondary acute hospitals in a trust, and therefore would receive lower volume of cases, which could affect their need to learn.)

Hospital 1 was within the 95% confidence limits for both university trusts and all 23 hospitals, while hospital 2 was below these limits both for DGHs and all combined. This indicated that hospital 2 had lower organisational complexity than hospital 1. DGHs saw the whole spectrum of cases, though referring some elsewhere. The average number of specialities was greater (though only slightly) for DGHs than for university hospitals. Hospital 1 (20 specialty groups) and hospital 2 (18 specialty groups) were unusual in reversing this relationship, but this was useful for the research as it was further evidence of the higher complexity of hospital 1 compared to hospital 2. On this test hospital 1 had greater organisational complexity and so a greater need for organisational learning than hospital 2

To summarise, on all the indicators, hospital 1 was more likely to be a learning organisation than hospital 2. As shown in table 4.1, hospital 1, the university hospital, was above average on all of the indicators in at least two out of the three years from 1995-6 to 1997-8.

Criterion validity of hospital selection

Two external criteria supported the validity of the selection of hospital 1 as higher OL capacity and hospital 2 as lower:

1. The comparatively low funding for hospital 2 was confirmed in the MacLean report published in March 1999 following adverse incidents.[256] Data collection started for my project in hospital 2 in October 1999. MacLean's conclusions were useful in validating project findings. It mentioned low morale, clinical dissatisfaction with CEO turnover, rising patient complaints following bad publicity about adverse events, and low resource provision in comparison with the other Glasgow hospitals. A number of substantive recommendations were made in relation to A & E, general surgery, general medicine. These were about organisation and delivery of care. For example, in A & E, staffing level was inadequate, but a separate receiving unit was needed. For general medicine, patient transfers between wards were recommended to be reduced, to improve continuity of care and to save time on ward rounds. The standard of medical practice was found to be "exemplary". However, no independent clinical audit of care was carried out by the review.

2. The Information and Statistics Division (ISD) of the Scottish Office, reported that hospital 1 was more complex than the average Scottish acute hospital. It produced an unpublished report about the complexity of hospital 1 relative to other Scottish acute hospitals in 1997-98. The following quotes come from a letter written by the author of the report:

> "ISD produces national complexity weights for each acute specialty using English national reference costs. The weights are scaled so that the average weight for each specialty is 1.00. When applied to SMR01 data for an individual hospital or trust, a measure of the local casemix can be estimated in resource terms, for example an average complexity

> or weight of 1.12 for specialty X suggests a casemix 12% more complex, in resource terms, than the Scottish average specialty X case"…… …… "Based on the 17 acute specialties covered by the 97/98 HRG report, [Hospital 1] trust's overall complexity factor was 1.12 – i.e. in the specialties done by [Hospital 1] (within the 17) their cases were on average 12% more complex than the average cases in these specialties in Scotland. Table 1 in the HRG report shows that [Hospital 1] trust has a cost efficiency index of 1.09 i.e. 9% more expensive across the included specialties than expected, based on national experience (not teaching trust experience)." Reid B. 1999 (personal communication).

Health Resource Groups (HRGs) were groupings of procedures and diagnoses. They applied to particular clinical specialties. They were based on clinical similarity and similar resource use.[197]

Post hoc validation of hospital selection.

The measures (particularly for organisational learning) used to select the hospitals were crude (see above). There was a need to confirm by measuring the organisational learning culture again in the situations investigated. This was part of the main research. Each hospital's culture was tested on two separate indices derived from separate validated questionnaire scales. One scale measured OL capacity, the other scale measured hospital culture. For senior staff, the OL scores were higher for hospital 1 than hospital 2. The hospital culture scores were slightly higher at hospital 1, but formalisation scores were significantly higher at hospital 1. The mean for hospital 1 was 4.48, that for hospital 2 was 4.12. The higher formalisation score raised some questions about the relationship between organisational formality and the OL measure.

4.2.4 Selection of SIGN guidelines included in the study

Aim

The aim was to choose a pair of guidelines, one more and one less complex to implement, on clinical and organisational criteria. The reason for this was to ensure guidelines chosen represented each. Managerial criteria were not relevant to this process for the guideline documents because the volume of patients involved was a local issue. The DVT prophylaxis and all the Diabetes guidelines were the prime candidates because they were widely applicable in acute hospitals, giving more chance of achieving the numbers of responses needed for the scales. A series of filters was not required for measuring the complexity of these guidelines. It was a simple content analysis, using the procedure described below, of the 22 pilot SIGN guidelines already published at the time of the research.

Guideline selection

Rationale – measurement of organisational complexity

OL, although it took place in individuals, was necessarily a social process, which worked best in groups of heterogeneous personality types. Groups containing heterogeneous personality types were known to be more effective.[187] Personality types were linked to cognitive (and hence learning) styles.[187] A relationship has been suggested between a team's orientation toward the future, the present, or the past and more effective learning.[187] Experiment, for example, involved speculation about future applications, but was based on theory developed over time (like practice guidelines). An organisational learning cycle embracing all the learning styles has been suggested.[96] Different parts of the learning cycle relied on different learning styles.[287] Different personality types were attracted to different types of clinical work.[190;232;325] Multidisciplinary clinical groups were composed of more heterogeneous personalities than single discipline groups. It followed from this, at least

hypothetically, that more multidisciplinary guidelines, although organisationally complex to implement had the greatest OL potential and were potentially (if successfully implemented) more clinically effective than unidisciplinary guidelines.

Guideline selection process – for organisational complexity

The specialties, professions, care types and patient representatives involved in developing the guideline were counted, as were the professions, specialties, care types, management groups and services recommended for inclusion in the implementation group.

Local implementation group membership recommendations:
one point was given for recommendation of:

- more than one profession
- more than one type of care,
- more than one specialty,
- more than one service (e.g. health and social services), and
- management involvement.

Protocol development group membership:
points were given (one each) according to the numbers of:

- medical specialties,
- health professions,
- care types and
- patient representatives.

Box 4.1 scoring system for organisational complexity of clinical guidelines.

Guideline 12, which did not make implementation group membership recommendations, was included in scoring based on the development group only. The counts were used to create an organisational complexity index for each guideline. Of the 22 pilot guidelines (guideline 10 was not SIGN), 16 gave recommendations for involving specific groups in implementation, and 17 gave recommendations for protocol development group membership. A system to score these was devised, see box 4.1. Scoring was carried out according to the

rules shown in box 4.1. The summed points provided an organisational complexity index for each guideline.

Guideline selection - organisational complexity results

Using the approach described above, the DVT guideline was significantly more complex than the other pilot guidelines, and the diabetes guidelines were about average.

Rationale – measurement of clinical complexity

Guidelines were viewed as lists of recommendations. The greater the number of recommendations the more complex the guideline became to implement. Only "A" grade recommendations were counted. The "A" graded recommendation in a SIGN guideline was the most important because based on the most valid evidence (at least one randomised controlled trial).[368] For a description of the evidence levels and grades see appendix A3.2.

The complexity of the implementation, rather than the complexity of the guideline itself, was the relevant factor for this study. Implementation included understanding the guideline, remembering the recommendations, comparing them with practice and policy, and deciding and communicating clinical action. A specialist guideline could be clinically simple if it had narrow scope (few recommendations), like the SIGN diabetic renal disease guideline (number 11).

Guideline selection process - for clinical complexity

The "A" grade recommendations in 21 pilot guidelines were counted. (Guideline 5 was excluded as it did not grade recommendations, and 10 was excluded because it was not SIGN) The majority of recommendations were concerned with diagnosis and treatment.

Summary

The OL capacity required to implement would be greater for a more complex guideline. The DVT guideline was assessed as more complex than each individual diabetes guideline for two reasons. These were:

1. its implementation involved more specialties for protocol development and implementation than the mean for the pilot guidelines. (see appendix 3.2.2) It was therefore more organisationally complex than average, and
2. it contained more A grade recommendations than the mean for the pilot guidelines (see appendix 3.2.2). It was therefore more clinically complex.

4.2.5 Selection of health professionals

The professions were doctors and nurses, as the majority of NHS clinical staff, with complementary roles. These two groups provided an opportunity to study a routine and bureaucratic structure working in parallel with a looser structure that aimed to facilitate non-routine activities, which benefited from more clinical reasoning.

> "The parts of an individual's skill that are completely routinised are those that he or she does not have to think about – once a routine is switched on in the workers mind, it goes to its end without further consultation of the higher faculties."[388]

The theoretical framework for comparison developed as descriptions of type 1 and type 2 guideline implementation were enriched (see chapter 3). Other substantive themes came out of the coding.[81;82]

Statistically representative sampling was needed for the valid use of the survey. Most interviewees also completed a survey. This enabled survey and interview results to be analysed together. Nurses, midwives and doctors were

the majority of Scottish acute clinical staff (see table 4.2). Hence the focus on them. Midwives and medical staff made and accepted referrals, nurses generally did not.

Hospital Services (All Scotland)	**Count**
Medical staff	6441
Nursing staff	
Qualified (D grade and above)	29525
Unqualified (Auxiliaries)	6325
Dental	200
Hospital and Community Services (All Scotland) (No separate figures given for hospital only)	
Professions allied to Medicine (9 professions)	
Qualified (for membership of professional association)	5247
Unqualified (assistants and helpers)	672

Table 4.2 Professional hospital staff in Scotland categorised by profession (Whole Time Equivalents at 30/9/95 [193]

The research population was nurses and midwives of D grade and above, and doctors of all grades. Staff with less than 10 weeks service were excluded. Consultants and G- grade clinical nurses/midwives were the most important group for the study as they were the clinical leaders. At least 30 staff nurses/midwives and a small number of junior doctors were included in each trust as representatives of the led. The small number of junior doctors was because SHOs and HOs, as they stayed with a hospital for around 6 months, were unlikely to be as familiar with the hospital culture as consultants. Staff nurses formed the bulk of the workforce and this alone meant their attitudes were important for hospital culture.

There were no midwives in hospital 2. The midwives in hospital 1 were included because the consultants from the relevant directorate were included. Midwives had largely the same training as nurses and they filled a similar role in that directorate. Their responses were compared with those of nurses later in the project. Health professionals in four directorates were excluded from the population to reduce the number without involvement in either DVT prophylaxis

or the specialist treatment of diabetes. These were Accident and Emergency, Anaesthetics and Theatres, Imaging, and Laboratories.

In hospital 1, there was no researcher access to staff lists. The selection method was to take every second name from a randomly ordered list. In hospital 2, the sample was selected from the staff list by the researcher using an SPSS randomising function. Staff at another satellite hospital some miles away were excluded because this hospital did not share consultant staff with hospital 2.

Justification of sample size

The initial sample in each trust was intended to be 200, to give a total of 400. This assumed a minimum 50% response rate and a final response of 200 from the two trusts combined. This response rate was optimistic for this type of study (see studies listed in appendix 6.1). For example a comparison of whether staff had been involved in guideline implementation or not between the hospitals would ideally compare 100 staff in each hospital. If a proportion of 0.40 in one hospital and 0.60 in the other said they had been involved this would be a significant difference at $p<0.05$.[308] From Machin and Campbell's tables[254] a sample size of 97 per group would give 80% power at $p<0.05$, and a sample size of 86 would give 75% power at this level of significance. A sample size of 43 per group was closer to the size of the groups actually recruited for this analysis. This would detect a difference between a proportion of 0.35 in one group and 0.65 in the other at 80% power and $p<0.05$.

The statistical power to detect differences in OL capacity means between two groups was worked out formally retrospectively using statistical tables.[254] An 80% power was given by this sample size (100 in each group), assuming a minimal difference between OL capacity means of 0.40 needed to be detected. This assumed for example an OL capacity mean in hospital 1 of 4.2 and in hospital 2

of 3.80, and a significance level of 0.05. As in fact, because of the response rate, only around 45 senior staff from each hospital were in each group used to compare the hospitals a minimal difference of 0.60 would have been detected at 80% power. If however standard deviation was assumed to be 0.8, the minimal difference detected at 80% power would be 0.6*0.8=0.48. All of the above has been confirmed with a statistician at University of Glasgow, department of statistics.

Reminders were intended. The response rate was lower than hoped and reminders were not possible in hospital 1, so approximately a further 300 were sampled in an attempt to get the sample of 100 assuming only a 20% response rate. The same sample size (c 500) was used in the second trust for comparability. As senior staff had a higher response rate in hospital 1 (over 50%) the sampling strategy was amended to allow reminders in hospital 2 concentrate on obtaining equivalent response rates from senior staff as to hospital 1 so the senior professional groups could be compared between hospitals.

There were no reminders at hospital 1 owing to lack of resources to carry this out at the personnel department because the contact organising the issue of letters to the sample was not allowed to reveal who had initially been asked to participate. Hospital confidentiality rules forbade it. When the contact went on long term absence from work for health reasons, resources did not allow for replacement.

Invitations to participate

A personally addressed letter requested participation. An addressed returns envelope was included to increase response rate. The interviews were tape-recorded. Because this was thought likely to discourage some health professionals from being interviewed two different versions of the letter, one giving an option to return a survey without being interviewed (see appendix 3)

were sent out a month apart in each hospital. The first letter was sent to 200 sample members and the second to the rest. Both letters included a standard summary of the project. The letters were varied as described below. This was a means of triangulating the data collection methods.

Version 1 of invitation letter

The reply slip for the first letter (see appendix 3.9) asked for participation in the research without distinguishing between interview and survey. The first went to a randomly selected group of 200. This group was given the survey at interview. That the interviews were to be tape-recorded was not mentioned. Potential interviewees were made aware of the need to tape record by telephone when the appointment for the interview was booked.

Version 2 of invitation letter

The second reply slip (see appendix 3.10) distinguished between participation in the survey and the interview. Respondents could therefore choose to participate in the survey only. The survey was included with the letter. The need for tape recording the interview was mentioned in the letter. Respondents were told they need not be involved with DVT prophylaxis or diabetes treatment to answer the survey. Respondents to the second letter could return the survey whilst ensuring they remained anonymous as the survey was included with the letter and could be returned anonymously by post.

Reminders

The best response rates at hospital 1 were from G grade nurses/midwives (sister/charge nurse) and from consultants. Consequently, at hospital 2, G grades and consultants were targeted as key comparison groups for both surveys and interviews. Reminders were by telephone to all non-responding consultants and clinical G grade nurses. The response rate among these groups

was high for health services management research in this setting. As consultants and G grades were long serving and had a wider span of control than junior staff they could be expected to know more about the learning capacity and culture of the hospital. Added to this, with their educational role they were likely to be the main transmitters of values and behaviours affecting learning capacity. They therefore made an important group for comparison of the learning capacity of the hospitals.

When no further responses were obtainable from these groups, 50 D and E grade nurses were reminded by a modified version of letter 2 in order to increase survey response toward the 100 level (appendix 3.11).

4.3 Measurement method for organisational learning

4.3.1 Rationale

Acute hospitals had broadly similar levels and sources of funding, and they were subject to the same legislative constraints. Variations in organisational behaviour were likely to reflect values, beliefs and expectations. Some formal structures such as libraries, computer information networks, briefings, seminars, and training programmes were helpful for OL, but they did not guarantee it.

So, to measure OL capacity it was more important to measure OL culture than to collect data about structures. OL culture was reflected in the strength of beliefs (attitudes) about aspects of OL. It was thought to have multiple aspects.[151;313] How could these be measured?

The measurement of attitudes

The best methodology for the quantitative measurement of attitudes was scaling, for the following reasons:

1. the large number of items sampled a number of dimensions of the topic, giving a more valid and balanced measure,
2. the most reliable items were selected from an initial pool,
3. idiosyncratic responses which might have led to biases in individual items cancelled each other out when absorbed into an overall mean.

The strengths and weaknesses of the Likert scale were reviewed in comparison with other types of scale (see appendix 3.5). Scales were categorised into those where the respondent directly estimated their own attitude and those where the attitude was adduced by the researcher from comparisons of responses.[115] On balance a Likert scale was thought best because it was additive, gave a total index and was preferred by respondents. Likert scales used direct estimation, and the danger of social desirability bias was recognised. Although there was a danger of confusing different dimensions the OL capacity scale finally chosen had only one dimension anyway, confirmed in factor analysis by the authors.

There were other possible methods for gathering data about learning capacity. These included nominal group process, repertory grid techniques, and discourse analysis. They were rejected for this study because they were not quantitative and also impractical because time consuming for health professionals who had little spare time in their working day. Table A3.4 in appendix 3.4 gives details.

Selection of scales piloted

The BPO database was trawled using "organisational learning" as a search term. Neither the British and the American approaches were able to show examples of instruments that had been widely used in the health service.

Scales considered

Other possible scales were identified. Further literature searches were done. Two search strategies were used for each database to maximise "hits". See appendix A3.3 for details of search results.

Search 1

Of four papers identified using "measurement scale", two related to the SERVQUAL an instrument which assessed health services quality through patient perceptions.[14;234]. The third also assessed patient perceptions of service quality.[164] The fourth measured nursing quality.[427] None were suitable for measuring organisational learning capacity or culture because:

1. they assessed quality rather than learning,
2. three took a patient perspective which was external to the learning process,
3. the other applied only to one professional group.

Search 2

One reference was retrieved using "learning culture OR learning capacity". It concerned a scale measuring learning capacity in business purchasing functions.[186] This identified 4 orientations: to the team, to systems, to learning and to memory. Further scales were identified mainly through other researchers and personal knowledge from previous research projects. These included:

1. The Team Audit Questionnaire (Hearnshaw HM – personal communication 1998). This questionnaire was confined to audit only and had not been formally validated.
2. The Culture Questionnaire ((Hearnshaw HM – personal communication 1998).
3. This was adapted for general practice from a published business approach.[140] There was no claim to measure organisational learning. Its

purpose was to stimulate discussion about culture. The items were similar to those on the scale finally used. It was longer.

4. The Evaluation of Clinical Competence form (ECC).[80] This applied to physiotherapy students only.
5. Questionnaire for assessing staff perceptions of trust-based clinical audit programmes.[247;248] Limited to clinical audit only.
6. The ward atmosphere scale.[284] Confined to wards rather than the whole organisation.
7. The clinical learning environment scale.[106] This applied to clinical learning and ward nurses only.
8. The Learning Company questionnaire.[314] (see below).
9. The Learning Organisation survey.[151] (see below).

From these, all but two were rejected for piloting for the reasons given above. The two piloted were the Learning Company questionnaire[314] and the Learning Organisation Survey.[151] See report of pilot.

The learning capacity of each hospital was measured using the Learning Organisation Survey.[151;152] This was a seven category Likert type scale. The items were clearly related to day to day experience and obviously connected to underlying values and beliefs. The scale used self-report, not direct observation, as learning was not directly observable. It was short, quick, and the language used performed well in piloting (see chapter 5). It included 5 separate OL sub-scales based on dimensions found in a literature review. It was self-validating as the instrument included two other scales for job satisfaction (predicted to have positive correlation with OL) and formalisation (negative correlation). The scale was not developed for use specifically in the NHS acute sector. The hospital culture scale was developed for this setting. It measured a related aspect of culture, collaboration. It validated the OL Scale in the NHS acute setting.

The sub-scales of the OL scale were:

1. Clarity of mission and vision (4 items)
2. Leadership (5 items)
3. Experimentation (5 items)
4. Transfer of knowledge (4 items)
5. Teamwork and group problem solving (3 items)

The further scale measuring hospital culture[229] was administered at the same time.

The first use of the 21 item learning capacity survey was to develop an overall learning index for each study sample. This was done as detailed in appendix 1.1.2.

4.3.2 Aims of comparisons using scale scores

The OL scale was a measure of individual satisfaction with the organisation's learning capacity, the mean score for each hospital was an indicator of the OL capacity of the hospital. The mean score for a subgroup within each hospital was an indicator of the OL capacity of the hospital for that subgroup. The aims of these analyses were:

1. firstly, to see whether as predicted by the selection procedure hospital 1 had a higher learning capacity than hospital 2, so that guideline implementation could be compared in organisations of different learning capacity, and

2. secondly, to identify natural groups of high and low organisational learning capacity, not only the hospitals themselves, but also professions.

The five sub-scales in the learning organisation survey were compared for hospitals and professions. This was to see if any sub-scales in particular were associated with the differences.

4.3.3 Main groups

Comparisons were between scores on all scales and sub-scales, clinical seniors only, except where seniors and juniors were explicitly compared. Seniority groups were systematically compared because senior grades scored higher on OL capacity. This was a known effect with this instrument (personal communication, Goh S. 18/05/2000 – see appendix 1.5.3). The exclusion of juniors controlled for bias caused by different proportions of junior staff in the groups compared. The main planned comparisons were between the two acute hospitals. The OL capacity of the medical and nursing professions were to be compared with special reference to differences and similarities between hospitals, making the hospital the main focus of comparison. Different sets within sets were planned for comparison of these groups as in table 4.3 below. It was necessary to look at the sets within sets as scores varied considerably between sub groupings. These variations could have been cancelled out in the full response set, and any subgroups of significantly high or low learning capacity consequently missed.

	Between Hospitals	Between Professions
Within hospital	-	All senior Doctors with senior nurses in each hospital
Within Profession	All senior doctors and nurses	-
Within grade	Seniors and juniors	Senior doctors with senior nurses Junior doctors with junior nurses
Overall	All seniors hospital 1 with hospital 2	Doctors with nurses

Table 4.3 Main planned comparisons of OL scores

To give information generally relevant to the interpretation of other analyses, the correlation between all scale scores and career history items including age was tested.

4.3.4 Other comparisons

Guideline implementers as a group were compared on scale scores with non-implementers, and members of implementation groups were compared with those not on them. This gave an overall measure of the association of OL with involvement in guideline implementation. The scores of those in service at the date of guideline implementation were compared with those joining the hospital later to see whether the initial implementation process in the hospital had any lasting effect on the OL capacity of the staff who experienced it.

4.4 Data collection method for guideline implementation

4.4.1 Rationale for the use of semi-structured interviews for data collection

Reasons for the use of the case study strategy were given in this chapter, section 4.1. The semi-structured interview was able to gather this type of data. It was possible to use it to find the patterns of belief about implementation of SIGN guidelines. Specific advantages and some disadvantages are listed in table 4.4.

Advantages	Disadvantages
Explanation/clarification of questions	Interpersonal reaction to interviewer (this was at least consistent)
Qualification of responses	
Flexibility – could probe for unexpected topics, not entirely predefined	Interviewer characteristics - for example age, gender, not being a health professional
Other non-verbal information recorded – tone of voice, laughs, sighs etc	Variety in interviewer behaviour. Large number of interviews helped to even this out
	Defensive responses. Reassurances of confidentiality and anonymity were given to reduce suspicion

Table 4.4 Semi-structured interviews – advantages/disadvantages for this research[389]

4.4.2 Guideline implementation interviews

Reasons for rejecting alternatives to semi-structured interviews

For completeness, the main alternatives to semi-structured interviews and reasons why they were not used are given in table 4.5 below. The development of the pilot interview schedule is described in chapter 5, followed by the changes to the interview schedule as a result of the piloting.

Possible Method	Reason(s) for rejection
Unstructured interviews	Some structure was needed for consistency in comparison
Structured interviews	Would not have allowed probes following up unexpected issues
Participant observation	Access was not allowed to confidential meetings.
Documentary analysis of audit reports	Access not allowed, only a minority of guidelines was audited, reports were very general. Primary data on the views of health professionals was the research focus
Documentary analysis of departmental policies	Did not show whether there was dissemination or implementation, (the research focus).
Survey	Superficial, misinterpreted, inflexible, though more neutral than face to face interview. Response rate problems.

Table 4.5 reasons for rejecting alternatives to semi-structured interviews

The interview schedule (see appendix A1.4) covered protocol development, dissemination, and implementation (including audit and change), for a guideline chosen by the interviewee. General issues were also covered. All interviews were tape recorded and transcribed.

4.4.3 Interview structure

The interviewee was given a choice of talking with reference to SIGN DVT prophylaxis or SIGN diabetes or another clinical topic. The interview was structured using guideline implementation theory about stages of implementation (see rationale for methods section).

The guideline referred to in each interview was recorded in the interview script. If the interviewees did not wish to reply with reference to either SIGN DVT prophylaxis or one of the SIGN diabetes guidelines they were invited to reply about another guideline rather than abandon the interview. The full interview schedule is in appendix 1.4.

Dissemination was covered under four heads –

1. How the interviewee got to know about the guideline,
2. How the interviewee informed others,
3. Desirable changes,
4. Support needed from the hospital.

Implementation covered -

1. involvement in implementation groups developing local protocols,
2. action to ensure recommendations were put into practice,
3. involvement in the audit group,
4. knowledge about the audit aims and quality improvement.

Results of implementation included -

1. communication of findings to the interviewee and others,
2. Changes to interviewee's and others' practice.

A section on learning investigated -

1. learning about other teams and directorates,

2. new ways of working, and help needed.

A final section asked for general views on -

1. purposes and use of SIGN guidelines,
2. whether professional colleagues and other professions would agree,
3. ideal expectations of guidelines,
4. their effectiveness,
5. any factors constraining or facilitating their implementation.

4.5. Summary of case selection rationale

There were 2 groups ("study samples") each containing two contrasting cases. They were:

Profession – Doctors and Nurses

Hospital – Hospital 1 and Hospital 2

The cases formed an four cell matrix (Chart 4.2). Two cells were predicted to be at opposite poles of the spectrum of OL capacity because they contained all the groups expected to be of high or low OL capacity. Depending on the relative influence of each of the two factors (unknown) the others were expected somewhere between these poles.

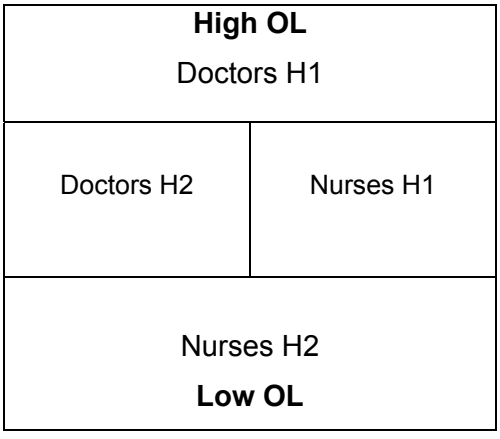

Chart 4.2 Four possible combinations of cases and predicted OL capacity.

In brief, hospitals, professions and guidelines expected to be associated with different OL capacity were selected, OL capacity was measured and guideline implementation activities and beliefs were compared.

There was no possibility of proving causality from this research design. It tested the association between learning capacity and type of guideline implementation activity in hospitals and professions. Each difference that was found between groups at interview was tested by matching it to the type 1 and type 2 models to see whether either hospital was implementing the guidelines more as an information system supporting double loop generative OL, a reference only system supporting only single loop compliance checking, or neither.

4.6 Statistical methods

4.6.1 Corrections for large number of tests

Quantitative comparisons of scale scores

The bonferroni correction for large numbers of tests was applied to the distinct groups of tests rather than the tests en masse, since the bonferroni correction was known to be conservative (personal communication from H. Gilmour, statistician at University of Glasgow Department of Statistics, 2001). To determine the significance level required the formula used was p-value divided by number of tests. Some tests were repeated within study samples (profession and hospital) as well as for the overall sample. For this reason they were correlated with the overall tests, so not included in the number of tests for calculating the bonferroni correction required.[35] The small number of comparisons of OL in each group of main scale comparisons, meant correction for large numbers of tests was not required here. The sub-scales were highly correlated with each other. Bonferroni corrections were thus inappropriate for

the comparisons on sub-scales.[35] As there was only one chi square test, a Bonferroni test was not required there.

Qualitative comparisons of guideline implementation

The chi-square tests were applied to the five different guideline adoption stages and to the general issues about guideline adoption. The bonferroni adjustment was made in each of these distinct groups for each of the three types of data. The level of significance required for significance at 5% after bonferroni adjustment (if required) was calculated for each distinct group. Bonferroni adjustment was not considered required if there were less than five tests in a distinct group.

Comparisons of OL capacity and guideline implementation

Rules for calculating the bonferroni correction for large numbers of statistical tests were followed. The tests were divided in to 3 distinct groups as shown in the columns of each table. Bonferroni correction did not apply where measures were correlated.[35] As the OL sub-scales were highly correlated with each other (chapter 6), the correction level was not increased from that used for the complete OL scale (see chapter 10, table 10.2). So although there were five sub-scale tests for each test of the whole scale, because they were correlated, the number of tests used to calculate the bonferroni correction remained the same as for the whole OL scale. The correction for sub-scales was therefore the same as that applied for the complete OL scale in each distinct group of tests. Since SPSS would not show more than 3 decimal places for p values, in practice $p<0.001$ was used. The closed questions were fewer and a slightly higher value for p could have been used, in practice this would have made no difference.

There were two Chi square tests to compare study samples involved in guideline implementation activities found to be associated with significantly different

levels of OL capacity. This was too few for bonferroni correction to be necessary.

4.6.2 t-tests

Variances were assumed unequal between groups, and significance tests were two tailed.

4.6.3 Adjustment method for missing values

Missing values were adjusted for in the calculation of scale means by reducing the denominator.

4.6.4 Correlations

Correlation statistics used were parametric – Pearson's r.

4.6.5 One sample Chi square

This test was used to compare hospital 2 responders with the population for example on gender. It compared the proportions in the population with the proportion among the responders. This test is discussed by Cohen and Holliday[68] and Langley.[236] The numbers for the population and excluded directorates were supplied by the personnel department at hospital 1. The numbers in excluded directorates were checked directly with the relevant clinical director. There was a reasonable convergence.

4.6.6 Estimation of nurses and doctors in research sample in hospital 1

The number of G-grade nurses and the number of consultants in the hospital 1 sample were not available to the selection process. The size of the sample was known, and so were the numbers of G-grade nurses and consultants in the research population. As the sample was a simple random one, the numbers in these groups in the sample were estimated using the proportions in the

population. The number of consultants in the hospital 1 sample was estimated by deducting the number in excluded directorates, (58) from the total number in the hospital (85). This gave a research population of 27, deducting the 7 medical and clinical directors, who were all included in the sample, and halving the remaining 20, (since the sample was 1 in 2) to give 10. The sample was therefore 10 plus 7 = 17. The number of G grade nurses/midwives in the hospital 1 sample was estimated by deducting the number in the excluded directorates (31) from the population (161), to give a research population of 130. The 1 in 2 random sampling gave a final sample of 65.

A different method was used to estimate the proportions of nurses and doctors among all staff in included directorates in hospital 1. As the breakdown of all staff by profession in the excluded directorates was not known, this estimate was liable to be invalidated by there being proportionately more doctors in the excluded directorates. This was in fact quite likely as there was a high number of consultants in the anaesthetics and theatres directorate, (excluded). The assumption might have been that that there were a similar proportion of doctors in the hospital 1 population as in hospital 2. In that case the difference between responders and research population on profession in hospital 1 would have been smaller but still significant at $p<0.05$.

The population in each age group in hospital 1 in the included directorates was estimated from the breakdown by age group in the whole hospital supplied by the personnel dept.

Chapter 5 - Pilot study

5.1 Development of initial interview schedule

The aim of the interview schedule was to gather data about implementation patterns for the guidelines. The structure came from accepted stages of the implementation of clinical guidelines. The stages were development, dissemination and implementation.[160] For the interviews, these stages were applied to the development and introduction of the local protocols resulting from local adaptation (Fig 5.1). Further sections on the outcomes of guidelines and on general views were added. The interview questions were developed in consultation with audit experts (including clinical) at the Scottish Clinical Audit Resource Centre.

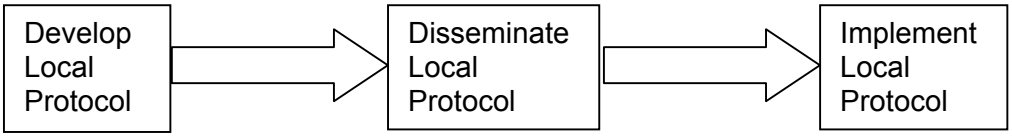

Fig 5.1 Model of Guideline implementation at local level.

A previous postal survey of guideline implementation in Scottish Acute hospitals had also applied the three stages to the introduction of local protocols.[276;278] The previous work asked about time frames and details for each stage. The respondents described the stages:

1. the first stage was usually a baseline audit of current practice or discussion and planning of implementation.
2. the second stage was usually developing and piloting a local protocol.
3. the third stage normally included re-audit. Training was mentioned.[277]

The whole three-stage guideline implementation process took on average over a year. The results showed that more explanatory information was needed on why guidelines were sometimes successfully implemented and sometimes not. The

planned new research investigated reasons for action at each stage of guideline implementation, and the OL levels associated. Specific issues included:

1. the effectiveness of different methods of dissemination,
2. multiprofessional collaboration,
3. the effectiveness of clinical audit,
4. clinical and managerial learning and change, and
5. expectations for what guidelines should achieve.

The initial interview schedule included a section specifically on clinical audit because another study[413] corroborated the use of audit (with feedback) as the main implementation method in use in Scottish hospitals. That study had focused only on DVT prophylaxis. Relevant questions were adapted from a semi-structured interview schedule developed and piloted for a study of barriers and facilitating factors to clinical audit.[209] Open questions were used within the development, dissemination, implementation and outcome structure. A section was added on learning at team level, and between teams. Since the research question covered SIGN guidelines generally, a section covering general ideals and beliefs about SIGN guidelines was included.

5.2 Pilot study aim

The two short-listed OL measurement scales[151;313] pre-selected from the literature review, the hospital culture scale,[229] and the initial interview schedule were piloted. The pilot took place in a District General Hospital outside Glasgow. For the pilot of the scales, the aim was to choose the instruments best accepted and understood in the acute hospitals in the NHS (Scotland). For the interview pilot, the aims were:

1. to test face validity,
2. to identify any ambiguous or overlapping questions,
3. to gather comments for better wording and on topic coverage,
4. to reveal questions not essential to the research question,

5. to assess timing,

5.3 Pilot Method

Four consultants from different medical and surgical specialties (Care of the elderly, anaesthetics, pathology and respiratory medicine) and five senior nurses were selected purposively using recommendations from a contact in personnel and a trust structure chart to ensure wide coverage of directorates. Some interviews were audio-taped. Others, including a Director of Quality and a Consultant Obstetrician gave informal opinions.

Following the pilot, interviewees were asked to complete the survey before the interview if possible. This was to increase rates of return and to provide opportunities for clarification.

5.4 Pilot Results

5.4.1 Organisational learning measurement scales

The Learning Company questionnaire

This tool explicitly measured ideals for learning with the reality in organisations. These could then be compared to measure the potential for change. Comments indicated that the Learning Company questionnaire[314] was found too long and heavy with business terminology alien to health service professionals. It had been used in one acute hospital, but no published report of this was available. The only published report concerned use of the scale in measuring the organisational learning capacity of chartered surveyors firms.[265] This study compared the firms on the 11 dimensions used by the questionnaire, which the authors concluded, if "tailored to suit surveying organisations" would provide "helpful categories to explore and evaluate learning in surveying practices". The Learning Company questionnaire was not used for my study.

The Learning Organisation survey

This is referred to as the OL Survey. It was developed in Canada by Richards and Goh.[338] This survey used a rationale based in the second approach to OL, the information-based organisational science theory described in the literature review. It assumed firstly that "OL is really about individuals learning and sharing knowledge that will help the organisation achieve its goals." The second assumption was that "Design elements of an organisation (its structure, tasks, decision-making processes, reward systems and communication processes) either encourage or discourage learning and information exchange."[338] Richards and Goh's rationale was:

> "Therefore, if we can assess how well an organisation's design helps to clarify goals, encourage experimentation, and promote teamwork and information sharing we can evaluate the organisations learning capability."

The OL survey measured how satisfied the individual members of the organisation felt with these aspects. It performed best in the pilot. Its relative brevity and low use of jargon were liked. It had been reported in a well-recognised journal.[151] There were no published examples of use of the OL scale in hospitals, but published articles described its use and development in the public sector.[337;338] It was direct measure of respondents' satisfaction with learning in their organisation. Lower satisfaction indicated greater potential for change. This scale was chosen because it was quicker to complete, had more face validity for health professionals, and was simpler to analyse.

Because there were no published examples of use of the OL scale in hospitals, and as the publications related to the developers' use of their own instrument, further validation was needed. A more general measure of specifically hospital culture was needed to do this. The hospital culture scale[229] was particularly suitable as it focused on doctors' and nurses' attitudes. It caused some

chuckles of recognition, especially from nurses. It was designed to measure health professionals' beliefs about collaboration in the hospital. The validation hypothesis was that, within limits, (for example the ability to accommodate constructive conflict) more collaborative culture would be associated with greater learning capacity.

5.4.2 Interview schedule

The full interview schedule both as piloted and as changed after the pilot is given in technical appendices to this chapter.

Theoretical framework from coding of interview schedule responses

The responses to the interview questions were assigned to theoretical categories related to the creation and use of information, to test the applicability of this OL perspective to guideline implementation. These categories were termed "codes". It was a hierarchical structure. The codes were grouped into a structure relating to the creation and use of information. This was called the pilot coding frame. The main headings are given below. The pilot coding frame appears in full in appendix A4.2.

1. Information about the guidelines, involvement and control in their introduction,
2. Quality of information (e.g. whether evidence-based),
3. Motivation to use information,
4. Using information,
5. Control over the use of information,
6. Clinical audit,
7. Time,
8. Limitations of information,
9. Equity for patients,
10. Generating or creating information,

11. Team uses of information.

The emergence of this coding structure showed that the interview responses fitted into a framework based around information creation and use. That they did so indicated guideline implementation could be viewed as an OL process from the "organisational science" perspective.

Implications of pilot coding frame for coding the main data

So a culture of organisational learning, could be seen in more concrete terms in relation to guideline implementation as information creation (type 2 learning) and information use (type 1 learning). A learning culture valued both the creation and use of information. A hospital or group of high learning capacity would use guidelines to create information as well as simply using the information in them. Type 1 guideline implementation was referencing process. Type 2 guideline implementation was the creation of new information to support the identification and achievement of new goals.

The coding frame developed in the pilot bolstered and refined the concepts of type 1 and type 2 learning. It applied them to information processing activities and skills. This information perspective later underlay the coding and analysis of the main project data.

Revisions to the interview schedule

Where a question did not yield codes relevant to the research question, it was omitted from the revised questionnaire. Where varying interpretations showed a relevant question had been badly designed the question was revised or merged with others. Where responses showed a question was not answerable - for example because of lack of knowledge, it was discarded. The codes are explained in appendix A4.3. Revisions to the interview schedule are tabulated in appendix A4.4 to state explicitly why each retained question was necessary in

relation to the OL approach used, and why each discarded or adapted question was dropped or changed. Questions were cross-referenced to the questions in the old interview schedule that had generated them.

5.5 Summary of changes resulting from pilot

A technical appendix (A4) cross-references the interview schedule to the coding frame. This appendix contains:

1. the interview schedule piloted
2. the coding of responses showing how each code was related to individual questions in the old interview schedule, and also showing how the codes were intended to relate to the new questions
3. the pilot coding frame – formally ordered and numbered,
4. the revisions to the piloted interview schedule with reasons for each amendment or deletion

The new interview schedule with reasons for asking each question is given in appendix A1.4. The full changes made to the pilot interview schedule and personal details survey are summarised in tables A4.4.1 and A4.4.2 in appendix 4.4. Deletions were made for the following reasons:

1. The question was not directly related to the research question, for example:

i. to what extent there had been previous involvement in guideline implementation,

ii. what were attitudes about clinical audit.

2. The question was covered elsewhere, for example:

i. attitudes to particular guideline – covered in general issues section,

ii. length of service, age gender etc were covered in the OL survey.

3. The question was found to lead the interviewee to assent or to influence answers to other questions, for example:

i. whether the interviewee found any local protocol (if developed) satisfactory,

ii. section on audit replaced by one on implementation,

iii. whether results were shared with other teams replaced with question on learning about other teams.

There was a change in ordering of questions to put general questions at the end, because they were more difficult for interviewees to answer "cold". These changes were intended to increased validity and reliability as they further focused the interview, prevented redundancy and reduced threats to validity from leading questions. Some additions were made. The main research issue was highlighted by reflection on the pilot as whether involvement in guideline implementation was associated with higher OL capacity. The data testing this was strengthened by adding a question on whether the interviewee was part of the implementation group for the guideline. A suggestion from a senior manager that how trust senior management could help to facilitate learning from guideline implementation should be a question was included. That the suggestion was made showed there was for senior managers a real interest in how to make guidelines effective.

Section 3 – Results

This section has 5 chapters.

- Chapter 6 is concerned with validity. It reports response rates, tests of the survey data to ensure they were representative of the hospitals, and tests of the validity in the NHS acute hospital setting of the instrument used,
- Chapter 7 is hypothesis generating, and compares the context of each organisation using a humanistic qualitative analysis,
- Chapter 8 is hypothesis testing. It compares OL score between study samples,
- Chapter 9 is hypothesis testing, and compares guideline implementation activities and beliefs between study samples,
- Chapter 10 is hypothesis testing, and compares the OL scores associated with the main guidelines implementation activities and beliefs with the OL scores for others.

Chapter 6 – Validity testing

6.1. Aim of this chapter

The overall purpose of this chapter can be divided into three parts:

1. to report the response rates and missing values,
2. to make demographic comparisons between the sample and the populations, and analyse the effect of reminders
3. to validate the research tools in the NHS acute hospital setting

6.2. Response to scales and interviews

It was essential to show how representative the survey responders were to allow valid comparisons of hospitals' OL scores.

6.2.1 Response rates

In hospital 2 the sample was over 75% of the population, in hospital 1 it was 50%. The replies from all grades of staff to the requests for participation included both first and second time responders. The first time response rate was higher at hospital 1 than hospital 2. No differences were found between first and second time responders in hospital 2 on mean scale scores or demographic and other indicators. There were no reminders at hospital 1. Some of the replies were refusals to participate. Some participated in interview or survey but not both. See chart 6.1.

The important response for comparison of hospitals was that from senior staff in each profession (G grade nurses and consultants), because this group was compared between hospitals. This rate was much higher. See charts 6.2 and 6.3.

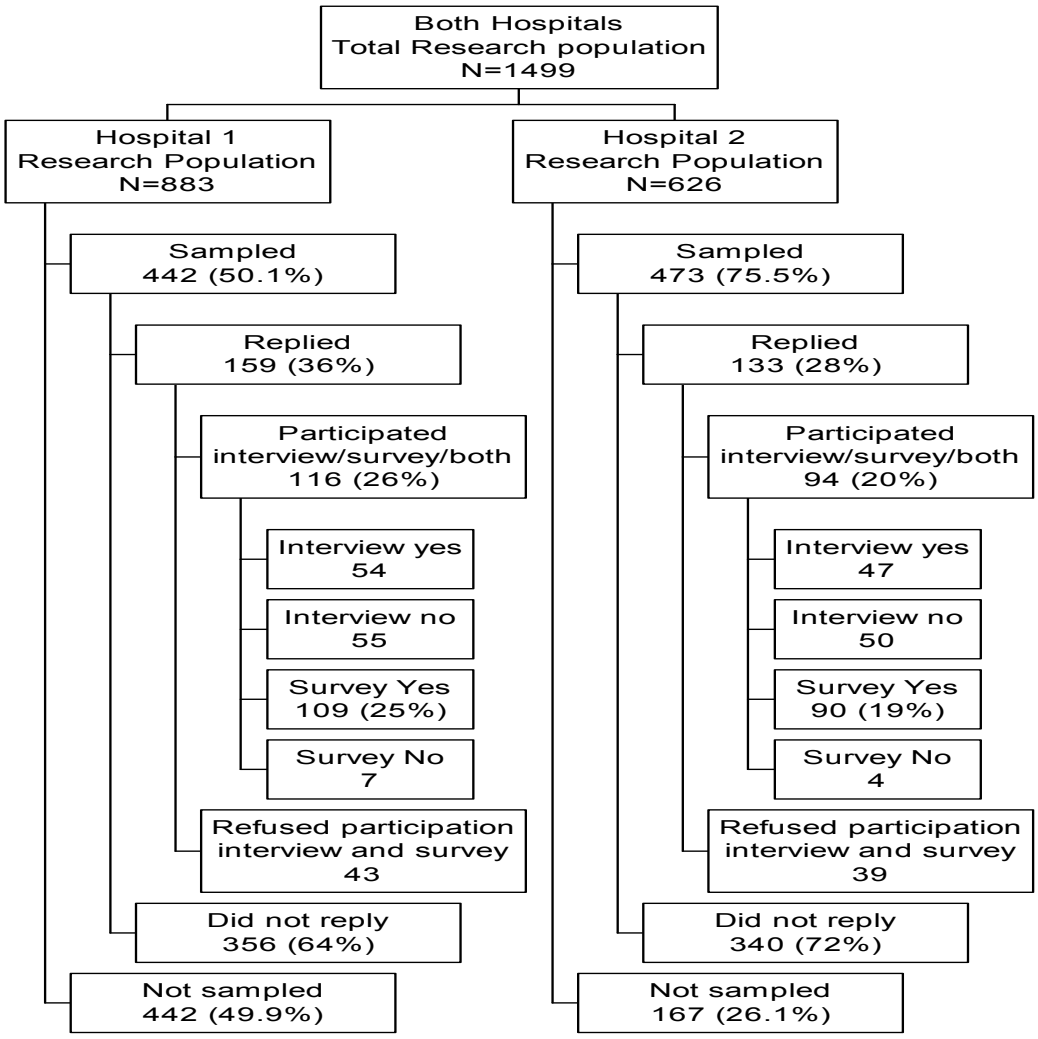

Chart 6.1 – response rates from all staff by hospital (N=1499)

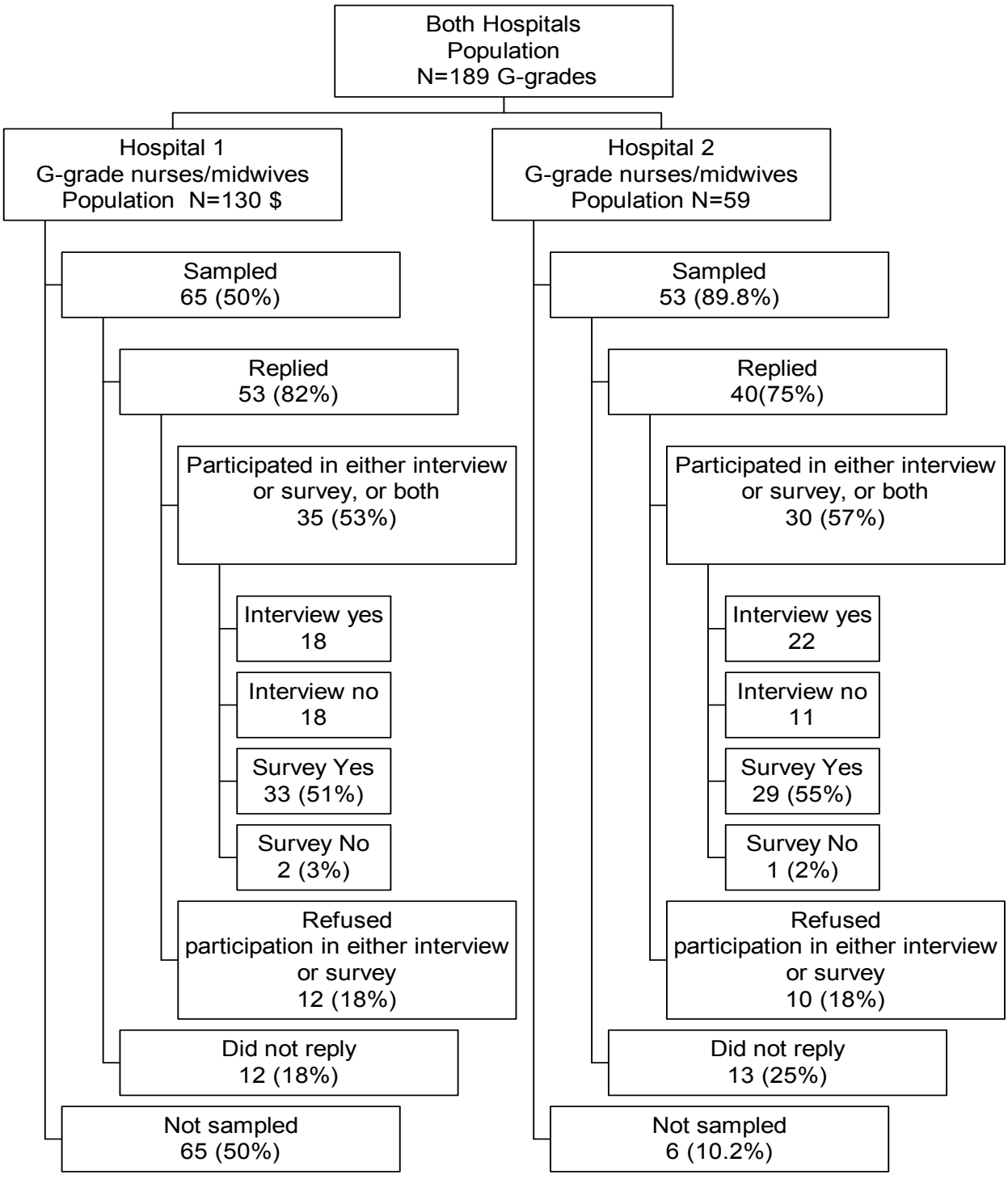

Chart 6.2 Response rates of senior Nurses/Midwives by hospital (N = 189)

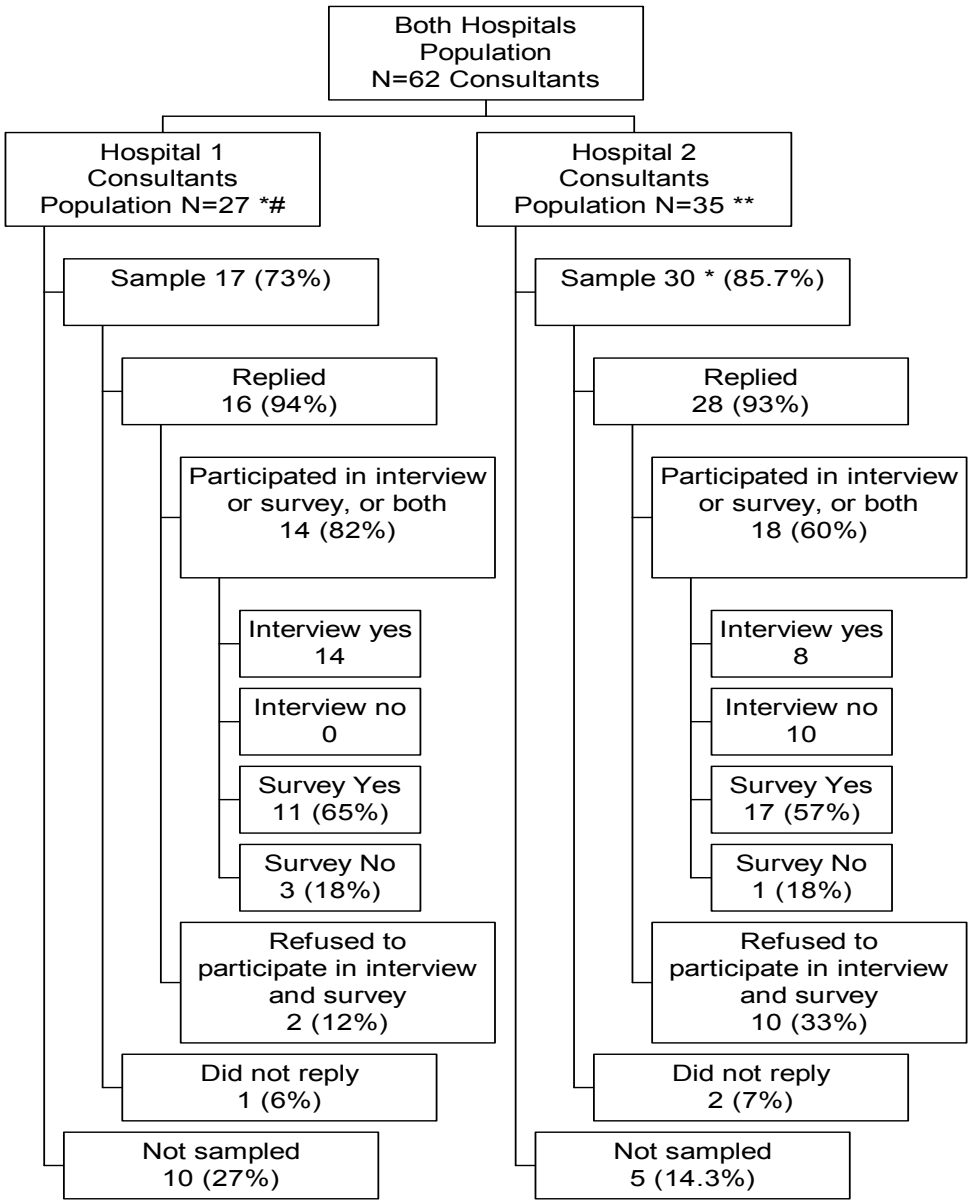

Chart 6.3 Response rates of consultants by hospital. (N=62)

Notes to charts

$	The number of G grade nurses/midwives in the hospital 1 sample was estimated - see statistics section 4.6
#	The number of consultants in the hospital 1 sample was estimated – see statistics section 4.6
*	In hospital 1 the Medical director and the 6 Clinical Directors in the relevant directorates were all included in the sample. The total population in Hospital 1 was 1210, the research population of 883 excluded the 327 staff in the excluded directorates.
**	1 anonymous survey respondent deducted

In hospital 2 the high response from the senior staff was due partly to telephone reminders, which were much more effective than the written reminders to the junior staff. Responses from the consultants and G grades combined to give a reasonable comparison in this important senior clinical group of the learning capacity of the two hospitals (see table 6.1).

HOSPITAL	Doctor	Nurse	Total
1	11 (39%)	33 (53%)	44 (49%)
2	17 (61%)	29 (47%)	46 (51%)
Total	28 (100%)	62 (100%)	90 (100%)

Table 6.1 senior clinical comparison group for analysis by profession and hospital.

6.2.2 Reasons for non participation

Reasons for refusing to participate in the survey fell into 5 broad groups (table 6.2).

Reason	Hospital 1	Hospital 2	Total
Not involved with topic	***16 (47%)***	***3 (12%)***	***19 (32%)***
Too busy	***2 (6%)***	***12 (46%)***	***14 (23%)***
No knowledge of SIGN guidelines	***2 (6%)***	***1 (4%)***	***3 (5%)***
Other	***5 (15%)***	***3 (12%)***	***8 (13%)***
Away from work etc. (exclusions)	9 (26%)	7 (26%)	16 (27%)
Totals	34 (100%)	26 (100%)	60 (100%)

Table 6.2 All staff, reasons for non response

Some non-participants were excluded from the study. Exclusion from the study was justified if it did not reduce representation. The two main reasons for non-response were not grounds for exclusion from the study because:

1. Non-involvement with the topic was no bar to completing a survey, these people were as much a part of the culture as those involved.
2. Lack of time ("too busy") would exclude the busiest people who were also likely to have more contact with others and hence to be the most influential.

The relative sizes of the two main reasons for non-response were reversed between the hospitals (table 6.2), but the total percentage was similar. Valid exclusions (both hospitals) were mainly for maternity absence, (table 6.3).

Maternity absence (9)
Chairman of research committee (1)
Working temporarily elsewhere (1)
Outpatient attachment only (1)
Only 1 session per week (1)
Left hospital (2)
Less than 3 months in post (1)

Table 6.3 Reasons for exclusion from the study (all staff both hospitals)

Assuming the proportion excluded was reflected in the samples, the effective sample size was reducible by an equivalent percentage in each hospital. This meant the effective response rate was increased. The increase was not quantifiable because the non-responders may have differed from the responders. The exclusions applied to senior clinical staff too. See table 6.4.

	Gave reason for refusal		**No Reason**	**Total refusals**
Hospital 1	Exclusion	Not exclusion		
G Grade nurses /midwives	2	14	4	20
consultants	1	1	3	5
Total	3	15	7	25
Hospital 2	Exclusion	Not exclusion		
G Grade nurses	2	7	2	11
consultants	1	5	5	11
Total	3	12	7	22

Table 6.4 Senior grades' reasons for refusing to participate in the survey

6.2.3 Missing Scale Values

Main scales

In the calculation of main scale means the denominator was reduced according to the number of items missing. In the OL scale responses there were three

items with more than two missing responses. Comments about the organisational mission indicated that the important mission was seen as professional. This may have explained the 8 missing responses to this item. Other items had between zero and two values missing.

On the formalisation scale no item had more than four responses missing. On the job satisfaction scale the highest missing responses were seven for satisfaction with supervisor. This item did not apply to some staff. The hospital culture scale allowed respondents to check a "don't know" or "not applicable" box for each item instead of scoring it. These were coded as missing for the calculation of means, resulting in higher numbers of missing values. The maximum was 25.

The highest numbers of missing items on both the hospital culture and the learning capacity scales related to knowledge of the hospital mission statement (item 10 on the culture scale and item 2 on the learning capacity scale). For the other main scales, >95% of scale items were 100% complete.

Sub-scales in the learning capacity scale – missing values by response case

Sub-scale means were calculated by reducing the denominator if there was only one item missing in a response. If more than one item was missing the sub-scale mean was coded as missing. One response was affected for senior clinicians (transfer of knowledge sub-scale), and four for all staff. For all respondents 199 scale means resulted for all sub-scales except transfer of knowledge (197) and teamwork and group problem solving (198). For senior clinical staff 90 scale means resulted for each sub-scale except transfer of knowledge (89).

Hospital culture scale

Sufficient items for the calculation of scale means were completed by 195 of 199 respondents. The large percentage of "don't know" and "not applicable" responses, which were coded as missing and replaced by means, meant these results from this scale had to be interpreted with slightly more caution. Sufficient items for the calculation of scale means were completed by 88 of the 90 senior clinical respondents. There were fewer missing values to be replaced by scale means among senior respondents than in the full set of 199.

Missing values effect on means for main scales

Scale means were calculated both for all respondents and the senior clinical group. For each main scale, the number of items with missing values was counted by response case rather than by individual item. The maximum number of items missed by any respondent was 10 by one respondent on the hospital culture scale. The maximum for a senior respondent was eight by one respondent on the hospital culture scale. Most responses were complete.

6.2.4 Response to interviews

The majority of interviewees were senior staff (31 in hospital 1 and 32 in hospital 2). In hospital 1, 48 of 54 interviewees responded to both the survey and interview, in hospital 2 it was 44 of 47. The response for interviews about DVT guidelines was higher than for Diabetes (see table 6.5).

Hospital	DVT interviews	Diabetes interviews	Other guidelines interviews	Total Interviews
1	36	10	8	54
2	37	2	8	47

Table 6.5 Interview numbers split by guideline and hospital.

The low number of diabetes interviews in hospital 2 may have been because the consultant in charge of the diabetes unit did not participate. Lack of time was the reason given.

6.2.5 Summary of response rate analysis

The analysis of response rates has shown the following points:

1. the survey response rate from senior clinical staff sampled in each hospital was higher than for junior staff.
2. the response rates among senior clinical staff were broadly similar between hospitals,
3. response rate was highest in hospital 1 consultants (65%) and hospital 2 consultants (57%).
4. hospital 2 G-grades (57%) gave a higher response than hospital 1 G-grades (53%).
5. a significant minority (roughly a quarter) of the total reasons given for non-participation justified the exclusion of the respondent from the study sample, so increasing the effective response rate,
6. a somewhat smaller but still significant proportion of senior clinical staff (20%) gave reasons for non-participation justifying exclusion from the study, somewhat increasing the effective response rate for senior staff so that comparisons between hospitals based on them were more valid,
7. the completion of individual items by responders was good on the main scales, where >95% of scale items were 100% complete,
8. only two sub-scales had more than 1 item missing. The senior clinical staff missed fewer items.

Overall, the response from the key group of senior clinical staff was better than from junior staff. It was acceptable for management research in NHS

hospitals, as shown by comparison with other published studies with low response rates shown in tables A6.1.1 and A6.1.2 in appendix 6.1.

6.3 Responses for demographic and organisational groups

6.3.1 Introduction

It was important to assess whether demographic factors might bias comparisons. To assess the likelihood of this, the compositions of population, sample and survey response groups were compared. Scale score was compared for demographic sub groups across the study samples. Those responding after reminders were compared with first time responders. The full response group was used in validation of scales and for comparisons within hospitals. The senior clinical staff were compared demographically between hospitals as they were the group for whom scale scores were compared between hospitals.

In hospital 2 additional data was available about the population's seniority, length of service, age, and gender. In hospital 1 the numbers of senior clinical staff in the sample were estimated from the population. The survey responders in hospital 1 were compared with those at hospital 2. There were no significant differences in age band, length of service, or profession. Midwives and audit co-ordinator (hospital 1) were excluded for the comparison of profession.

6.3.2 Gender

Response in comparison to population

A significantly higher proportion of males than females responded at hospital 2. A one sample Chi square test showed this (statistics section 4.6 and table 6.6).

Gender	Responders	Population
Male	24 (27%)	111 (18%)
Female	66 (73%)	500 (82%)
Total	90 (100%)	611 (100%)

Table 6.6 Difference in gender between responders and population in hospital 2 $X^2 = 4.37$, DF=1, $p<0.05$ (Note: 13 anonymous responders (1 male and 12 female) and 16 of unknown sex (13 who did not respond, and 3 who responded but were not in the sample) were deducted from the population. This was so as not to inflate the value of X^2.)

Hospital 1 in comparison to hospital 2

The survey response in hospital 2 was compared with that in hospital 1. Gender of the survey respondents was significantly different (see table 6.7).

Gender	Hospital 1	Hospital 2
Male	15 (14%)	24 (27%)
Female	94 (86%)	66 (73%)
Total	109	90

Table 6.7 Number of survey responders by gender and hospital (Yates' X^2 statistic = 5.2, DF=1, $p<0.05$)

More males responded than expected at hospital 2 – this difference was evident between hospitals to a small extent across all professions. It reached significance owing to the high number of junior midwives responding at hospital 1, who were all female. Females were significantly more likely than males to see their hospital as formal, and significantly less likely to see it as collaborative (table 6.8).

Scale	Female mean	Male mean	T statistic	Significance
Formalisation	4.6	4.0	3.6	<0.000
Collaboration	3.1	3.4	2.7	<0.01

Table 6.8 Significant main scale differences between females and males (all responders)

There was no significant difference between the genders in job satisfaction or learning capacity scores. There were no significant differences between hospitals for senior clinical responders on gender. This was important, as they were the group used for comparison of OL capacity scores between hospitals.

6.3.3 Seniority

To confirm whether the seniority balance in the hospital 2 sample represented the population, a one sample X^2 test was used. Grade was re-coded into two categories, senior and junior. Clinical consultants and nurses of G-grade and above were classified as senior, all others as junior. There was no significant difference between sample and population on seniority (table 6.9).

Grade	Sample	Population
Senior	83 (21%)	116 (19%)
Junior	390 (79%)	510 (81%)
Total	473	626

Table 6.9 Population and sample in hospital 2 by grade. (1 clinical audit and 13 anonymous responders excluded)

However, differences between survey responders and population in hospital 2 were significant as shown in table 6.10.

Grade	Survey responders	Population
Senior	51 (57%)	116 (19%)
Junior	39 (43%)	510 (81%)
Total	90	626
One sample $X^2 = 86.60$, DF = 1, $p<0.01$		

Table 6.10 Population and survey responders in hospital 2 by grade. (1 clinical audit and 13 anonymous responders excluded).

The survey response in hospital 2 significantly over-represented senior staff. The stratification at the reminder stage explained this. It was part of the reminder strategy to include as many senior clinical staff as possible. The seniority of responders was compared between hospitals (table 6.11).

Seniority	Hospital 1	Hospital 2
Senior	45(42%)	51(57%)
Junior	63(58%)	39(43%)
Total	108	90
$X^2 = 4.42$, DF = 1, $p<0.036$		

Table 6.11 Hospitals by seniority level (1 clinical audit excl.)

The imbalance in seniority between hospital responses did not affect the comparison between hospitals because the comparison group was restricted to senior clinical staff.

6.3.4 Profession

In hospital 2 data for grade, length of service, age, and gender were available. In hospital 1 the numbers of clinical G grades and consultants in the sample were estimated as confidentiality rules forbade their disclosure. The survey response group was compared with the research population for each hospital. The profession balance was similar for each hospital between survey responders and population. See table 6.12.

Senior clinical staff	Hospital 1 response	Estimated Population Hospital 1	Hospital 2 response	Population Hospital 2
consultants	11 (25%)	27 (17%)	17 (37%)	35 (37%)
nurse/midwife (G grade)	33 (75%)	130 (83%)	29 (63%)	59 (63%)
Total	44	157	46	94
	X^2= 1.9, DF = 1, p>0.05		% response as for population	

Table 6.12 Senior clinical survey responders and senior clinical research population by hospital.

The 46 senior clinical staff from hospital 2 were compared with the hospital 2 population. The profession balance was similar (see table 6.13).

Profession	Hospital 1 response	Hospital 2 response
Doctor	11 (25%)	17 (37%)
Nurse or Midwife	33 (75%)	29 (63%)
Total	44	46
	X^2 (Yates) = 1.00, DF = 1, p>0.05	

Table 6.13 Comparison of response by senior clinical staff between hospitals

There was no significant difference between the hospitals in the balance between G grades and consultants responding to the survey - see table 6.13.

There was no significant difference in profession between all survey responders and population in hospital 2 (see table 6.14). Anonymous responders and 1 clinical audit were deducted from the population for the chi-square. In hospital 1 however, proportionately fewer doctors responded than nurses/midwives. Proportions of doctors and nurses/midwives in the hospital 1 research population (which excluded certain directorates) were estimated from the proportions known to exist in the whole population for hospital 1, but this was not of high validity as described in the statistics section 4.6.

Profession	All Survey responders hospital 1	Estimated research population hospital 1	All Survey responders Hospital 2	Population hospital 2
Doctor	16(15%)	256(29%)	23(26%)	136(21%)
Nurse/midwife/audit	92(85%)	627(71%)	67(74%)	504(79%)
Total	108	883	90	640
	X^2 = 10.5, DF = 1, p<0.01		X^2 = 1.08, DF = 1, p>0.05	

Table 6.14 Numbers of each profession responding from each hospital

6.3.5 Time in organisation

Length of service for the survey responders was normally distributed in each hospital. The Kolmogorov-Smirnov Z value was 1.3 for hospital 1 (p>0.05) and 1.1 for hospital 2 (p>0.01). The mean for hospital 1 was 11 years (n=107) and for hospital 2 12.2 years (n=90).

For all respondents, there was a correlation between length of service (time in the organisation) and learning capacity score, job satisfaction score and collaboration score (see table 6.15). There was no correlation between length of service and formalisation score. Both senior and junior seniority groups differed from all respondents, their length of service had no correlation with any of the scale scores, so seniority rather than length of service was the main factor associated with scale score.

	Correlation (Pearsons r)	Significance	N
OL Capacity	0.155	0.029	197
Job satisfaction	0.196	0.006	197
Hospital culture	0.151	0.036	193

Table 6.15 Time in organisation (all staff) – correlation with scale scores

Start year of service, hospital 2

The sample in hospital 2 was compared on start year of service with the population. The population mean start year was 1991. The mean start year for the survey responders was 1988. The start year of service was compared between the survey responders (excluding the anonymous ones) and the whole population using a one sample Kolmogorov-Smirnov test (rather than a one sample t-test) as the research population was not normally distributed on length of service – shown by the high value for Z from the Kolmogorov-Smirnov test (see table 6.16). The survey responders were normally distributed.

	N	Z	p
Research population (not normally distributed)	626	3.8	<0.001
Survey responders (normally distributed)	77	1.08	>0.1

Table 6.16 Kolmogorov-Smirnov test of population and survey responders' distributions on start year of service in hospital 2

Chart 6.4 shows how the year of start of service in hospital 2 was not normally distributed. It was skewed toward more recent starts.

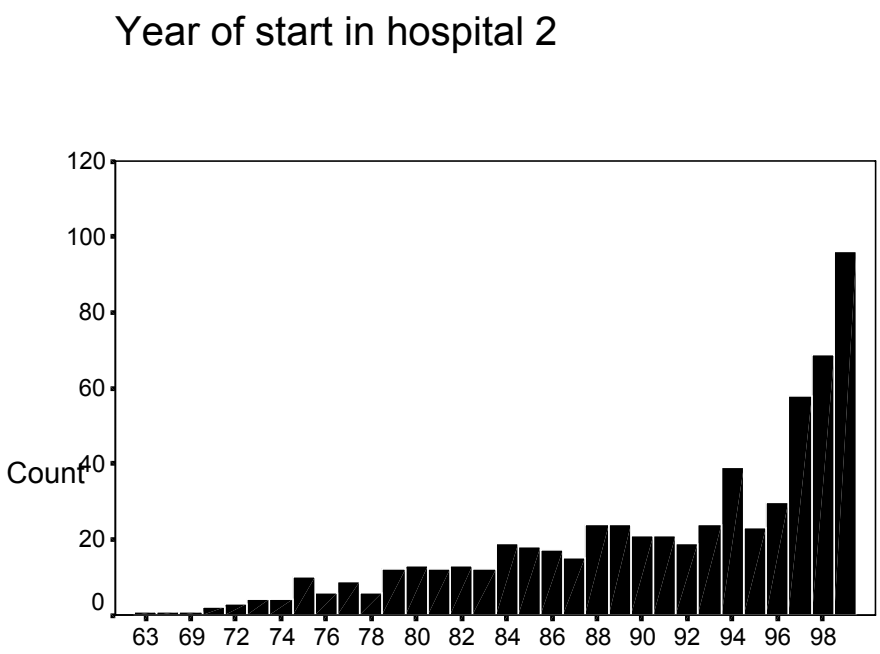

Chart 6.4 Hospital 2 research population by start year of service (N=626)

Both population and sample of senior clinical staff were normally distributed on start year of service. Kolmogorov-Smirnov "Z" = 0.66 for the hospital 2 population, and 0.54 for the sample, ($p>0.7$ for both). Length of service for the senior clinical survey responders and the senior clinical population was normally distributed in each hospital. Kolmogorov-Smirnov "Z" = 0.49 for hospital 1 and 0.56 for hospital 2, ($p>0.9$ for both).

There was a significant difference between hospitals in length of time in their current post for all responders, but not for senior or junior staff alone (table 6.17). Staff stayed longer in their positions at hospital 2. There was no significant difference between hospitals for length of service.

Group	Hospital 1 mean time in current position	Hospital 2 mean time in current position	N	T statistic	Two tailed sig.
Senior clinical responders	8.9	10.8	90	1.31	<0.194
Junior responders	3.1	3.6	107	0.60	<0.53
All survey responders	5.5	7.5	197	2.15	<0.034
	Hospital 1 mean length of service	Hospital 2 mean length of service	N	T statistic	Two tailed sig.
Senior clinical responders	17.15	15.78	90	0.80	<0.43
Junior responders	6.6	7.4	107	0.60	<0.55
All survey responders	11.0	12.2	197	0.93	<0.36

Table 6.17 Years in current post for responders by hospital and mean length of service for senior clinical responders in each hospital

The mean number of previous organizations staff had worked in was similar between hospitals (Appendix A5.1). The same applied for senior and junior staff to the mean number of previous functional areas staff had worked in. For all staff considered together, staff had worked in significantly more functional areas at hospital 1 (Appendix A5.1). From hospital 1 38 (36%), and from hospital 2, 34 (38%) had worked in another industry. In hospital 1 32 respondents, and in hospital 2, 25, gave a length of time in another industry. There was no significant difference between hospitals for all staff or for senior or junior staff in the length of time. They had spent on average twice as long in the hospital as since working in the other industry and joining the hospital. These responders had thus had time to absorb hospital culture.

6.3.6 Age group

The population in each age group in hospital 1 in the included directorates was estimated as described in the statistics section 4.6. There was a significant difference in age group (see table 6.18) at 5% between hospital 2 responders and hospital 2 population (one sample $X^2 = 10.00$, DF = 3, $p<0.05$).

Age group	20-30	31-40	41-50	51+	Total
Estimated population Hospital 1	247	391	164	77	879
	(28%)	(44%)	(19%)	(9%)	(100%)
Population Hospital 2	215	241	129	55	640
	(33%)	(38%)	(20%)	(9%)	(100%)
All survey responders hospital 1	24	52	24	7	107
	(22%)	(49%)	(22%)	(7%)	(100%)
All survey responders hospital 2	17	41	21	11	90
	(19%)	(46%)	(23%)	(12%)	(100%)
Senior clinical responders Hospital 1	0	20	18	6	44
	(0%)	(45%)	(41%)	(14%)	(100%)
Senior clinical responders Hospital 2	2	22	12	10	46
	(4%)	(48%)	(26%)	(22%)	(100%)

Table 6.18 Numbers and rounded row percent for the balance of age groups between hospitals and all survey responders and the population in hospital 2. (4 in hospital 1 were of unknown age)

There was no significant difference between age group of hospital 1 responders and the estimated age groups in the hospital 1 population (one sample $X^2 = 1.63$, DF = 3, $p>0.05$). There was no difference in age group between hospitals for all staff ($X^2 = 2.13$, DF = 3, $p<0.55$) or for senior clinical responders ($X^2= 4.25$, DF = 3, $p<0.24$). This meant bias of scale score comparison between hospitals owing to age group was unlikely.

Age within hospital

The OL score for different age groups showed a similar pattern in each hospital for all respondents (see charts 6.5 to 6.6).

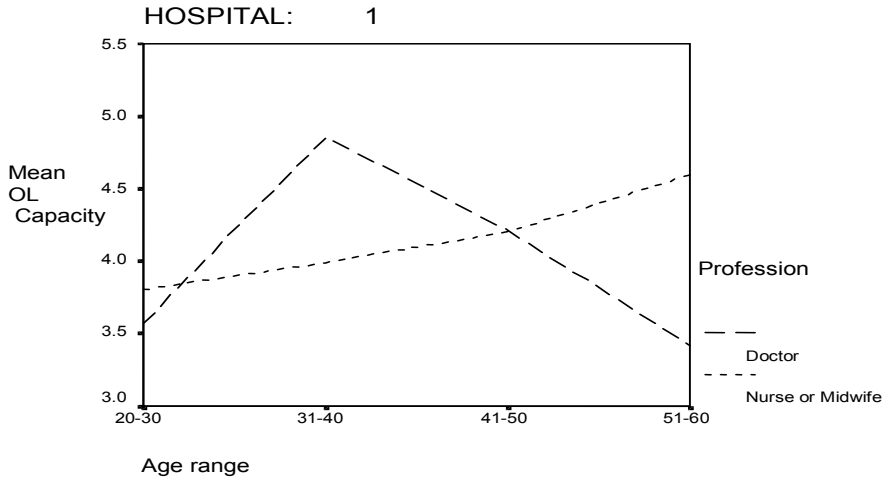

Chart 6.5 OL score by age group within profession (Hospital 1)

Nurses' scores increased, doctors' decreased with age. The pattern was similar for senior staff. This was of course an age effect rather than a cohort tracked longitudinally. The over 61 age group was excluded as it contained one doctor and no nurses. There were 2 missing values.

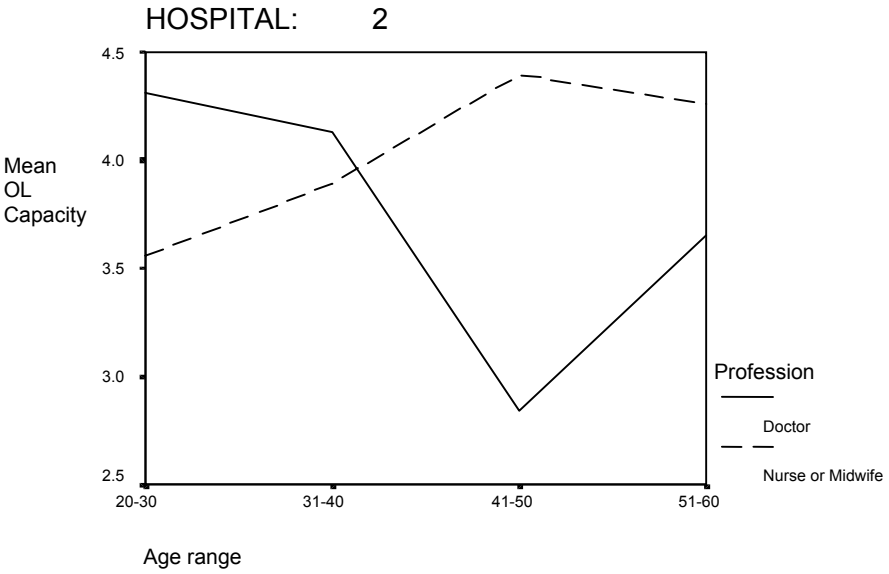

Chart 6.6 OL score by age group within profession (Hospital 2)

Scale means in individual age groups

OL score varied differently with age in each profession (see chart 6.7).

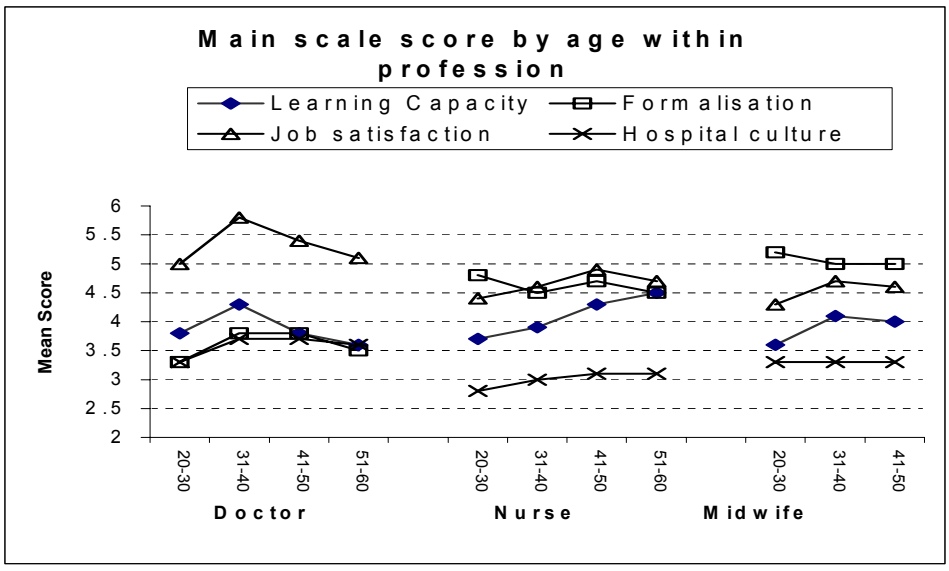

Chart 6.7 scale means for age groups by profession (N=196)

Generally, OL capacity peaked at 41-50. See chart 6.8.

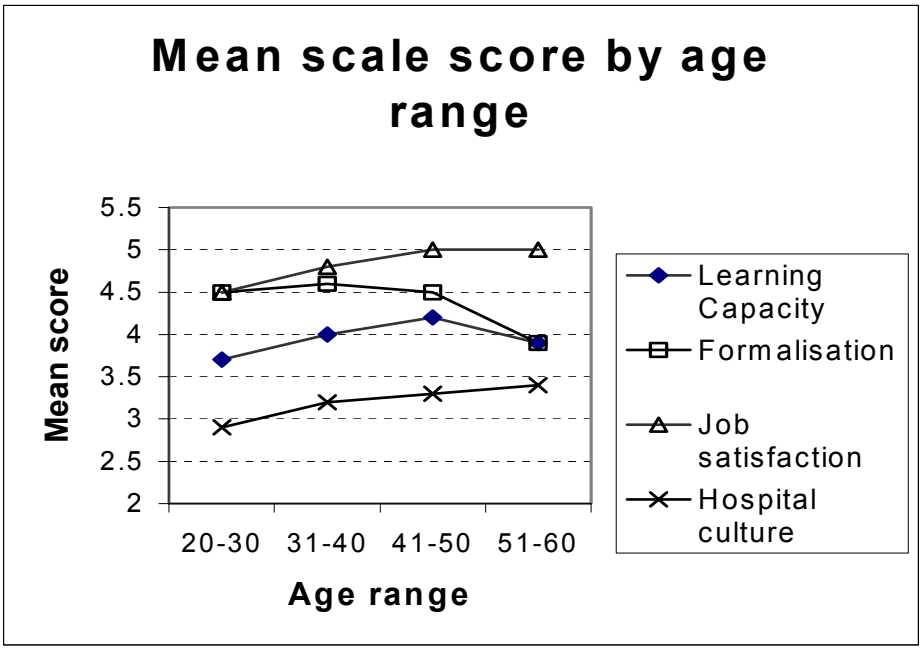

Chart 6.8 Scale means for age groups (N=196)

For all survey responders together, the age effect was tested using one-way ANOVA. It was significant for:

- formalisation (F=2.8, p<.05),

and sub-scales:

- clarity of purpose (F=3.3, p<.03),
- leadership commitment and empowerment (F=3.0, p<.04),

teamwork (F=2.8, p<.05).

Age within profession

Appendix A5.2 contains a table by age group and profession. OL capacity peaked in the medical profession in the 31-40 group, while in nurses it rose consistently through the age groups and overtook doctors in the 41-50 age group (see chart 6.7 above, and appendix A5.2). For nurses the age effect on OL capacity was significant (F=4.7, p=.009).

Appendix A5.2 gives table giving means for the sub-scales of OL capacity. Chart 6.9 (below) gives an overview.

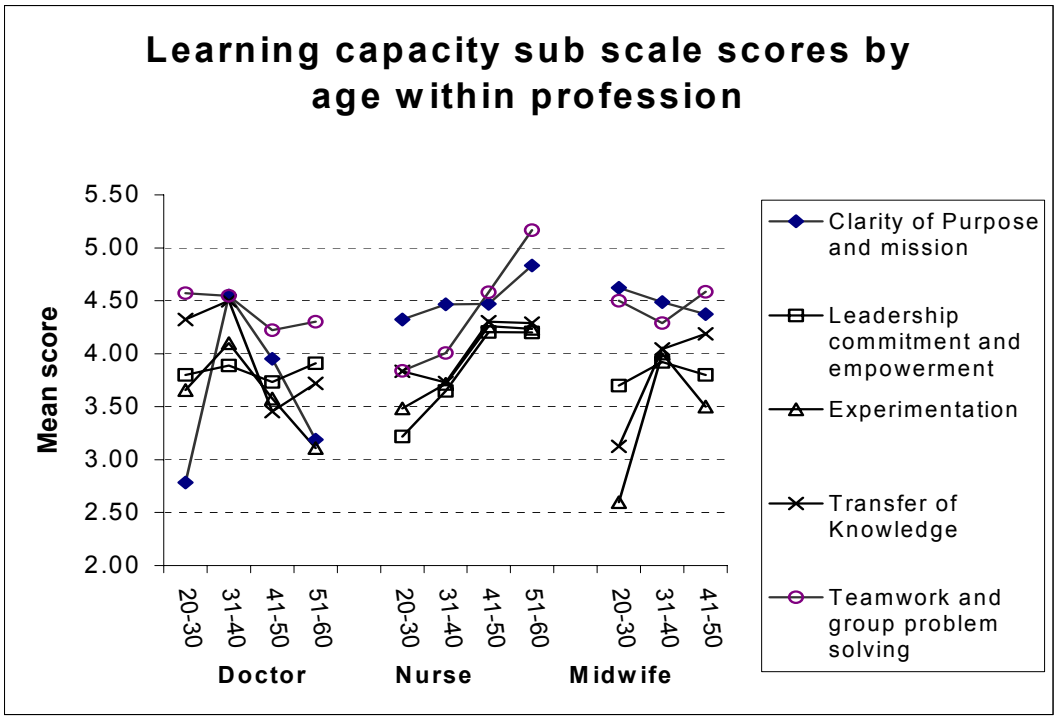

Chart 6.9 – Sub scale means by age within profession

The teamwork and group problem solving means were generally the highest. The age effect in the sub scale score was significant for the medical profession for one of the learning capacity sub scales. This was clarity of purpose and mission (one way ANOVA, F=5.7, p<.004). For doctors, OL clarity of purpose peaked at 31-40, but fell after that. For nurses all of the sub scale scores in the learning capacity scale *except* for clarity of purpose were significantly affected by age group (table 6.19).

Sub-scale	F	P
Clarity of purpose	0.5	<0.68
Leadership	4.3	<0.007
Experimentation	3.7	<0.015
Transfer of knowledge	2.7	<0.050
Teamwork	6.7	<0.000

Table 6.19 Analysis of variance in sub-scale scores by nurses' age group

For midwives there was no significant age effect, perhaps because most of them (23 of 29) were concentrated in the 31-40 age group. Possible causes for the changes in OL score with age are discussed in Section 4.

6.3.7 Guideline Implementation dates

Hospital 1

In hospital 1 the DVT prophylaxis guideline was implemented with Clinical audit department support in February 1996. The Diabetes guidelines were implemented from June 1996 (clinical audit department).

Hospital 2

In hospital 2 the DVT guideline was first implemented at different times from 1995 to 1997 in separate directorates by the clinical audit department, see Appendix A5.2 for details.

Of the diabetes guidelines, only the visual impairment guideline needed formal implementation in hospital 2 (clinical audit department), again see appendix A5.2 for details of directorate implementation dates.

Numbers starting pre or post implementation were compared using the date of directorate implementation. There was an obvious equivalence in the figures for each hospital (table 6.20).

	Hospital 1	Hospital 2
Started	Survey	Survey
Pre DVT	77 (71%)	64 (71%)
Post DVT	31 (28%)	26 (29%)
Unknown	1 (1%)	0
Total	109 (100%)	90 (100%)

Table 6.20 Both hospitals. Counts of survey responders by DVT guideline implementation date. $X^2 = 0.13$, DF = 1, $p>0.05$

A comparison between responders and population was possible for hospital 2. X^2 for hospital 2 survey responders compared to research population on whether started in post at hospital before or after implementation of DVT guideline showed no significant difference.

6.3.8 Reminders (Hospital 2)

The methods and targets for reminders in Hospital 2 are shown in table 6.21.

Reminder type	*53 telephone reminders*	*50 written reminders*
To	21 consultants 30 G-grades * 2 F-grades	9 Doctors below consultant 40 D/E grades 1 F grade
Surveys returned	28 (53%)	7 (14%)

Table 6.21 Response to reminders, Hospital 2. (* 6 G and 9 H grades employed on non clinical duties were excluded, 1 G-grade on night shift was not contactable)

Comparison of first and second time responders

The survey responders from the reminded group were compared to the first time survey responders on age profession and whether started in the trust pre or post DVT guideline implementation. There was no significant difference. Sub-scale scores were compared for first time survey responders (55) and second time survey responders (35). An independent samples t-test showed no significant difference between those reminded and the first time responders. There was no significant difference in the balance of consultants and clinical G-grades returning surveys before compared with after a reminder (table 6.22).

	Doctor	Nurse
Survey response and reminder	7 (25%)	14 (23%)
Survey response no reminder	21 (75%)	48 (77%)
Total	28 (100%)	62 (100%)

Table 6.22 First time and reminded respondents in senior clinical group (both hospitals combined) $X^2 = 0.063$, DF = 1, $p > 0.05$

Sub-scale scores were compared for the senior clinical group. An independent samples t-test showed no significant difference between those reminded and the first time responders.

6.3.9 Conclusion on demographics of the sample

The senior clinical groups in each hospital were sufficiently similar on profession, gender and age to provide a useful comparison of learning capacity scores between hospitals and between consultants and G grade nurses. The senior staff included were representative of senior clinical staff in the hospital. The survey sample in hospital 2 was weighted to males and the senior clinical staff.

Length of service had no significant correlation with OL score for senior staff or for juniors, but did for all staff as a whole, implying seniority was the active factor. It was normally distributed in the survey responders, but not in the population in hospital 2. Senior staff were normally distributed on this. There was no significant difference between hospitals in length of service for senior staff. Nor was there a difference for them in time in position or number of organisations or functional areas worked for.

Age was related to nurses' OL score in Hospital 2 but not for doctors and not in Hospital 1. Age was associated with differences in clarity of purpose and mission for senior staff. This peaked at 31-40 for seniors as a group, but rose consistently for senior nurses, though not as much as their score on other OL sub-scales.

There was a spread of responses from different directorates in each hospital. Reminders were possible in hospital 2, and created a response group of senior clinical staff that was comparable between hospitals. However, the DVT

guideline was implemented a year later in Hospital 2 than in hospital 1, while the diabetes guidelines were implemented in both hospitals from the first half of 1996.

6.4 Validation of scales

As the OL, formalisation, and job satisfaction scales had not been tested in NHS acute hospitals they needed validation in that environment. The first stage was to test whether the distribution of the data was normal, and thus whether parametric statistical tests could be used. Item means were compared between hospitals. Then the scores of all staff on the four main scales, OL capacity, formalisation, job satisfaction, and collaborative culture were correlated to see whether correlations obtained by the developers were replicated. Correlation was done both overall and in main demographic subgroups. Where possible, this validation used both hospitals combined for the larger numbers and better statistical significance. The correlation between the OL sub scales and between the OL sub-scales and the OL main scale was checked as a test of reliability.

6.4.1 Distribution of survey scores.

The responses to the OL capacity scale, the formalisation scale, the job satisfaction scale and the hospital culture scale were normally distributed. The one sample Kolmogorov-Smirnov test confirmed this. Overall, job satisfaction and formalisation were slightly positively skewed but not significantly at 5% (see appendix 5).

The distributions were normal for:

- each hospital sample and for hospitals analysed together,

- Doctors and for nurses and midwives grouped together both across and within hospitals,
- G grade nurses and consultants as separate groups both within each hospital and for the hospitals combined,
- Both senior and junior clinical staff.

6.4.2 Mean survey scores

Means for each item on the OL capacity scale were calculated in each hospital and for both hospitals together. The means are shown in Chart 6.10. A table is to be found in appendix A6.2 and the full text for scale items in appendix A1.1.1.

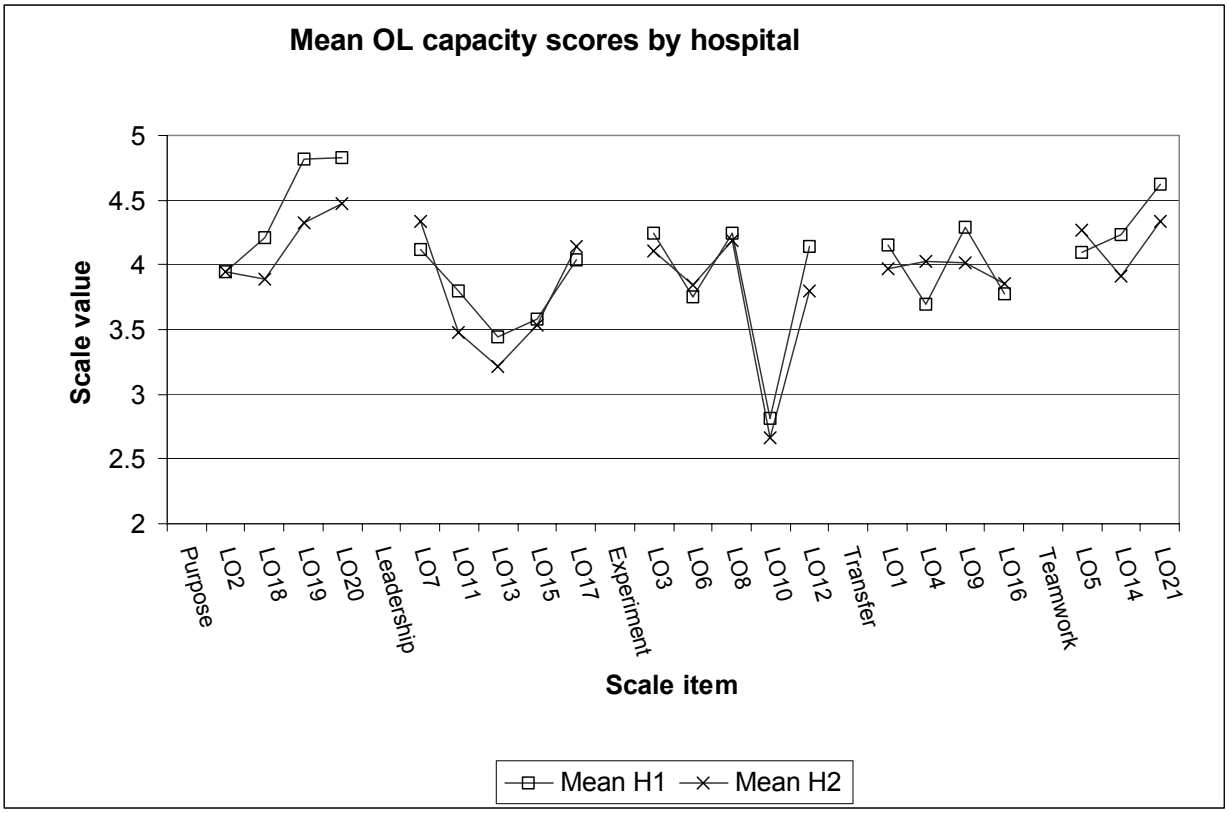

Chart 6.10 Means for individual items in the OL capacity questionnaire. All survey respondents. Sub-scale name is shown at beginning of each group.

Similar patterns for individual scale items in each hospital gave evidence of item reliability. The highest and lowest items were the same in both hospitals. The highest was item 20: "The organisation's mission statement identifies values to which all employees must conform." The lowest was item 10: "Innovative ideas that work are often rewarded by management." The means for individual items were similar in each trust. In general, means for hospital 1 were, as predicted, higher than for hospital 2. This suggested hospital 1 had greater OL capacity.

6.4.3 Correlation between the 4 main scales

The OL capacity scale was found by its authors to be positively correlated with job satisfaction ($r=0.064$, $p<0.001$, $n=429$) and weakly negatively correlated with formalisation ($r= -0.023$, $p<0.001$, $n=429$).[151]

In the two hospitals taken together, the correlation with job satisfaction was confirmed (table 6.23 below). The correlation with the collaborative culture scale, was positive, as expected. This gave further evidence for the validity of the OL capacity scale in the acute NHS hospital setting. There was no correlation with formalisation score either negative or positive.

	OL /job satisfaction		OL/Formalis'n		OL /HC		Formalis'n/ HC		Job satisfaction/HC	
	Senior	All	**Senior**	All	**Senior**	All	**Senior**	All	**Senior**	All
Pear'n Corrl'n	**0.516**	0.58	**-0.032**	-0.13	**0.444**	0.49	**-.030**	-0.13	**0.476**	0.48
Sig.	**<0.000**	<0.000	**<0.766**	<0.07	**<0.000**	<0.000	**<0.78**	<0.08	**<0.000**	<0.000
N	**90**	198	**90**	198	**88**	195	**88**	194	**88**	194

Table 6.23 Correlation between hospital culture (HC), OL and other main scales for (1) senior clinical group only (bold) and (2) all respondents.

Correlation between the scales was tested separately in consultants, G grades, and junior staff. Two of the 3 correlations found between scales existed to a greater degree for consultants than for juniors or G-grades (see table 6.24).

Group	Job satisfaction /OL capacity		Hospital culture /OL capacity		Hospital culture /job satisfaction	
	Correlation (r)	Number	Correlation (r)	Number	Correlation (r)	Number
Consultants	0.57	28	0.695	26	0.56	26
G-grades	0.6	62	0.48	62	0.39	62
Juniors	0.52	90	0.44	88	0.48	88

Table 6.24 Significant correlation between main scales for consultants, G-grades, and junior nurses/doctors $p<0.01$ for all

Correlation between scales within age groups

The effect of age on the correlation between scales was investigated, with the results shown in tables 6.25, 6.26 and 6.27.

Age group	Correlation of OL / job satisfaction (Pearson's r)	Significance	Number
20-30	0.62	<0.000	41
31-40	0.64	<0.000	93
41-50	0.54	<0.000	45
51-60	-0.124	>0.63	17

Table 6.25 Correlation of OL / job satisfaction scale scores in the 4 main age groups

In those under 51 years old there was a highly significant positive correlation between OL capacity score and job satisfaction (table 6.25). In those over 50, OL capacity score and job satisfaction were not significantly correlated. The OL scale was therefore most valid for those under 51.

Age group	Correlation of OL / formalisation (Pearson's r)	Significance	Number
20-30	-0.077	>0.6	41
31-40	0.018	>0.8	93
41-50	0.082	>0.59	45
51-60	0.37	>0.14	17

Table 6.26 Correlation of OL / formalisation scale scores in main age groups

OL and formalisation were not significantly related in any age group. The developers found a weak divergence here. See table 6.26.

Age group	Correlation of OL / collaborative culture (r)	Significance	Number
20-30	0.58	<0.000	39
31-40	0.6	<0.000	93
41-50	0.288	>0.05	44
51-60	0.089	>0.74	16

Table 6.27 Correlation of OL / collaborative culture scores in the 4 age groups

In those under 41 OL capacity and collaborative culture were, as predicted, significantly positively correlated (table 6.27). This showed again that the scale was most valid for younger staff, who scored most highly on OL. In the 51-60 age group there was a significant negative relationship between job satisfaction and formalisation (Pearsons r -0.67, N = 17, p <0.004). The relationship between job satisfaction and collaboration was significant in age groups 20-30 and 31-40. This was again in accordance with other data showing the scales were most valid in younger age groups – table 6.28. Over age 40, the relationship between job satisfaction and collaboration remained positive but not significantly.

Age group	Pearsons r	N	Significance
20-30	0.49	39	p<0.002
31-40	0.56	93	p<0.000

Table 6.28 Relationship between job satisfaction and formalisation

Correlation between scales by age within profession

To check for any differences within professions which might affect hypothesis testing, the significant correlation of the OL capacity scale with the other scales was tabulated for each profession within each age group. See table 6.29.

Age group	Job satisfaction/ OL		Collaborative culture/ OL	
	Pearsons r	N	Pearsons r	N
20-40				
Doctor	0.76**	18	0.78**	17
Nurse/midwife	0.63**	115	0.60**	114
41+				
Doctor	0.42	21	0.55*	19
Nurse/midwife	0.61**	42	0.36*	42

Table 6.29 Correlation between OL capacity and other scale means by age group within profession (Related at 5% = * at 1% = **)

Like the OL score itself, the correlation between OL and job satisfaction and collaborative culture scales for doctors lessened after the 20-40 age group. For nurses the reduction was gentler or not present (table 6.29 above). Both the correlation between doctors' OL capacity and job satisfaction (table 6.29) and their mean OL capacity (chart 6.7) were highest below age 40.

6.4.4 Correlation between sub scales

For the full response set, all the OL capacity sub-scales were significantly correlated with each other at p<0.000. See table 6.30.

SUBSCALE	Clarity of Purpose and mission	Leadership commitment and empowerm'nt	Experimentat'n	Transfer of Knowledge
Leadership commitment and empowerment	0.47			
Experimentation	0.522	0.687		
Transfer of Knowledge	0.458	0.630	0.636	
Teamwork and group problem solving	0.351	0.548	0.549	0.518

Table 6.30 correlation between sub-scales. N=199.

All sub-scales were correlated with OL capacity scale total at p<0.000 for all respondents (not shown) and for the senior clinical staff alone (table 6.31)

SUBSCALE	Pearson Correlation
Clarity of Purpose and mission	0.73
Leadership commitment and empowerment	0.85
Experimentation	0.89
Transfer of Knowledge	0.85
Teamwork and group problem solving	0.68

Table 6.31 correlation between sub-scales and scale total.
N= 90. (Senior clinical staff)

Unexpectedly, the clarity of purpose sub-scale was significantly associated with the formalisation scale, in both the full group (r=.263, p<0.000), and senior clinical staff alone (r= 0.262, p<0.013, N=90), and junior staff alone (r=0.283, p<0.004, N=101). The correlation applied in each hospital. The correlation was strongest for hospital 2 doctors, but not significant for any one profession within a hospital. No other OL sub-scale was associated with formalisation.

The developers found a single factor which captured all the five dimensions. It explained 46.7 percent of the total variance.[151] A factor analysis was carried out on the 21 individual items using my hospital data for all respondents. One factor was clearly most important, with an eigenvalue (standardised variance) of 6.3 explaining 30% of the total variance. There were 5 other factors with eigenvalues between 1 and 1.6. An eigenvalue of 1 is the accepted cut off point for initial factors.[223] Cumulatively all 6 factors explained 60% of the total variance. Therefore the results achieved by the developers were not entirely verified in my study, but there was certainly a similar pattern, with one main factor. Using the other accepted method,[395] a visual ("scree") plot to see any marked reduction in gradient (see chart 6.11) and so decide which factors to extract, only one factor would be used and so no rotation would be required.

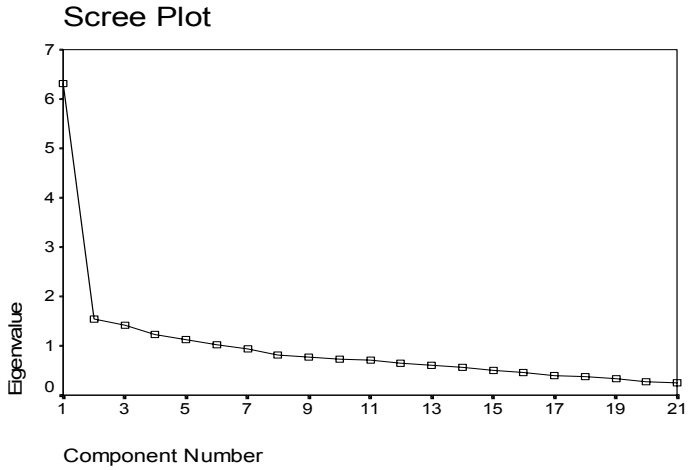

Chart 6.11 Scree plot of initial eigenvalues for OL scale factors

I also did a factor analysis using the 5 sub-scale means from all respondents. This resulted in a single factor. This factor alone explained 63% of the variance. The sub-scale means thus behaved more in accordance with the idea of a single factor explaining organisational learning behaviour, because a single factor explained more of the total variance.

6.4.5 Summary for scale validation

Together, the statistical tests reported in this chapter gave good evidence for the validity of the OL, formalisation and job satisfaction and hospital culture scales in the acute hospital environment. The distributions were normal overall and in the main study samples. The means for individual OL scale items followed similar patterns in each hospital, which helped to confirm scale reliability. As predicted by the selection procedure, item means were generally higher in hospital 1.

Both job satisfaction scores and hospital culture scores were highly correlated with OL scores. This was as predicted and validated the OL scale for use in the NHS acute hospital context. Both the correlation and the mean OL scale scores were affected by age group, particularly for doctors, peaking at age 31-40. The

correlation weakened especially for those over 50 years old. There was no correlation either positive or negative between formalisation and OL score. This was unexpected, as the authors reported a weak negative correlation. However the difference may have simply indicated somewhat different conditions in Scottish hospitals from public service environments in Canada.

The five sub-scales of the OL capacity scale were highly correlated with each other, and with the OL scale total. This showed that the instrument measured a single dimension and was likely to give a total index rather than a profile. This was in accordance with the developers' findings using factor analysis.[151] However, the factors found by the developers for the 21 scale items were not entirely verified in my study. These results mean there might be scope for developing an improved version of the OL capacity scale for the NHS.

Chapter 7 - Hospital context

Introduction

Chapter 6 described response rates, missing values, demographic differences between responders and population and gave validation evidence for the research instruments.

The context each hospital provided for guideline implementation was important in providing potential explanations of both the similarities and differences in guideline implementation which were also relevant to the hypotheses. This chapter 7 reports qualitative findings about each of the five themes identified in the literature review to enhance and enrich understanding of the hospital contexts. It uses a humanistic approach, not a quantitative one.

Method of analysing hospital context

The sub-themes found in 20 senior clinical interviews were structured by the researcher, though not coded, under the three approaches to OL and the themes of clinical audit and leadership which were identified as important aspects of context in the literature review. As well, the issues thought from this experience to be the most revealing were examined for all 101 interviewees with the help of computer text searches for key words. Finally, the whole of each interview with each clinical audit co-ordinator in each hospital was examined in detail.

Previously, the complete full transcriptions of the 101 interviews had been fully computer coded, using NUD.ist, in a hierarchical structure of nearly 2,500 individual codes within the interview question structure. This was based around the dissemination-implementation-outcomes model of guideline adoption. These substantive codes were combined into larger substantive themes derived from the natural groupings they fell into. The term 'substantive' is used because

these themes were real-world content based rather than theoretical and form based. Where appropriate, the high level themes were further grouped under theoretical categories of single and double loop learning derived from organisational learning theory. These formal (theory and form based) categories were used in the current analysis as part of looking at innovation, since this equated to type 2 change. There were of course numerous response categories which could not easily be grouped as either type 1 or type 2, and numerous substantive categories offering alternative explanations of hospital context could not be discussed for reasons of space, or were not pursued. These will be briefly discussed at the end of this chapter.

Aim of the analysis of hospital context

The aim was to trace in each hospital the logical links between the context, the cultural mechanisms or processes, and the outcomes in terms of the facilitation or hindering of guideline implementation.

Background

In 2002 Rycroft–Malone et al[351] updated a conceptual framework for change originally developed by Kitson et al[225] in 1998 (see chapter 3). This was the most structured approach to the problem of describing and comparing hospital contexts I found in my literature searches, and it helped to validate my choice of relevant aspects of context. It did not drive the work, it was an alternative but complementary approach to the five themes I identified myself from the literature. The framework, as revised, included the original three main dimensions of evidence, context and facilitation; although within these some of the sub-elements were changed. Examples of high and low poles are given for each dimension. The framework predicted more successful implementation of change when more of the dimensions and their sub-elements were "high" than when they were "low". This framework did not include the external context of

the organisation – the climate of public opinion, hospital and NHS media profiles, governmental and health board political pressures, legal frameworks, or pressures from social care, primary care and professional bodies.

Brief Hospital vignettes:

Hospital 1

As this was written, 300 consultants at Hospital 1 trust tabled a list of concerns to the health minister, Malcolm Chisholm, criticising in detail the way the trust was being managed. Two months later, the trust press office refused to supply an original copy of the document on the grounds that the matters had been addressed; however a copy had been given in the (Glasgow) Herald newspaper on 25.1.02 (see appendix A6.2). The criticisms displayed an understanding of management language and criticised management of the trust in its own terms - structures, communication, feedback, decision timing, and the chain of command, as well as on specific clinical issues.[252]

Many of these consultants led SIGN guideline development groups, (this applied for both of the guidelines focused on by the present study) and some were involved in their own research. The audit department was not criticised. Higher funding for teaching and research gave more capacity overall. There seemed to be real consensus team-working. There had been a large investment in a new maternity unit, on the site, which had room to expand.

Hospital 2

At hospital 2, consultants were longer serving than in hospital 1. The MacLean report on hospital 2[256] contained criticism of a number of organisational features, for example boarding out of patients in wards not covered by nurses experienced in working with the specialty or the consultant responsible for them.

The audit department was criticised in my interviews, and had been recently reduced in number. Team working seemed in a number of cases to be done (eg orthopaedics) just by splitting the individual consultants' work along the lines of separate patient groups rather than joint working by pooling all the skills relevant to each patient. An important aspect of context was the buildings. Whilst hospital 1 was originally Victorian, it had a large new block, and other new building was in progress, hospital 2 was still almost entirely in the old Victorian building, with no room to expand. Consultants' offices, for example, were often hidden away up narrow dark staircases.

7.1 Communication

7.1.1 Communication - hospital 1

Uses of guidelines in communication

In hospital 1 feedback from audit of guidelines gave reassurance that you and your practice were satisfactory, and would not be criticised. "Best practice" was the key phrase: it was mentioned nearly four times more frequently in hospital 1.

Doctors communicated because of interest, or "Internal commitment" - as Argyris put it (see chapter 2). "as it happens we've got a major interest in diabetic nephropathy", (consultant hospital 1). A consultant emphasised the polarity between being compelled or forced to implement guidelines and doing so through interest. A senior nurse contrasted dissemination through a newsletter with dissemination by an individual pushing a topic out of interest combined with implementation through others who might be less interested. It was acceptable to be dictatorial if you were an enthusiast for patient care.

> "if you don't have somebody pushing them people will ignore them" (senior nurse, hospital 1)

The value given to multidisciplinary practice was connected with a high value on consensus practice in hospital 1 and also with tendency in hospital 1 to value sub-specialisation. This was encouraged by guidelines which showed it was better for a sub-specialist to treat rare conditions, which might not be included in SIGN guidelines in any case (consultant, hospital 1). Hospital 1 clinical directors were positive about standardised practice; a corporate vision was considered part of the hospital 1 culture:

> "basically our staff do not have to worry about it being a Tuesday and so and so's patient as to whether or not treatment a, b, or c is used" (consultant, hospital 1),

Specialist issues were referred to nearly four times as often in hospital 1 (text search for speciali*). Unfortunately, with specialisation also came a tendency to lack interest in other areas of care. Asked what the problems were in implementing guidelines a consultant replied:

> "ennui - I mean I think that's the basic problem you know it's the fact that you know you get so much stuff through the mail that sometimes it's difficult to prioritise and you know if you're a super-specialist then you tend to concentrate in your area don't you?" (consultant, hospital 1)

Implementing guidelines, for example by training new house officers in them every 6 months, was a chore,

> "I mean quite candidly, 2 weeks from now someone will do something and I'll say why did you do that and they'll say because we always did it in such and such a place," (consultant, hospital 1)

Power, guidelines, and communication

The national development of both the DVT and diabetes SIGN guidelines was widely recognised in hospital 1 as driven by consultants (for example by a senior nurse, general medicine). So if anything, power was wielded by those hospital 1 consultants who were involved in guideline development over their hospital colleagues and professionals in other hospitals such as hospital 2. This also meant that practice often did not require to be changed in hospital 1 with implementation of these guidelines because it had evolved in accordance with this view of the evidence in any case. This was less likely to be the case at hospital 2. For some doctors though, SIGN guidelines were an unwelcome attempt to control the quality of their practice.

Another consultant made an interesting classification of people into guideline producers and guideline followers, seeing it implicitly as a power relationship:

> "I don't think nurses are any different to doctors both are human beings, and they are divided into those that issue guidelines and those that receive them. Those that receive them have a healthy scepticism about those that issue them" (consultant, hospital 1)

Most nurses did not issue clinical guidelines that directly affected the practice of doctors. But a senior nurse said nurses were now reading and doing research and senior nurses would now take account of written evidence from junior nursing staff. (senior nurse, hospital 1)

Midwives saw themselves as different in having practitioner status:

> "Do you know that the burden is on us to update and provide care and having practitioner status is different from nursing we have different legal responsibilities in midwifery than nurses do so it's on our back to initiate some of these things." (senior midwife, hospital 1)

At hospital 1 there were mentions of doctors reminding nurses about guideline implementation, checking on ward rounds for example, but not in hospital 2.

Scope of communication

A consultant described the implementation process – firstly a discussion of whether change was needed to policy, and then discussion with other surgical teams in the hospital. Audit was of mortality and morbidity, including complications. Once only, doctors only had attended at extraordinary single discipline audit meeting when they had to address a problem. This supported an idea that a level of confidentiality was sometimes needed for the open debates (open within the confidentiality boundaries) required to get change.

There were some examples of structural factors leading to restriction of communication by the nursing profession. Nurses were invited to medical meetings, but did not have time to go (senior nurse, general medicine). A weekly hospital meeting was in theory open to all but "in practice maybe 99% of the audience are medical staff and I hardly ever see a nurse there..." (consultant, hospital 1)

Hospital 1 had a general practice (health centre) housed within the hospital buildings, this may have helped in liaison with primary care for audit and research for example – a consultant mentioned it in connection with his innovative research with primary care on hypertension. There was a primary care representative on the DVT implementation group in hospital 1 but this was not mentioned in hospital 2.

7.1.2 Communication – hospital 2

Uses of guidelines in communication

In hospital 2 there was a tendency to retain individualised practice. The orthopaedics directorate was an extreme example of where the SIGN guidelines were not agreed on:

> "I mean even getting two consultants to agree on what type of prosthesis to use is a major problem [….] it's very difficult, it's very, they just won't decide on anything." (senior nurse, hospital 2)

Nurses reminded doctors more insistently about DVT prophylaxis at hospital 2 than at hospital 1, while leaving the ultimate responsibility with them:

> "down here especially we're good at saying to medical staff on I don't agree with that and we've got this here to prove that this is the best way to go." (senior nurse, hospital 2)

Power, guidelines and communication

The general feeling of lack of strategic control of guideline implementation at Directorate level was echoed in a view that hospital 2 was part of a bigger DVT prophylaxis audit across Glasgow - the data collection was criticised, but passively. This wider audit was not mentioned at hospital 1. Similarly, the view that:

> "the only folk who truly benefit from guideline production are the people who are intimately involved" (consultant hospital 2)

– was not given at hospital 1, and it was difficult to imagine such a view being heard there – perhaps because so many were involved in writing and implementing the guidelines – both DVT prophylaxis and Diabetes SIGN guidelines groups were led by people at hospital 1.

Nurses might use their reading of guidelines to challenge the practice of individual doctors, but only if the guideline had been accepted by the doctors as directorate policy. So, while in hospital 1 the main thrust of nurses' views was to encourage and remind doctors to use guidelines, in hospital 2, nurses saw the use of TEDs as a medical decision and one that might need to be challenged on nursing grounds for example, if there was broken skin.

> "We would say to a consultant we shouldn't be using stockings on this patient because the SIGN guideline [says so], we've not to do it" (senior nurse, hospital 2)

Nurses felt empowered by guidelines:

> "now, we probably say to the medical staff have you prescribed whatever for that patient or you haven't prescribed, why not." (senior nurse, hospital 2)

Scope of communication

At hospital 2 the concept of the clinical team was somewhat ambiguous – what it was depended on how you defined it. It could be seen as broad and multidisciplinary (ward based) or as consultants only.

In orthopaedics the potential conflict about DVT prophylaxis (seen too in hospital 1) had been bypassed by splitting up the work:

> "we weren't certain that there was really evidence to support what was recommended. As I say that's not been a concern to me because I don't do those operations." (consultant, hospital 2)

This could be seen as a defensive measure; it certainly prevented further debate, and therefore prevented type 2 OL, but in a situation where debate among doctors was causing day to day problems for nurses this was perhaps in the short term, but probably not in the long term, a good thing for OL in general. In this situation, the evidence was not conclusive about prophylaxis for

lower limb joint replacement, so in a sense there was no place for type 2 OL at local level other than carrying out or participating in primary research.

Summary of communication context

Briefly then, best practice defined by specialists and research was accepted as communicated by guidelines in hospital 1, where there was also acceptance of multidisciplinary information sharing with some reservations about cost and confidentiality. In hospital 2 local and individual versions of best practice were still possible, although nurses challenged doctors on this.

7.2 Information systems and procedures

7.2.1 Information systems and procedures – hospital 1

Availability of SIGN guidelines

The DVT prophylaxis guidelines appeared to be the most effectively disseminated guideline: "DVT is one of the very few ones that I can honestly say is looked at." (senior nurse, hospital 1). At the implementation level, information was related to the ward organisation and held on the ward. A consultant and a senior nurse remembered being issued with a little card about DVT prophylaxis, and had found this useful. One or two hospital 1 doctors mentioned accessing the SIGN guidelines through the internet, but not through internal hospital IT systems.

Professional involvement

A senior nurse in surgical HDU mentioned the audit nurse who worked for the quality nurse. That the audit officer was seen as being still a nurse indicated again some professional ownership by nurses of audit. Involvement might be in protocol development or audit or both.

Feedback methods for audit results

A senior nurse, (orthopaedics) and a midwife mentioned difficulties with communication and information about audit:

> "I don't know what happened sort of level above us - medical level"… "you sort of hear maybe 6 months down the line that it's been a positive or negative audit and you very rarely get it on paper." (senior nurse, hospital 1)

> "you know when you audit something and then you're supposed to get the interim results and then a reaudit. That doesn't seem to happen," (junior midwife, hospital 1)

This was perhaps the organisational learning downside of having too much protection within medical groups. Feedback on audit results was not usually specific to individuals, nor was it very quick, and for these reasons it was likely to have lower impact than if the opposite applied. An increase in team working and team accountability meant feedback was usually to teams not to individuals. For better OL, there needed to be a constructive process within the team for discussing individuals' contributions in the light of audit results, but this was rare and only done in exceptional circumstances.

In one relatively recently set up unit (Day Surgery) where nurses were in control, there was the exceptional feature of rapid individual feedback to doctors:

> "we go right back to the consultant and say look here it's early days but we find that a, b and c is happening and that has only happened since your registrar has taken hold of your list or whatever." (senior nurse, hospital 1)

In both hospitals feedback was generally not to individuals but to directorates. A particular problem with feedback was where it could not be in "real time" because of IT limitations.

7.2.2 Information systems and procedures – hospital 2

Availability of SIGN guidelines

In hospital 2 the difficulties with information seemed to be at the more basic level of the technicalities of filing and referencing it. A consultant said for example:

> "the common areas, the duty areas, are festooned with folders, information packs of one kind or another; extremely difficult to keep in order and the average nurse wanting to find information might be hard pushed to find it there." (consultant, hospital 2)

A senior nurse in the elderly directorate confirmed the difficulty of finding guidelines for nurses "a huge folder together with lots and lots of other folders". Although the hospital 2 clinical audit co-ordinator said that the SIGN guidelines and excerpts from texts on guideline implementation had been uploaded onto the hospital intranet, the problem was that the computers in theatres and in the wards were in use for other purposes.

The library had copies of all SIGN guidelines, said a consultant in hospital 2. She had not been able to get copies through the hospital otherwise, having come into post after implementation. This doctor had worked both at hospital 1 and hospital 2 and remembered the DVT prophylaxis card issued at hospital 1. She found this easier for medical staff than the method at hospital 2 where "they have to actually seek them out in a folder or a booklet". She had not heard any audit presentations on the topic at hospital 2. She had been in post for 18 months.

There was no mention of information about the results of previous audits, they were not, for example, known to be filed in the library, so it was difficult to build on previous work, and to create a knowledge base including the local historical context. This was a general omission in both hospitals.

Professional involvement

There was much emphasis on the need for more resource and the time limitations for protocol development from hospital 2 doctors. A consultant mentioned the time and support needs, from audit staff for example, so that doctors did not have to write up protocols in their own time – this was seen as an imposition. Another consultant confirmed this, saying guidelines were not audited because:

> "the problem here with audit is that we are not given resources to carry out audit." (consultant, hospital 2)

This theme was not seen at hospital 1, (which had more resource for training). Yet the DVT audit was remembered in hospital 2 as being done, not primarily by a clinical professional, but by the audit department (senior nurses in gynaecology, CCU/ICU, elderly directorate, and a consultant in hospital 2).

There was a link between individual and organisational learning. The guidelines were used in studying for qualifications by nurses (senior nurse, elderly directorate). But they were also used by "untrained" nurses (assistants) who had had training on the DVT guidelines. Audits were carried out by junior doctors as part of their training, for example in the elderly directorate. But again the results of these efforts were not explicitly centrally filed so did not attain their full potential as an organisational learning resource.

Feedback methods for audit results

A senior nurse (elderly directorate) felt you got better feedback about audit results for a guideline if you were in the audit group for that guideline, a theme echoed in each hospital. The unfortunate outcome of this was that those outside the audit group, who probably needed better feedback, in fact got worse feedback. No hospital audit day had yet been held in hospital 2. A senior nurse, said, in rather surprised tone, referring to hip fracture and the guideline implementation facilitator at hospital 2:

> "the girl unfortunately has left to another job but she did actually send us on the literature to say what actually came out of the audit." (senior nurse, hospital 2)

The Scottish Confidential Enquiry on Perioperative Deaths (SCEPOD) was a source of feedback independent of hospital feedback systems:

> ".. something they often point out is DVT prophylaxis, then that would come back to me. That's only if a patient dies. (consultant, hospital 2

This mechanism appeared to have been weakened by orthopaedic issues about the evidence, since the doctor quoted seemed to regard a comment on the omission of DVT prophylaxis as a routine matter.

Summary of information context

The key points were the better availability and dissemination of the DVT guideline in hospital 1 as compared to hospital 2, and the demand for more feedback from nurses about audit results in hospital 1. Consultants in hospital 2 wanted help with writing protocols. In both hospitals there was no central archive of audit results, and a feeling that the best audit feedback was restricted to members of the audit group

7.3 Innovation

7.3.1 Innovation - hospital 1

Active or reactive

A consultant at hospital 1 mentioned comparing his own practice with best practice. This meant using published literature and led to innovative ways of matching best published outcomes. The following quotation describes a context and mechanism difficult to imagine in hospital 2:

> "10 years ago as I say we set up a unit whereby anybody with renal disease would be seen by both - a team of both diabetologists and nephrologists and we audited that clinic after 10 years experience and we looked at various things which are in SIGN but before SIGN, […] it's not really been through SIGN." (consultant, hospital 1)

The important points about context here were that there were resources available in hospital 1 to fund the mechanism – a research registrar, and the consultant had enough autonomy to invest in the research he wanted. The outcome of the research was pending, but the outcome of these conditions was that a piece of type 2 learning was in progress, with possible implications beyond the immediate local context.

Involvement in developing SIGN guidelines

Perhaps the main contextual difference between hospitals was that consultants in hospital 1 were actively involved and leaders in national groups writing SIGN guidelines, for both DVT and Diabetes, but consultants in the hospital 2 were in the main not – with 1 exception – this was a consultant who was leading a SIGN national group for a different guideline. This involvement in SIGN guideline development was professionally prestigious. Leading development groups indicated that a clinician was a respected expert in the field, and this was

closely associated with doing research personally, another respected activity. Innovation was a valued leadership activity in the medical profession.

Clinical, structural, and processual innovation

High Dependency Unit (HDU) had been an innovation resulting from informal review of processes 5 years before (senior nurse, surgical HDU). The anaesthetists talked to nurses about patient care informally and HDU came about with their support. HDU was a nursing led unit but used one SHO. There was not good support from medical staff for this development - unlike for ICU. Hospital 1 had other examples of specialist units run by nurses or with nurses in lead development roles – for example the day surgery unit (two senior nurses, day surgery were interviewed), which served 25 consultants from different specialties using separate protocols for each specialty, and which had done an audit to improve its liaison with primary care nurses (senior nurse, day surgery), through a liaison sister. Another innovation was the specialist multidisciplinary stroke team with 16 designated beds for stroke patients in the hospital. There was a nurses' standard setting group for stroke care, and a stroke redesign project with a designated co-ordinator. Innovative change in hospital 1 often involved collaboration between specialist nurses and specialist medical staff.

7.3.2 Innovation – hospital 2

Active or reactive

Reactive innovation was mentioned at hospital 2 as a result of bad publicity about patient abuse some years ago, and a resulting visit from the Scottish Health Advisory Service (SHAS). Funding was given for new soft furnishings for two wards. It was an innovation to the patient environment (senior nurse, hospital 2).

In hospital 2 a barrier seen to using guidelines was the problem in keeping them up to date, not mentioned in hospital 1 (senior nurses, CCU/ICU, and general medicine, hospital 2). This was probably connected to hospital staff not setting the guidelines but rather attempting to ensure practice mimicked them.

In hospital 2 the lack of a change management culture was criticised:

> "There isn't a change management culture within the trust. It doesn't happen in anything." (consultant, hospital 2)

Involvement in developing SIGN guidelines

There certainly appeared to be a much lower level of involvement by hospital consultants in hospital 2 in the national SIGN guideline development groups. In the one case where a hospital 2 consultant was leading such a group it was obvious from many comments that this was very influential in the department. The consultant was mentioned by a senior nurse proprietorially:

> "Our Dr X has had a part in playing in the SIGN guidelines Stroke so the guidelines are clinical guidelines that we've got at ward level" (senior nurse, hospital 2,)

There was evidence here of higher self esteem generated by feeling you were in the vanguard of national best practice, that it was your practice first.

Clinical, structural, and processual innovation

An organisational innovation at planned hospital 2 and not seen at hospital 1 was:

> "one day a week, sorry, one day a month, whereby all clinical commitments are cancelled for the day...presumably things such as audit would be discussed at that" (consultant, hospital 2,)

In hospital, 2 link nurses formed a system to link up to disseminate information about more specialist care for patients to staff in other specialist and general wards. A device co-ordinator trained staff on the use of clinical devices.

There were many notices in this hospital about aggression management of patients, and dangers to staff, and there was a local guideline on this (senior nurse, elderly directorate). This was not seen or mentioned at hospital 1.

A less successful innovation at hospital 2, which told of a culture of cost cutting, was the practice of washing and reusing TED stockings. A senior nurse at hospital 2 considered it acceptable to wash TED stockings and reuse them:

> "you found a lot of the girls doing a quick wash, hanging them over the heater and they actually weren't wearing them till they dried again" (laugh) (senior nurse, hospital 2)

Two others at hospital 2 mentioned washing TEDs – one that patients were taught to wash their own at home (junior nurse) and the other, an infection control nurse, was concerned to stop this practice. In hospital 1 by contrast patients were sent home with a supply of TEDs.

The hospital 2 orthopaedic directorate was an innovation in Glasgow:

> "we have a separate orthopaedic unit from A & E and we, our department stays open almost for 24 hours a day, whereas other orthopaedic units are core hours, Monday to Friday 9 to 5, we're not, so we have a big input in patients that come in out of hours" (senior nurse, hospital 2)

The knowledge that they had this important role may, with support from the Royal College of Orthopaedic Surgeons, have increased resistance to pressure for implementation of the DVT prophylaxis guideline in this directorate, despite the generally weaker links into the Royal Colleges in hospital 2.

Summary of innovation context

Active critical thinking and testing of new practice at hospital 1 was not evident at hospital 2, where innovation was more reactive. There was greater involvement in SIGN by consultants at hospital 1. Cost constraints had undesirable effects at hospital 2, where updating guidelines was seen as a problem.

7.4 Clinical audit infrastructure

7.4.1 Clinical audit infrastructure - hospital 1

Unit of implementation

An initial mass approach to dissemination of the audit results of the DVT guideline in hospital 1 by the clinical audit dept was abandoned when they found it ineffective.

> "Mass dissemination exercise (laugh) unbelievable. […] We then reaudited the impact of that only in medical block, because we didn't have resources to do anything else, and only found a slight increase, and we got lots of feedback from staff as to why that was, which was very helpful. (clinical audit co-ordinator, hospital 1)

This first audit was done without involving the ward staff, and the clinical audit co-ordinator felt this had been a mistake. Audit results were then more targeted to people known to have an interest in receiving them, such as clinical directors and senior nursing staff. This was a piece of OL for clinical audit.

Dissemination of guidelines was structured around directorates, and audit was directorate based. There was an overall impression that consultants saw the directorate as a reality for policy creation in hospital 1 more than in hospital 2. Discussions and policy-making about guideline implementation took place in directorates in hospital 1.

> "with DVT well because DVT is - involves the whole specialty and because we've a kind of department that is heavily interested in thromboprophylaxis, then we just set up a small group for that to sort it through." consultant, (consultant, hospital 1)

In hospital 1 the obstetrics directorate "came out trumps" (Clinical audit Co-ordinator hospital 1) as having the best rates of compliance, but directorates were not encouraged to compare themselves competitively against each other. Results were fed back at directorate level, not at consultant level; individual consultants could not be immediately identified.

A physiotherapist gave an instance of the hospital 1 culture of focusing on the clinical problem rather than the guideline implementation, and also highlighted the importance of actually carefully reading the guideline. (NB this was actually a rogue interview which of course was excluded from the analysis by profession, but was retained as contextual information):

> "I said that masses of them weren't receiving it until 48 hours later […] so the next time when we audited again they looked at the time lapse and that showed a much clearer picture." (Senior physiotherapist, hospital 1)

Audit department

The clinical audit co-ordinator saw better information systems as the way forward to improve the learning process, and used an interactive model:

> "Well I think the way to do it is through a clinical information system and build in either prompts on a clinical information system or maybe more de- well it depends maybe to pick particular conditions and perhaps do a you know, care pathway." (clinical audit co-ordinator, hospital 1)

This respondent also felt there was probably a big mass of nurses on the wards who did not know what the SIGN guidelines were.

As indicated above, resource limitation had reinforced the learning that expensive mass dissemination was not the way to implement guidelines, and the audit co-ordinator was prepared to admit an implementation gap, a piece of open, model 2 behaviour. No criticism of the audit department was voiced.

7.4.2 Clinical audit infrastructure - hospital 2

Unit of implementation

A centralised approach to communication and to doing audit here, contrasted with the learned less centralised approach in hospital 1. The centralised approach was described by the clinical audit co-ordinator as follows:

> "Basically we, the guideline arrives on our desk and comes to the guideline implementation group who then through the group nominate an appropriate lead person to lead that guideline within the trust." (Clinical audit co-ordinator, hospital 2)

As in hospital 1, a person with a temporary role in facilitating the implementation of that guideline (DVT prophylaxis) was introduced, but whereas in hospital 1 the person had a real clinical job title "DVT Prevention Co-ordinator", in hospital 2 the role was that of "guideline nurse". The difference was that in hospital 2 the focus was on the role and the guideline itself, while in hospital 1 the focus was on the clinical problem.

Audit department

The clinical audit department had over the years developed the protocol for guideline implementation already described. Although the audit department

claimed the protocol had evolved and changed it did not seem to have changed much from the initial DVT implementation methods, except that now a multidisciplinary hospital group brought all the key players together more explicitly at hospital level. This did not seem to have gone hand in hand with increasing legitimacy (and hence effectiveness) of the centralised structures:

> "very recently, we had one of the guideline team come over just to go over things with us and reinforce and so on, but not a very positive interaction somehow." (consultant, hospital 2)

In hospital 2, the clinical audit co-ordinator saw clinical information systems as the way ahead, but with rather a different emphasis from hospital 1 – simply to upload the HTML version of the guideline on to the trust intranet, rather than, as in hospital 1, using a system of prompts within electronic records.

Compliance rates with the recommended DVT prophylactic methods had, according to the audit co-ordinator, increased and remained steady in hospital 2 (as in hospital 1) since the initial implementation. Ongoing audit in hospital 2 was by a spot check or snapshot of all patients in a ward on a particular day every 6 months. Some clinicians were sceptical about the audit results because only a sample was audited (consultant). The audit department had recently lost most of its staff owing to job moves and other reasons, and the audit co-ordinator blamed this for the inability of his department to do more auditing.

Summary of audit infrastructure context

A learning approach to clinical audit in hospital 1 contrasted with an approach at hospital 2 that continued to be centralised and focused on doing audit rather than helping others to do it. It focused on roles rather than real problems. In hospital 1 the audit process was used by directorates to develop policy; in hospital 2, although this happened there was also distrust of the validity of audit results and criticism of the audit department. Hospital 1 had a vision for

the way IT would integrate with practice; hospital 2 saw IT more narrowly, as an electronic version of a paper record.

7.5 Leadership

7.5.1 Leadership - hospital 1

An inclusive approach to decision-making, a prime value of evidence-backed consensus and a respect for knowledge generation through research were main characteristics of leadership in hospital 1. The leadership roles of consultants and ward sisters are considered separately in the following analysis.

Consultants' leadership role

In hospital 1 clinical directors generally made a point of their democratic inclusive consensus style of leadership.

> "there was then discussion amongst the clinicians on the unit as to whether there was any requirement for a change in policy." (clinical director, hospital 1)

However, junior doctors and senior nurses in this directorate were told rather than involved:

> "I think that the decisions in relation to the adoption of the guideline would be made at consultant level and then disseminated to the junior doctors and the senior nurses." (clinical director, hospital 1)

The medical local champions gained respect for their knowledge, expertise and skill from their peers and from nurses, and so they gained influence, partly at least, as a result of their involvement in research, for example at hospital 1 the DVT guideline leader was referred to proudly as "an expert" by others:

> "we had [x] who's sort of expert, a world wide expert on clotting, blood clotting, doing ward rounds in the wards you know so I was always very

> aware that oh God these my end should have their TED stockings on or you know whatever." (senior nurse, hospital 1))

A text search for the word "expert" found occurrences in 7 interviews out of all 101, and these were all in hospital 1. This implied leadership through technical expertise was valued in hospital 1 rather than leadership by formal role or by resource power.

Hospital 1's culture was thought to determine the kind of consultant leaders it appointed, leaders who expected to be part of a consensus-based team:

> "I think we have been very active in multidisciplinary working and getting things in the way of guidelines and protocols in place and educating people to ensure that we speak with a kind of corporate vision which has been a feature of this hospital for years you know we don't have a ...that it's cultural is probably really, probably influences things like who gets appointed into senior consultant jobs and midwifery jobs […] we're big enough people to accept that it's safer and more sensible for 90% of people to buy in to something and do it one particular way than for people to cause confusion by saying well it has to be done my way or no way. And that's a cultural thing this hospital thinks a big strength, but from my previous experience in other places it's rare." (consultant, hospital 1)

A number of consultants and ward sisters in small directorates or specialty units said that the small unit size made dissemination of information easier. This seemed to be an important leadership function, so span of control was important – a nurse said she had a small unit of 12 staff, a doctor said he had 6 consultants and 10 juniors, and this made it easy to communicate. There was perhaps therefore a span of control issue in relation to the key issue of dissemination.

Doctors were not seen as managers by nurses, yet nurses still did what they said in a curious arrangement where doctors had power over nurses without responsibility for them. These relationships seemed the same in each hospital.

Ward sisters' leadership role

G grade nurses (more commonly still called sisters) were the ward leaders for nursing:

> "... the senior the G grade is the person that's responsible. I'm involved a good deal in practice, I'm involved in the clinical area more putting them into practice." (F grade nurse, hospital 1)

Sisters led their staff using evidence-based practice, and might also delegate the learning management part of the leadership role to a junior:

> "I'm ward manager for learning of it but the sister we've got here is a ward manager. The ward as a whole is very striving towards standards and good quality of care, and she's always trying to upgrade things by evidence based practice, research, or looking at the guidelines." (junior nurse, hospital 1)

Ward meetings were reported as two-way, with opportunity for questions, and an inclusive explanatory style was usually regarded as essential to get staff commitment:

> "All the information was made available to the staff and it was discussed - it's been discussed at ward meetings." (senior nurse, hospital 1)

Motivation of staff was an important leadership role in nursing, although the combined ward manager and clinical role was found problematic by some g-grades owing to time constraints and the demands of the clinical role which was seen as a priority that could not be denied:

> "at times I think I don't think this is worth it you know it's like, you know I'm supposed to [be a] ward manager, but I can't manage a ward when I'm out there looking after patients you know and the amount of bits of paper I get." (senior nurse, hospital 1)

A very positive comment such as the following would not have occurred in hospital 2:

> I don't actually have any problems with the trust the way they approached it. I think if you have, they give us a lot of leeway, we can run up, we have a whirlwind teaching program running here which is open to multidiscipline, anyone. Anyone who's got something that they've researched or want to talk about, there's time given to us and we can share it with other disciplines […] so we're given a lot of time if you've got an idea you've got a lot more backup now to go and say look I need time for this, and I need a wee bit of help, if I get a group of people together is that OK? - And you know there's a lot more - even in the last two years than there has been in the 20 years I've been in nursing.." (senior nurse, hospital 1)

Specialist nurses often had specific leadership roles, usually at sister level, so the pattern of specialist knowledge-based leadership was repeated in nurses as in the hospital 1 doctors:

> "There's a diabetic sister that works in X ward in Y hospital, and she runs the diabetic clinic." (junior midwife, hospital 1)

In both hospitals, audit was led at two levels, care audits were led by nurses, and treatment and outcomes (recovery) audits were generally led by consultants. A previously quoted remark makes the point:

> "The audits generally - it's led, it's sister led within our ward for the standards. Anything higher than that is led by our senior consultant." (junior nurse, hospital 1)

7.5.2 Leadership - hospital 2

Consultants' leadership role

An inclusive style was used for dissemination to junior doctors by consultants in one directorate, but the nursing structures were kept at arm's length. Nurses were involved in clinical audit which was by definition multidisciplinary, but doctors had their own uni-professional medical audit group, and saw audit and guidelines in a different way:

> "without being elitist about this, I suspect guidelines for many nurses means just some clinical pointers as to how best to treat a given condition." (consultant, hospital 2)

The 23 interviewees who mentioned the word "consultant" in hospital 2 revealed some useful contrasts with hospital 1. For example the culture was seen very differently from the collaborative guideline-accepting culture in hospital 1:

> "So you have to make people feel part of it, […] Not all consultants believe they're [guidelines] important." (consultant, hospital 2)

In this hospital fears about "big brother" were explicitly voiced, again by the same doctor, and about others rather than himself:

> "this concept of big brother is watching, you know the clinical standards, governance, professional performance, re-accreditation now for doctors." (consultant, hospital 2)

Leadership through knowledge and evidence were little mentioned. Nurses still deferred to the consultant role, but there were some indications that this

might be wearing thin, There was a sense of exasperation with consultants who were "set in their ways" sometimes from nurses.

Ward sisters' leadership role

Some nurses in hospital 2 wanted a more inclusive leadership approach to dissemination from doctors, but this was more about doctors supporting nurses in implementation rather than as in hospital 1, nurses demanding an input into the process of producing the local protocols:

> "I think we could have done with a bit more instruction, a bit more dissemination through the G grades, rather than just these are the guidelines, and this is what you've to do." (senior nurse, hospital 2)

Ward managers (G-grades) were regarded as having the main responsibility for disseminating guidelines to their staff (as distinct from ensuring they were acted on):

> "even if you send something to a clinical director there is no guarantee that he will speak to his colleagues. If you send it to a clinical nurse manager she will certainly give it to her colleagues and everybody else" (senior nurse, hospital 2)

Ward sisters had the important responsibility for ensuring guideline recommendations were acted on day to day, not only by their nurses, but also by junior doctors.

> "it's my responsibility as a nurse to make sure that they do know about them and that the patient I'm looking after is receiving the appropriate treatment within those guidelines." (junior nurse, hospital 2)

As in hospital 1, sisters had ultimate responsibility for the delivery of education and training of ward nurses, which included education required to implement guidelines:

> "she has the end responsibility to make sure that they know these kind of things." (junior nurse, hospital 2)

While individual responsibility was supported by some in hospital 1, individualism was generally abhorred by nurses, especially in hospital 2:

> "if they've got their own ideas on things sometimes they can be a bit difficult." (senior nurse, hospital 2)

There were examples of supportive and communicative management styles being preferred at hospital 2:

> "she very much smoothes the path for us in a lot of ways, and as I say she's got a good long term with the medical staff within the area, so that helps a lot." (senior nurse, hospital 2)

Leadership seemed, from the following quotation, to be sometimes a more informal process in H2 than in H1. This interviewee said the real ward leaders might not necessarily be ward managers (G-grades), but this was said in a spirit of surprise, (whereas in H1 as a previous quote showed, all levels were encouraged to come forward with new ideas):

> "if I want things done, I don't always go to the person that would appear to be the one that would do it, I'll go to the one that will actually achieve that change, […] you know you maybe have a real bright wee staff nurse that knows how to get things done" (senior nurse, hospital 2)

Summary of leadership context

In hospital 1 the most accepted leadership style was inclusive and collaborative and used expert power and research involvement as a prime value, but this was not mentioned in hospital 2. Hospital 1 doctors used a less inclusive approach with junior medical staff than some parts of hospital 2, but nurses were not generally excluded from any regular audit meetings, while they were excluded from some medical audit meetings in hospital 2. A small span of control was an

asset to consultants' directorate dissemination in hospital 1. It was still possible to be a convincing consultant leader and to use different practice from guideline based best practice in hospital 2. In both hospitals senior nurses at G-grade level in charge of wards were responsible for implementation. In hospital 1 nurses found it difficult to combine management and clinical roles, and were willing to question this. A continuing clinical involvement was valued by their staff. Informal nurse leaders were encouraged in hospital 1 but were a surprise to some in hospital 2. Specialist nurses had leadership roles in hospital 1, but less so in hospital 2. There was a two level leadership of audit in both hospitals. Nursing audit and medical audit were separated because there was no medical involvement in nursing audit.

Conclusion

This conclusion summarises and starts to discuss the differences and some of the similarities between hospital contexts as a basis for further discussion in chapter 11, where similarities between hospitals are also further analysed and discussed. Each of the contextual themes is now compared between hospitals in a loose and discursive format.

Communication about audit results was particularly seen as needed for reassurance that practice was best practice in hospital 1, although checking compliance was mentioned equally in both hospitals. Specialisation and super-specialisation were important elements of the hospital 1 context, and much less emphasised in hospital 2. Specialisation was, with research-based expertise, how hospital 1 consultants retained their professional autonomy. Specialist nurses were a particular feature of hospital 1. Innovation to service delivery was often led collaboratively by specialist nurses working together with specialist consultants. Hospital 2 consultants had their role power, which some defended vigorously by insisting on retaining their own practice either explicitly or by subterfuge. This curtailed further medical debate about best practice in that area.

Some hospital 2 directorates retained uni-professional medical audit groups as the explicit norm, while in hospital 1 these groups were uni-professional in fact but not in principle. In contrast hospital 1 emphasised a collaborative culture of consensus practice in most directorates. Dialogue, debate, even disputation were accepted in hospital 1 as part of medical practice at the policy level, but not in day to day practice.

In both hospitals nurses had responsibility for day to day implementation of guidelines in wards, though consultants and audit departments gave talks and manuals (hospital 1) to new junior doctors. While in hospital 1, consultants would remind sisters about guideline implementation, they expected to be reminded by them in hospital 2, and nurses there were quite insistent about doing so, with less appreciation than in hospital 1 of the advisory nature of guidelines.

Information systems at hospital 1 seemed to have succeeded in making the DVT prophylaxis guideline widely known there. Copies were held on wards in folders, and posters gave the key points. A small card had been used initially and was generally held to have been most useful. Some doctors said they used the internet to access the guidelines.

The audit co-ordinator saw IT systems as the way forward in both hospitals, though in different ways. In hospital 2 copies of guidelines were available on the trust intranet, but this had limited terminal access. In hospital 1 a more ambitious vision of electronic care plans with audit points and prompts for guideline implementation was mentioned by the audit co-ordinator, but this was only a hope. At present in both hospitals nurses performed many of the information system functions. In hospital 2, unlike hospital 1 there appeared to be a desire among some doctors to be less involved in guideline implementation, including audit and writing protocols. A need for more resource for these

activities was mentioned in hospital 2, and this was being addressed (the proposed monthly audit day). Feedback was not full in either hospital. In hospital 1 there was a sense from nurses that guidelines were filtered out at levels above them in the nursing and management hierarchies. Nurses did not like this, perhaps because they used the guidelines for professional development.

The diversity and amount of innovation, particularly in new ways of delivering care, - new roles and structures - was where the greatest difference between the hospitals could be seen. Hospital 1 had a much greater range of initiatives. The greater number of consultants at hospital 1 leading or contributing to SIGN guideline development groups was an important difference between hospitals. Some innovations were related to SIGN guideline topics, the stroke team for example, and many were collaborations between nurses and doctors. Implementing guidelines was a more passive form of innovation, and at hospital 2 there were examples of reactive innovation in response to external pressures. Some less desirable innovations in the form of "making do" such as washing and reusing TEDs were also reported there, presumably a result of resource limitation. The lack of a change management approach was mentioned at hospital 2.

The clinical audit and guideline implementation infrastructure seemed to have varying styles. The audit department in hospital 2 had a strong but very centralised approach, which despite some changes in terminology did not seem to have changed in essence. The audit department in hospital 1 although starting with a centralised dissemination process quickly found this ineffective and abandoned it, using dissemination to key contacts and spot audits of compliance on a single day. It seemed to be generally held in high esteem. The hospital 2 audit department still seemed to have a one-way style, seeing itself as driving rather than supporting and facilitating the implementation. Hospital 1

appointed a guidelines nurse and then a DVT prevention nurse on a temporary basis, a different and more practical approach to the real problem, likely to have been appreciated more by those with coal-face values.

Leadership in hospital 1 was closely bound up with the issues about expert knowledge, specialisation and technical power which were expressed in but not conditioned by the involvement of so many of its consultants in leading and contributing to guideline development groups at national level. It may well have been the case that the hospital 2 link nurse system was an attempt to compensate for a lack of communication between its consultants. The hospital 2 consultants had role power, but this was validated in most cases by wider professional structures, not by respect for their research. In hospital 2 some routine audit meetings were explicitly for doctors only. Guidelines were still viewed as a threat to autonomy by some hospital 2 consultants rather than an enhancement of autonomy through improvement of professional practice as a whole, as was more the case in hospital 1. Ward meetings were generally nurses only in both hospitals. But these were often to cascade essentially medical agendas as well as to deal with nursing issues.

There were many similarities between the hospitals. These are discussed further in chapter 11, section 11.2.3. For example, there were more similarities than differences between the nurses in each hospital. Nurses generally did not appreciate doctors' individualism in having their own ideas, because it made day to day delivery of care more complex and liable to error, although perhaps paradoxically they had great respect for medical research. There was generally great emphasis on the benefits of uniformity and consistency in care, and none at all on the value of patient choice – care decisions were choices made by professionals. Patients were not involved in protocol development. Sisters, like consultants, had a training role, so were OL leaders but were not trained in this. There was a liaison nurse in hospital 2's elderly directorate, who liaised with

primary care outwith the hospital This form of liaison nurse did exist in hospital 1 – for example in day surgery.

The overall thrust of this qualitative evidence supported, illuminated and amplified the findings from the quantitative comparisons of qualitative categories, and added to the validity of the comparisons. In the further context of the Rycroft-Malone/Kitson framework, the majority of the differences found between the hospitals mapped on to that framework for change such that hospital 1 was generally high context (helpful for change) and hospital 2 was low context (less helpful).

What this implied for the high level research question was that in the high OL capacity context of hospital 1, a hidden potential in clinical guidelines (the mechanism) for producing truly innovative changes (outcome) generated from within the hospital rather than by copying best practice from elsewhere was realised. Guidelines, in the terms of the institutionalist debate, could function, in the right (high OL capacity) context, as an antecedent of innovative de-institutionalisation as well as, in other lower OL capacity contexts, as an institutionalising force. What appeared to affect the benefits achieved from guideline implementation most was not the guidelines themselves, but the kind of context in which they were implemented. In the next chapter the specific aspect of context addressed by the research question, the OL capacity of the hospital, will be quantitatively measured and compared between the cases (hospitals and the professions nested within them), to confirm whether they were as different as this contextual analysis has implied. Before that though, a word about the limitations of the coding.

Limitations of the coding framework

Single loop activities often had double loop implications – increased uniformity of care for example, seen as an aim of the implementation of guidelines, was

associated with a new emphasis on the goal of assuring better safety for staff as well as patients. In systems terms, routines were the "hows" at the systemic hierarchical level beneath the "whats" of the clinical goals. It was often the case that these "hows" contained "whats" when looked at from the perspective of a still lower systemic level. For example if a goal was to apply TEDs to patients with high risk of DVT, there were a number of different possible methods for doing this, including new storage and ordering procedures. A double loop learning process was needed to choose the best method. So whether a type of learning was single or double loop depended on from what point in the system it was being viewed. This was encouraging as it meant that double loop learning could occur even at low levels, it was not confined to a so-called "strategic" level at the top of the organisation. Leadership like this was needed from line leaders for OL to work; senior managers could create a climate for leadership to flourish at this level by creating vision and high level strategy, but they could not lead at this level themselves.

The base-level coding of substantive activities and beliefs was very low-level, so that some code categories contained only one item. These were aggregated into bigger categories in a hierarchical structure, but it was not possible to discuss even all of these higher level substantive categories, primarily for reasons of space. I could have investigated all the different defensive beliefs preventing communication. I could have investigated all the different forms of clinical audit. Instead, I focused mainly on the guideline adoption process as the main theoretical framework. I could have coded the stages of the OL cycle[97] especially viewed as information creation, integration, interpretation, and use (action), and found facilitators and barriers at each stage.

Chapter 8 - Comparison of OL scores of study samples

8.1 Introduction

This chapter is the first part of hypothesis testing, which continues in chapter 9 with the analysis of interview data and, then in chapter 10 with analysis of association between the main themes found at interview and levels of OL capacity. Data from two sources, the OL survey scales and the interviews, were analysed both separately and together.

In the present chapter, in accordance with the hypothesis, OL capacity is compared between the main study samples. Seniority level (i.e. senior or junior) was added to the analysis, as clearly important. The scores for formalisation, job satisfaction and hospital culture were not included as they were used for validation of the OL scale and were not part of testing the hypothesis. Clinical seniors were compared where possible. Sub-scale scores were investigated only if a significant difference was found on the complete OL capacity scale.

There were 11 comparisons of OL scale scores between study samples using t-tests. Three showed statistically significant differences. OL sub-scale scores were compared only if there was a statistically significant difference on the main scale. There were 3x5 comparisons of OL sub-scales, of which 9 were significant.

The comparisons were grouped by hospital, profession, and seniority. These were regarded as "distinct groups" for the purpose of calculating the bonferroni corrections for p-values (see section 4.6), which meant bonferroni corrections were not required. The sub-scales were put in separate "distinct groups" because they were correlated with the main scales.

8.2 Hospitals comparisons

8.2.1 Differences between hospitals

Clinical seniors had a slightly higher mean score at hospital 1, in accordance with the hospital selection process and hypothesis, but this was not significant at 5%, using independent samples t-tests (table 8.1).

Scale	Hospital 1 mean	Hospital 2 mean	T statistic	Significance (P)	Number
OL capacity	4.16	4.01	0.840	<0.404	90

Table 8.1 Comparison of OL capacity score between hospital 1 (44) and hospital 2 (46) – senior clinical group

The higher score at hospital 1 was owing to the consultants there. The higher scores in hospital 1 were influenced by consultants in the 31-50 age range, who scored higher than their age counterparts in hospital 2. (N=16, Means: H1 4.37, H2 3.67). This was a large difference between hospitals for consultants. G grade nurses at hospital 1 had very similar scores to hospital 2. Midwives at hospital 1 had the lowest score (table 8.2).

OL capacity Scale	Hospital 1 mean	Hospital 2 mean	T statistic	Two tailed Sig. (P)	Number
consultants	4.26	3.66	1.6	<0.126	28 (11+17)
G-grade nurses	4.20	4.21	0.47	<0.964	58 (29+29)
G-grade midwives	3.58	-	-	-	4 (4+0)

Table 8.2 Comparison of OL capacity score between hospital 1 (44) and hospital 2 (46) – senior clinical group by profession

8.2.2 Differences within hospitals

Professions within hospital

Consultants were compared with senior clinical nurses (G and above) in each hospital. See tables 8.3 and 8.4. Consultants in hospital 2 scored their hospital lower on OL capacity than did G grades. As variances were in fact equal the actual significance of the difference was p<0.04. This is why sub-scale scores

are given in the table. In hospital 1 consultants reported higher OL capacity than G grades.

Consultants saw hospital 2 as doing significantly less team working and experimentation and as having significantly less clarity of purpose and sense of mission than G grades.

SCALE /SUBSCALE	Consultant mean (N=17)	G grade mean (N=29)	t statistic (between professions)	p
OL Capacity	3.7	4.2	2	<0.052
Clarity of Purpose and mission	3.8	4.5	2.2	<0.033
Leadership commitment and empowerment	3.8	4.1	0.7	<0.478
Experimentation	3.2	4.1	3.1	<0.005
Transfer of Knowledge	3.8	4.0	0.62	<0.544
Team working and group problem solving	3.8	4.6	2.4	<0.026

Table 8.3 Senior clinical group comparison of mean sub-scale scores (hospital 2)

There was no significant difference between OL scores for professions in hospital 1, (table 8.4) and hence the sub-scale scores are not shown.

SCALE	Consultant mean (N=11)	G grade mean (N=33)	t statistic (between professions)	p
OL capacity	4.26	4.13	0.40	<0.69

Table 8.4 Senior clinical group comparison of mean scale scores in hospital 1

The OL capacity differences between professions were most significant between medical and nursing senior staff in hospital 2, and senior nursing staff scored hospital 2 higher than consultants. The consultants in hospital 1 reported higher OL capacity than those in hospital 2, but the higher OL capacity seen by senior nurses in hospital 2 (table 8.3) obscured this difference when the senior clinical staff as a group were compared between hospitals.

Seniority within hospital

There were no significant differences in OL capacity seen between grade levels in each hospital (table 8.5), but when grade was examined within professional groups there was a significant difference between senior and junior nurses (see this chapter section 8.4).

Scale name	Senior Mean	Junior Mean	T	Significance	Number
OL Capacity (H1)	4.19	3.91	t=1.74	p <0.85	N=108
OL Capacity (H2)	4.03	3.76	t=1.5	p <0.136	N=90

Table 8.5 Scale differences between seniors and juniors in each hospital

8.3 Professions comparisons

Doctors were higher scoring overall than nurses (table 8.6). This accorded with the selection hypothesis that medicine was a more complex profession than nursing. The difference was not statistically significant.

Scale name	Doctors' Mean	Nurses' Mean	T	Significance	Number
OL Capacity	4.17	3.9	1.28	<0.209	90

Table 8.6 Comparison of OL capacity score between doctors (28) and nurses/midwives (62) – senior clinical comparison group

8.4 Seniority

Senior clinical staff were compared with juniors. For 185 respondents who said whether they had implemented/adapted any SIGN guideline, seniors were much more likely than juniors to be involved in implementation (table 8.7).

Seniority	Implemented	Not implemented	d/k
Senior	71 (57%)	11 (38%)	7 (23%)
Junior	54 (43%)	18 (62%)	24 (77%)
Total	125 (100%)	29 (100%)	31 (100%)
	X^2 = 13.08, DF = 2, p<0.002		

Table 8.7 Seniority comparison of those implementing/adapting any SIGN guideline (125), those not doing so (29) and those who did not know.

For 67 senior clinical respondents who said whether they had implemented or adapted any SIGN guideline, there were no significant OL score differences between those who had implemented or adapted guidelines and those who had not. Seniority was thus associated with involvement in guideline implementation or adaptation generally (table 8.7) and seniority was also associated with higher reported OL capacity for nurses (see table 8.10). Involvement in guideline implementation or adaptation was not associated with any significant difference in scale score for all senior clinical staff as a group, but those who had implemented scored their hospital higher (table 8.8).

Scale name	Implemented Mean	Not Implemented Mean	T	Significance	Number
OL Capacity	4.14	3.92	0.97	<0.352	N=67

Table 8.8 Scale differences between those implementing/adapting any SIGN guideline (58) and those not doing so (9) (senior clinical group)

Senior clinical staff scored more highly than juniors, in accordance with their more complex organisational role (table 8.9).

Scale name	Seniors' Mean	Juniors' Mean	T	Significance	Number
OL Capacity	4.08	3.85	t=1.88	p <0.063	N=192

Table 8.9 Scale differences between clinical seniors (90) and juniors (102) – full response group

The difference was not significant overall, but senior nurses (G grade and above) had significantly higher OL capacity scores than juniors (see table 8.10).

Scale name	Senior Mean	Junior Mean	T	Significance	Number
OL Capacity (Doctors)	3.90	3.89	t=0.014	p <0.99	N=28s+11j
OL Capacity (Nurses)	4.20	3.85	t=2.68	p <0.009	N=68s+91j

Table 8.10 Scale differences between seniors and juniors in each profession

The sub-scales contributing to the difference were leadership, experimentation, and teamwork and group problem solving (see table 8.11).

SCALE	Senior mean (N=68)	Junior mean (N=91)	t statistic (between grades)	p
Clarity of Purpose and mission	4.56	4.40	1.05	<0.296
Leadership commitment and empowerment	3.98	3.57	2.30	<0.023
Experimentation	4.10	3.60	3.20	<0.002
Transfer of Knowledge	4.05	3.86	1.23	<0.220
Team working and group problem solving	4.46	4.02	2.97	<0.003

Table 8.11 Comparison of mean sub-scale scores – senior and junior nurses

In fact, there was a significant difference between senior and junior nurses in hospital 2, but not in hospital 1. This was an important difference between hospitals. The figures are shown in table 8.12.

SCALE	Senior mean (N=34)	Junior mean (N=33)	t statistic (between grades)	p
OL Capacity (Nurses)	4.23	3.69	2.65	<0.011
Clarity of Purpose and mission	4.43	4.14	1.08	<0.290
Leadership commitment and empowerment	4.06	3.36	2.42	<0.019
Experimentation	4.14	3.48	2.77	<0.008
Transfer of Knowledge	4.13	3.76	1.57	<0.230
Team working and group problem solving	4.51	3.86	2.84	<0.007

Table 8.12 Hospital 2 only - Comparison of mean sub-scale scores for senior and junior nurses

8.5 Summary

Although there were 11 OL scale and 10 sub-scale t-tests between study samples Bonferroni corrections were not required because the tests fell into distinct groups and OL sub-scales were correlated.

Clinical seniors at hospital 1 gave higher OL scores than those at hospital 2. This was caused by much higher scoring consultants at hospital 1 in comparison

with those at hospital 2. However, because of small numbers the difference was not significant.

Hospital 2 consultants reported significantly lower OL scores than hospital 2 G-grades, and this was particularly significant for experimentation, clarity of purpose and team working. This contrasted with hospital 1, where consultants scored OL higher than G-grades. There were no significant differences in OL score within each hospital between those implementing different guidelines or (within hospital) between seniors and juniors generally.

Senior doctors overall scored hospitals higher on OL than senior nurses. Seniors in general scored hospitals more highly than juniors, but the difference was significant only in the nursing profession, where seniors scored their hospitals significantly higher on leadership, experimentation and team working.

This difference was actually significant only in hospital 2, making another important difference between hospitals. Guideline implementers gave significantly higher OL scores than those not implementing. This may have been because implementers were significantly more likely to be senior than junior. DVT guideline implementers had only slightly higher OL scores than diabetes guideline implementers. Seniors involved in guideline adaptation allocated hospitals higher OL scores than those not involved, but not significantly.

In relation to the overall research question, the information from this analysis strengthened and enriched a number of the hypothesised differences between cases suggested by the qualitative analysis in the preceding chapter. The much higher OL capacity reported by hospital 1 consultants compared to hospital 2 consultants strengthened the view that the clinical super-specialist culture in hospital 1 where what you knew was valued highly, was supportive of high OL capacity as well as of high clinical learning capacity, because collaborative

relationships between professions were formed, based on common specialist interests. This happened in spite of a hypothetically possible tendency for specialisation to narrow individuals' range of interests. Once another profession (specialist nurses) came into their sphere of interest, an organisational dimension opened up for specialist doctors. Learning styles theory may help to explain this, if as implied by the literature review, professions' learning styles differed in emphasis but were complementary, forming together a complete organisational learning cycle as suggested by Dixon, one which was able to innovate as well as to comply. The markedly different OL capacity scores of the two professions in hospital 2 implied that this was not happening there, while their similar scores in hospital 1 suggested a healthier relationship. Although senior nurses' scores were not very different between hospitals, all did not appear to be well with even the nursing profession in hospital 2. This was implicit in the difference in OL capacity between the senior and the junior nurses, tending to imply that juniors' learning was not being nurtured. In a high OL capacity context this would not be the case. A number of comments from junior nurses in hospital 2 exemplified in the preceding chapter gave evidence of their disillusionment with senior hospital staff.

The results presented in the following chapter show differences in guideline implementation processes in these two hospital environments, and evidence has now accumulated to suggest more strongly than before that the two environments were indeed very different. Hospital 1 had a higher OL capacity than hospital 2, not overall perhaps, but between the professional cases nested within them, and especially the consultants, there were marked differences on quantitative measures, which were backed up by qualitative evidence suggesting that key dimensions relating to the ability to create strategic change and to three different perspectives on OL capacity differed systematically in important respects between the hospitals.

Chapter 9 - Analysis of Interviews

9.1 Introduction

This chapter uses Yin's quantitative approach to case study. Chapter 7 was a humanistic qualitative analysis looking especially at contextual issues by case. In the present chapter, the interview responses are first analysed to describe guideline implementation activities and beliefs overall. With the descriptions, the interview responses from senior clinical staff are also compared by hospital and profession (using chi-square) to see whether any of these study sample groups was significantly more involved in the main activities or beliefs. The study samples were profession (doctor and nurse/midwife) and hospital (1 or 2).

The term 'qualitative' was used for this analysis of the interviews, although statistical comparisons using Chi-square were at the heart of it because this part of the research was exploratory and descriptive, as well as comparative. The development of a bottom-up coding structure to categorise raw data was a step toward a set of concepts on which to base the development of substantive theory, a main function of qualitative research (pre-defined theoretical categories were used for coding, and developing formal theory). Because the hospitals were in many ways so similar, differences in guideline implementation methods and outcomes were often a matter of emphasis rather than absolute presence or absence of a particular quality. Chi-square was the appropriate statistical test for such comparisons of nominal (i.e. qualitative) data. The explanatory comparison of the study samples on the categories of behaviour and belief used Chi-square for testing for differences in the amount of emphasis given to that quality in each hospital. The use of chi-square was a rigorous way to test for difference in emphasis between study samples. It was a logical development of Yin's quantitative approach to comparative case study.[100;438]

The chapter is a comparative analysis of the hospitals and the professions 'in parallel', (by guidelines issues) rather than 'in series', (by hospital) for each interview topic. This facilitates the comparison of each guideline issue by considering the same issue in each hospital at the same point in the text. The disadvantage is it loses some of the case context. Chapter 7 compensated for this by providing a more traditional qualitative analysis of the cases one after the other or 'in series', comparing and contrasting selected qualitative themes within the case context of each hospital.

Why compare the study samples' guideline implementation activities and beliefs? This was done to answer the next part of the research question. The first stage (chapter 8) was to measure and compare the OL capacity of the study samples, having previously set up a situation where each member of a pair of samples was likely to have a different OL score. The second stage (this chapter) was to see whether there were differences between study samples in types of guideline implementation and whether any differences supported the differences found in OL score between study samples. The third stage (chapter 10) was to see whether different OL scores were associated with particular guideline implementation activities and beliefs, and whether any study sample was particularly involved in those differences.

9.2 Aims

To recap, the hypothesis testing was structured in three parts according to the three aims:

- the first analysis (chapter 8) tested for differences between study samples on OL capacity as measured by the OL scale.
- the current analysis (this chapter) aimed to describe and to test for differences between study samples in the most common issues perceived in guideline adoption activities and beliefs,

- the combined analysis (chapter 10) aimed to test for any relationship between particular guideline adoption patterns and OL capacity.

9.3 Coding system for interviews

The interview schedule is given in appendix A1.4. The interviews were structured around the three stages of guideline adoption, outcomes and learning.

- Dissemination
- Implementation
- Audit
- Outcome
- Learning

A detailed base of substantive coding resulted. Base codes were grouped into broader substantive themes. Where appropriate, these were amalgamated into formal groups defined according to OL and guideline implementation theory. A number of closed questions required agreement or disagreement. All 101 interviews were transcribed and all text was coded. In total, there were approaching 2,500 separate codes.

Substantive coding

The interview transcripts were coded to substantive categories. The analysis was structured by the above five stages. Most of the substantive categories were created using data driven coding from answers to open questions. Some resulted from closed questions (questions requiring yes or no answers).

Formal coding

The formal, or theoretically based, code applied to a number of different stages of guideline adoption was:

- Type of guideline adoption (type 1 or type 2 or both, as described in the methodology chapter 4)

Because type 1 adoption was common and type 2 was rare, type 2 usually overlapped with type 1. Testing of hypothesis 1 (type 1 or type 2) versus hypothesis 2 (type 1 and type 2) came down in practice to a comparison of type 1 and type 2 implementation.

A small number of more specific formal codes applied only to dissemination:

- Disciplinary setting – single discipline or more than one
- Direction of dissemination – single (type 1 OL), or two way (type 2/both)
- Type of group – structure based or task based.

These formal groups related directly to the hypothesis. This approach to coding was designed both to test formal (general) theory and to generate substantive (context dependent) theory for testing elsewhere. Bryman discusses this distinction.[44] The seniority effect on OL capacity found in the quantitative analysis was excluded by using only senior clinical doctors and nurses/midwives in comparisons between hospitals and professions. Out of a total 101 interviewees including 9 who replied only to the interview, 62 seniors were left after these exclusions. More doctors were interviewed at hospital 1, but the difference was not statistically significant, see table 9.1.

Profession	HOSPITAL	
	1	2
Doctor	14 (44%)	8 (27%)
Nurse	16 (50%)	22 (73%)
Midwife	2 (6%)	0 (0%)
Total	32	30

Table 9.1 Senior clinical interviewees by hospital $X^2 = 4.52$, DF 2, $p<0.11$

The high level substantive categories were assigned to a formal category where possible. This allowed some formal theory testing by comparing the relative

frequency of study samples inside and outside the substantive category involved. The comparisons used chi-square to determine if differences were statistically significant. This combination of approaches to analysis of the qualitative data continued the multi-method strategy of the whole project. The qualitative analysis gave the overall frequency of each code.

Tables of frequencies by hospital/profession are usually shown only if there was a significant difference in the relevant study sample after bonferroni correction. Some frequency tables are shown where there was a difference before but not after bonferroni correction if they related to a point that had come out in the qualitative analysis (see chapter 7). The main code for every question was subject to two chi square tests; one between professions and one between hospitals (see section 4.6). The number of tests per topic was therefore 2* (number of questions in the group) for bonferroni purposes. However, if a main code had fewer than 10 responses no X^2 test was done, unless there was an obvious disparity. This was because the expected frequency in one cell of a 2*2 table would then have been less than 5, as the positive responses would be split between 2 cells and the null responses for that code would be split between the other two. If the expected frequency was less than 5 Fisher's exact test was used.

9.4 Analysis by stage of guideline adoption

9.4.1 Introduction

In the following analysis, a descriptive table shows each main code for answers to individual questions about each stage of guideline adoption. The codes shown in these descriptive tables are not mutually exclusive. The chi square tests were carried out for the main code appearing in answer to each question. The chi square tables which are shown after the descriptive table therefore relate to a single line or cell within it, containing the count for a main code (N=62).

They do not relate to the descriptive table itself, which is for showing the main codes or themes for a question. The chi square table is shown only if there was a significant difference between hospitals or professions for that code. The figures in the chi square tables are for the existence or non-existence of one code only and so are mutually exclusive.

The analysis was structured by the questions used within the stages of adoption. Within each stage of guideline adoption the analysis was structured by the three different types of coding used as follows:

Closed questions

These questions investigated guideline adoption through pre-specified categories as given in the text. Each study sample participated in each stage of adoption. The largest category (yes or no) was compared with the rest of the 62 senior clinical interviewees using chi-square for profession and hospital.

Substantive data

The number of interviewees in the largest substantive category for a topic (the main one within each type, if types were applied) is given in bold. These were compared with the rest of the 62 senior clinical interviewees to see if any study sample was particularly represented using chi square as described above. Where there were other large categories these were given in italics as additional descriptive context.

Formal categories

The frequencies of different formal types of guideline adoption are given for each stage of adoption. Chi square tests were carried out as above.

9.4.2 Dissemination

Of the 62 interviewees 34 said they had been involved in adapting guidelines for local use and 28 said they had not. There was a significant difference

between hospitals in whether or not senior nurses said they had been involved in helping to adapt SIGN guidelines for local use (see table 9.2).

	Hospital 1	Hospital 2	Total
Involved	13 (81%)	7 (32%)	20 (53%)
Not involved	3 (19%)	15 (68%)	18 (47%)
Total	16	22	38

Table 9.2 Senior nurse interviewees' involvement in adapting guidelines for local use, comparison between hospitals. X^2 (Yates) = 7.2, DF 1, P<0.004 (Fishers)

As for each descriptive table in this chapter, there were 2 chi-square sub-tables for each main code with over 10 responses, one for profession and one for hospital. "Yes/no" was treated as one code. Only tables showing a significant difference are shown in these results. There were four sub tables here; views were similar between professions and hospitals. The high number who said they would disseminate differently next time (table 9.3) suggested some learning about dissemination had taken place. The demand for support was high.

Dissemination	Yes	No
Would disseminate differently next time	32	29
Dissemination support from senior management wanted	39	22

Table 9.3 frequencies for yes and no responses about dissemination

Table 9.4 shows frequency and description for the main substantive category within each type of dissemination. In both hospitals, dissemination to interviewees by references in the work area was especially by posters (4) and guideline/protocol folders (7).

Dissemination topic	Direction			
	One-way		Two-way	
To interviewee	Reference in work area	19	Discussion	5
By interviewee	Reference in work area	31	Discussion	11
Change desirable	One-off training	13	More discussion	4
Support wanted	Access	12	More discussion	4

Table 9.4 Frequencies of main substantive categories related to dissemination.

Other than reference in the work area, the nurses mostly had heard through one-off training (17). This was mentioned by only two doctors. The doctors mainly had their own personal reference documents as they heard from SIGN by post (14). They were the main channel through which this information came into the organisation. There were 19 mentions of information about guidelines filtering through, 16 came from nurses and 3 from doctors. In 2 cases (both nurses) it was explicitly stated that information was deliberately filtered out at higher levels:

> "I think the nursing staff dissemination is a bit haphazard. I'm sure it's supposed to come down via the operations managers to the clinical nurse managers then to the sisters, but I'm sure they're filtered out at ops managers level." (Senior nurse, hospital 1, Cardiac Surgery (ITU))

Dissemination to their own staff by providing reference in the work area was mentioned by 23 nurses/midwives and 8 doctors. It included posters (11) and guideline/protocol folders (11) held on the ward. Equal numbers of senior doctors (8) and nurses/midwives (10) disseminated by giving staff their own reference documents. More nurses (19) than doctors (6) used one-off training for their staff.

Dissemination preferred in future shifted from both methods experienced and those used. It moved to the provision of one off training rather than reference in the work area, or personally held references, though both were still mentioned. The question on organisational support suggested the hospitals needed to support better access to guidelines. This included giving them more publicity.

There were 10 sub-tables for testing chi square distribution between study samples. One difference was significant at the required level. Doctors were

less likely than nurses to have been disseminated the guidelines through a reference in the work area (see table 9.5).

Profession	Not reference in work area	Reference in work area
Doctor	21(49%)	1(5%)
Nurse or Midwife	22(51%)	18(95%)
Total	43	19

Table 9.5 Frequency of doctors and nurses disseminated guidelines by a reference in the work area. X^2 (Yates) 9.1, DF 1, P<0.004

In both hospitals one way dissemination was between twice and three times as frequent as two way (table 9.6). It was used to disseminate to others more than to the interviewee. Interviewees wanted to use more one-way than two-way dissemination in future, and wanted more support for it from senior management.

Dissemination	Direction		Disciplines		Group rationale	
	One-way	Two-way	Uni-	Multi-	Structure	Task
To interviewee	50	25	13	12	14	7
By interviewee	49	14	10	4	13	2
Change desirable	29	11	4	7	8	2
Support wanted	35	7	-	-	-	-

Table 9.6 Frequencies of binomial formal categories related to dissemination.

In dissemination to interviewees there was an equal balance of uni-disciplinary and multi-disciplinary contexts. Dissemination to their staff tended to be in a uni-disciplinary context. Those who wanted more dissemination tended to express a preference for multidisciplinary contexts. Groups used for two-way dissemination were more frequently structure-based (eg wards, directorates) than task (project) based.

9.4.3 Implementation

Implementation topic	Yes	No
Member of an implementation group	16	46
Acted to ensure recommendations put into practice	49	13
Other implementation activity	21	36

Table 9.7 Frequencies for yes and no responses about implementation

About 25% of interviewees were members of an implementation group, while about 75% said they had acted to put guidelines into practice. Most recalled their own implementation effort rather than others' efforts (table 9.7).

Interviewees were asked what they had done to implement the guideline. reminding (13) was the main substantive type 1 code (table 9.8).

Implementation	Type 1 implementation		Type 2 implementation
By interviewee - main	Reminding	13	Agreed local protocol 7
- *other*	Checking	12	-
- *other*	Documenting	12	-
Other implementation	Clinical audit	5	-

Table 9.8 Main substantive types of guideline implementation.

Checking (12) and documenting (12) were close behind and are included as context. The main type 2 substantive code was agreeing the local protocol (7). There was a significant difference between professions on this (table 9.9).

Profession	Agreed local protocol	Other
Doctor	6 (86%)	16 (29%)
Nurse or Midwife	1 (14%)	39 (71%)
Total	7	55

Table 9.9 Frequencies of professions agreeing local protocols. X^2 (Yates) 6.39, DF 1, p (Fishers) <0.007

The one nurse involved was included in an "unofficial" directorate group.

> "There's a small group within the orthopaedic unit and I was invited to one of their meetings." (Senior nurse, hospital 2)

Clinical audit was mentioned as type 1 implementation (checking) by 5 nurses/midwives and no doctors. There was one significant difference between study samples for implementation type (table 9.10).

Implementation	Type 1	Type 2
Type	37	11*

Table 9.10 Frequencies of type 1 and type 2 implementation activity
* significant difference at 5% between professions. N=62

Doctors used significantly more type 2 methods of implementation (table 9.11). They were for example involved in agreeing local protocols and discussing the relevance for implementation of feedback from audit.

Profession	Type 2 implementation	Not type 2 implementation
Doctor	9 (82%)	13 (25%)
Nurse or Midwife	2 (18%)	38 (75%)
Total	11	51

Table 9.11 Type of implementation by profession (X^2 =10.2, DF1, p<0.002)

9.4.4 Clinical Audit

In both hospitals most interviewees knew that there had been an audit (table 9.12). A minority were members of an audit group. Audit groups were drawn from one or two directorates, with little representation from primary care.

Topic	Yes	No
Audit		
There was an audit	43	12
Member of audit group	16	33
One directorate in audit group	20	19 (more than 1)
Audit group included primary care	5	33

Table 9.12 Frequencies for yes and no responses about audit of the guideline

Interviewees were asked about clinical audit of the guideline. Most interviewees mentioned type 1 aims for audit such as checking that practice complied with the guideline (table 9.13).

Clinical audit issue	Main codes			
Audit aims	Type 1 – Checking	33	Type 2 - Testing	8
Who did the audit	Audit office	17	Doctors	12
Audit group	Multidisciplinary	22	Unidisciplinary	18
Understandings of quality improvement	Improve practice	35	Clinical audit	24

Table 9.13 main substantive clinical audit codes by type (where applicable).

Improving practice in accordance with the guideline (9) and observing practice (9) were also important.

> "It was to establish the degree of the percentage compliance or percentage of the use of prophylaxis." (Senior doctor, hospital 2)

The main type 2 aim was to test the effect of the new intervention in the local context. Solving implementation problems (1) and getting the patient perspective (3) were included under this code. The audit office was the main group actually carrying out the audit. Nurses often remembered a nurse employed by the audit department checking patient records in the ward.

> "It was the clinical audit department, there was a nurse who was seconded I think if I remember rightly to do that." (Senior nurse, hospital 2)

Doctors were the second most commonly mentioned group doing audit (12) (table 9.12a) and after that were multidisciplinary groups (11).The composition of the audit group was most often thought multidisciplinary. The main understanding of quality improvement went no further than "improving practice", mentioned more frequently at hospital 2. The next most common was clinical audit. This was mentioned more by doctors, but not to the point of significance after bonferroni correction (p=0.03). There was a significant difference between hospitals before bonferroni correction, in that doctors were more often mentioned as doing the audit in hospital 1. (See table 9.14):

	Hospital 1	**Hospital 2**	**Total**
Doctor	9 (47%)	3 (17%)	12 (32%)
Audit Officer	5 (26%)	12 (66%)	17 (46%)
Nurse	5 (26%)	3 (17%)	8 (22%)
Total	19	18	37

Table 9.14 Main Professions mentioned as doing the audit: comparison between hospitals (percentages may not add up to 100 owing to rounding errors) $X2 = 6.36$, $P<0.043$

In both hospitals a large majority of interviewees mentioned type 1 aims (table 9.15). Type 1 aims included checking, improving and observing practice, type 2 included testing the effect of a new intervention and providing a basis for research.

Clinical Audit	Type 1	Type 2
Aim	44	7
Benefits of being in audit group	16	7

Table 9.15 Frequencies of type 1 and type 2 audit aims and benefits of being in an audit group

The benefits of being in a guideline audit group were also predominantly type 1 – including providing reassurance that practice was acceptable, showing room for improvement, and ensuring compliance. Type 2 benefits of being in an audit group included the potential for influencing practice and getting feedback on the adaptation of guidelines to local practice.

9.4.5 Changes resulting from guideline implementation

Findings about interviewees' personal clinical practice were not often formally disseminated (table 9.16). Where respondents answered that they were disseminated it was often because if in charge of a ward they regarded the work of the ward as their personal practice.

Change to practice	Yes	No
Findings communicated for personal practice	7	42
Findings communicated for team practice	32	19
Change to interviewee's practice	45	14
Other change to practice	26	33
Audit findings communicated outside clinical team	25	15

Table 9.16 Frequencies for yes and no responses about changes to practice

In one case two doctors shared results informally:

> "in the individual audit that [Dr X] and I do, we break it down into how she and I are managing patients," (Senior doctor, hospital 2,)

Findings were usually communicated for team practice. Most interviewees said there had been a change to their practice.

Results issues	Main codes			
Changes to personal clinical practice	Type 1 – More effective treatment delivery Increased awareness Documentation	29 12 6	Type 2 – New care delivery model New clinical activity	6 3
Other changes to practice	Type 1 - More effective treatment delivery Increased awareness New treatment from g/l	13 7 3	Type 2 – New care delivery model Learning culture	4 3
Communication of audit findings – where to	Between organisations To management	9 8		

Table 9.17 Main substantive results themes by type.

To explain table 9.17, there were 10 sub-tables dividing respondents (N=62) into those coded and not coded to the main codes and tabulating them against the study samples (professions and hospitals). Communication between organisations was mentioned significantly more at hospital 1 (table 9.18).

Hospital	Inter-organisational	Not Inter-organisational
1	8 (89%)	24 (45%)
2	1 (91%)	29 (55%)
Total	9	53

Table 9.18 Whether communication of audit results was inter-organisational $X^2 = 4.24$, DF 1, p (fishers) <0.028

More effective treatment delivery (type 1) included quicker, safer and more reliable delivery (table 9.17). New models for care delivery (type 2) included changes to roles – for example nurse/midwife initiation of DVT prophylaxis by raising the matter with medical staff. Increased awareness was mentioned by 10 nurses and 2 doctors. One doctor mentioned it in connection with setting up a new protocol.

> "I think it made me aware that, but it wasn't the only reason, that we had to look to make an official policy or at least to get a sound policy for

my team for DVT prophylaxis and hence that was done." (Senior doctor, hospital 2)

It was not always clear what increased awareness meant. Most often it was that the interviewee was sensitised to the issue:

"I think you became more aware, you were looking for patients to fit into the category of the SIGN guideline, whereas before it was very much left to the consultant..." (Senior nurse, hospital 2)

The communication of audit findings between organisations meant to the health board or through conferences:

"the clinical effectiveness group of the health board have seen the audit results and discussed them." (Senior doctor, hospital 1)

Results of implementation (Changes to practice)	Type 1 Change	Type 2 Change
Own practice	39	10
Other changes	21	10

Table 9.19 Frequencies of type 1 and type 2 changes to practice

For personal clinical practice, type 1 changes were again the most frequent (table 9.19). They included more effective treatment delivery, the introduction of new treatments to accord with the guideline, greater awareness of clinical issues related to the guideline, and better documentation. Type 2 changes included new models for care delivery, and new clinical activities. This substantive pattern was repeated for other changes reported by interviewees.

9.4.6 Learning in groups

The learning outcomes of guideline implementation are shown in table 9.20.

Learning topic	Yes	No
Learning about practice in other teams/directorates	28	33
New ways of working in own team/directorate	32	27
Primary care involved in new ways of working	10	31
Help suggested from the organisation	54	8

Table 9.20 Frequencies for yes and no responses about learning

Half had learned about practice in other teams, and half said new team or directorate work practices had resulted. A minority reported involvement of primary care in new ways of working. A large majority suggested ways the organisation could help this learning process, which indicated a need existed.

Directorates were the main group learned about as a result of the guideline implementation (table 9.21).

Learning topic	Main codes		
Learning about other team/directorate	Other directorate	17	
	Other hospital	5	
New ways of working in own team/directorate	Type 1 – Care process	14	Type 2 – Care process 14
	Increased awareness	8	
Organisational help needed for this learning process	Education	21	
	Dissemination	16	
	Audit improvements	12	
	Resources or time	7	

Table 9.21 Main substantive learning themes by type.

This indicated that the directorate was the natural learning unit. Mentions of learning in the interviewee's own directorate continued to highlight "increased awareness". It was mentioned, by 8 nurses but no doctors. The learning, whether coded type 1 or type 2, was mainly about care processes or working practices, including roles and relationships and changes to workload.

Type 1 examples included risk assessment for DVT on admission, support to decision making, more measurement for TEDs, fitting of TEDs by auxiliaries, more or quicker prophylaxis, more uniform practice between wards, and better form completion. Type 2 examples included policy review, more shared treatment, specialist nurses, self-policing, closer nurse liaison with medics and between specialties, easier clinical consensus, and more initiative from nurses.

More education was the main focus for help wanted from the organisation. More study days/sessions and more time for education outside the ward were included.

New ways of working in the interviewee's team or directorate showed an even split overall between type 1 and type 2 (table 9.19). Increased awareness was classified as type 1. Culture issues were included under type 2 change. Both type 1 and type 2 included different changes to care processes, roles and relationships. For example "risk assessment for DVT on admission" was classified as type 1 as it was a guideline recommendation, but "more initiative from nurses" was type 2 as it indicated increased autonomy. There was a significant difference for type 1 learning here (table 9.22).

Learning in interviewee's team or directorate	Type 1	Type 2
Type	21 *p,*h	16

Table 9.22 Frequencies of type 1 and type 2 learning at team/directorate level.

There was significantly more type 1 learning for nurses, and more type 1 for hospital 2 (table 9.23) which was consistent with the idea that the medical profession did more goal questioning and had higher OL capacity.

Profession	Type 1 learning	Not type 1 learning	Chi square
Doctor	2 (10%)	20 (49%)	X^2 = 7.71, DF 1,
Nurse or Midwife	19 (90%)	21 (51%)	p<0.005
Total	*21*	*41*	
Hospital 1	5 (24%)	27 (66%)	X^2 = 8.22, DF 1,
Hospital 2	16 (76%)	14 (34%)	p<0.004
Total	*21*	*41*	

Table 9.23 Differences between hospitals and professions in type of team/directorate level learning

There was more type 2 learning at hospital 1, supporting the idea that hospital 1 had higher OL capacity. Nurses mentioned both types together as frequently as

type 2 alone, the overlap showing perhaps the more routine nature of nurses' involvement with guidelines.

9.5 General issues – aims and implementation

9.5.1 Aims of implementation of guidelines

In both hospitals and professions there was consensus on the aims and uses of guidelines. The main purpose of the guidelines was seen as promoting consistency (often called uniformity) of care practice or policy for all patients (table 9.24).

Aim ***N=62 for each code***	
Consistency	29
Best practice	24
Evidence into practice	19
Improvement	17

Table 9.24 General views on aims of SIGN guidelines.

Best practice referred to best process. The wider purpose was to decrease the often reported variation in outcome between units and geographical areas, and even between practitioners in the same unit:

> "you could fetch up to exact same hospital the next day to someone else's clinic and get a completely different outcome as a result of it. " (Senior doctor, hospital 1)

The promotion of best practice was often mentioned in the same breath as consistency (10 interviewees did so)

> "Best practice - I think it standardises best practice." (Senior midwife, hospital 1)

Others saw a logical impossibility in "standardising best practice", because not everyone could have the best care. For them a more realistic aim was to set a

minimum standard. A minimum standard allowed some flexibility for a unit to learn better practice than the minimum, while providing a safety net too.

> "What you're looking for basically is what is the minimum that you'd be satisfied with that would be regarded as acceptable practice by a responsible body of medical opinion, and supported by a responsible body of peer scrutinised evidence." (Senior doctor, hospital 1)

There was still a minority of staff who regarded guidelines as an imposition, but a negative comment such as the one below was not what it seemed. A consultant who was driving research ahead of guidelines made it. It was more a declaration of autonomy – potentially a good thing for OL - than resistance to change:

> "The SIGN guidelines are an attempt by bureaucrats to control the quality of our practice - medical practice - and they are adding to the deluge of paperweight - paperwork that that rains down upon us advising and cajoling us and have almost no impact at all." (Senior doctor, hospital 1)

Evidence and best practice were mentioned together by 7 interviewees, for example:

> "I think the SIGN guidelines are evidence based, it's best practice and we should all be adopting that practice..." (Senior nurse, hospital 1)

Improving care was closely related to promoting best practice. It included safer care, improving resources for care and better integration of care:

> "Really improving patient care from a multidisciplinary kind of point of view instead of just being kind of unidisciplinary..." (Senior nurse, hospital 1)

9.5.2 Meaning of implementation

There was consensus that implementing guidelines was "carrying them out", also called "putting into practice" (table 9.23). The pre-requisite was to ensure they could be carried out, by adapting them, by knowing about them.

Meaning of implementation	***N=62 for each code***
Carry them out	27
Check/ensure they are carried out	23
Adapt them	21
Know about them	20

Table 9.25 General views on meaning of implementation of SIGN guidelines.

Checking they were carried out was a way to ensure it, and thus was also part of implementation. Implementation had most of the elements of a learning process, for example a comparison of guideline theory with local practice and its constraints, developing new theory (protocol), acting on it and review. Ensuring compliance was a more intimate ward based matter than formal clinical audit. It involved quick feedback from the ward manager (usually a G grade sister) to individual nurses, and nurses reminded doctors. Adaptation involved both defining exceptions as policy, and adapting the guideline to individual patients. Knowing about guidelines involved getting and disseminating information and ensuring the awareness of others.

9.5.3 Own use of guidelines

Guidelines were used for reference day to day particularly by nurses (table 9.26). Doctors used them for reference where there was uncertainty about treatment of a non-routine patient because the condition or situation was infrequently seen.

Own use of guidelines *N=62 for each code*	
Reference	20
Set/agree clinical policy	19
As procedural rules	12

Table 9.26 General issues on own uses of SIGN guidelines.

They were said to be used significantly more for setting clinical policy in hospital 1 than in hospital 2 (table 9.27).

Own use of guidelines	**Hospital 1**	**Hospital 2**	**TOTAL**
Reference	8	12	20
Setting clinical policy	14	5	19
TOTAL	22	17	39

Table 9.27 General issues on own uses of SIGN guidelines, by hospital. $X2 = 4.5$, $P<0.05$

There was a significant difference between hospitals on those who said their use for guidelines was in setting clinical policy, which was mentioned more at hospital 1 (table 9.27). This use was proportionately more mentioned by doctors (half) than nurses (a quarter). Table 9.27 shows the hospital split, and a chi-square test for both the main uses interviewees mentioned they had for the guidelines.

Doctors would typically read through relevant guidelines when they arrived and then file them, while nurses would keep protocols in a folder with others relevant to practice on the ward.

> "I very occasionally use them as a sort of textbook type resource. Otherwise, when they come out we have a look at it and decide whether it ought in some way to be incorporated into the list of guidelines we have in our directorate..." (Senior doctor, hospital 2)

> "We usually just refer to the guidelines we've got and work through to make sure that we're implementing as best as possible." (Senior nurse, hospital 2)

Setting or agreeing clinical policy was about incorporating the guideline into the unit (usually the directorate) policy:

> "When we get guidelines that come through that are relevant to our area of practice we review the guideline and then look at our area of practice and see whether there is anything that we need to vary within that practice. Now that hasn't happened very often because when there is something that we have to deal with that's outwith our area of expertise there are so many specialists within a big teaching hospital that it's very easy at any time of the day or night to get help from someone who is an expert." (Senior doctor, hospital 1)

Use as procedural rules meant that the guidelines were embedded as the basis for practice, they were internalised. This was mentioned almost entirely by nurses, and more in hospital 2:

> "You change your practice and you go with it and then it becomes second nature, you don't conscientiously think I'm using SIGN guidelines to do this..." (Senior nurse, hospital 2)

9.6 General issues – effectiveness and change

9.6.1 Effectiveness level

The consensus in both hospitals and the professions within them alike was that SIGN guidelines were effective rather than very effective (table 9.28). A number said they would be more effective if they were implemented better.

> "Overall I think they're useful, but I think there are issues there about targeting the guidelines that are actually relevant to peoples' practice and making sure that those people get them and are aware of them." (Senior doctor, hospital 2)

Effectiveness code *N=62*	
Very Effective	9)
Effective	29) Positive = 41
Fairly effective	3)
Could be more effective	6)
Not very effective	4) Negative = 21
Ineffective	1)
Other	10)

Table 9.28 Effectiveness of SIGN guidelines. Codes are mutually exclusive.

Those who said they had been very effective tended to mean they had focused attention and caused reflection. The one interviewee who thought guidelines were ineffective qualified this to say their effectiveness would be marginal. But this was the doctor mentioned previously in a specialist unit doing research in advance of the guidelines.

9.6.2 Barriers to effective implementation of guidelines

The main barriers to implementation in both hospitals were linked to dissemination and secondly cost and resistance to change (table 9.29). These were mentioned to similar extents in both hospitals.

Barrier	***N=62 for each code***
Dissemination difficulties	29
Resistance to change	20
Too costly	20
Disagreement with it	17
Lack of understanding	13

Table 9.29 General issues on barriers to effectiveness of SIGN guidelines.

In hospital 2 disagreement with the guidelines was mentioned as often as resistance to change. Equally lack of knowledge of the existence, content and location of the guidelines (mentioned by 14) was a major factor, especially in hospital 2:

> "I think the most likely thing would be apathy - people not bothering to read it or hospitals and departments in hospitals not having meetings to discuss these things." (Senior doctor, hospital 2)

> "the barrier there was ignorance in that the SIGN guidelines weren't freely available to us but when somebody else knew about it and you know demonstrated that there were benefits and it's probably safer for all our patients the nursing staff are quite amenable and they did it." (Senior nurse, hospital 1)

It was important to make the guidelines easy to read, and to provide opportunities for reading and discussing them, for example at induction or elsewhere.

Other than dissemination per se, natural human resistance to change was an important barrier. It was applied to both nurses and doctors, but doctors criticised their own profession in more detail:

> "I think doctors, many doctors are quite conservative and if they've always done something some way they don't really like to be told to do it another way," (Senior doctor, hospital 2)

Practicality was important, recommended practice had to be practicable:

> "I mean there's a lot of problems with the sizes and things like that, with TED stockings, people don't conform to the you know the actual size of them, they're difficult to get on," (Senior nurse, hospital 1)

It also had to be easily communicable:

> "for some of the SIGN guidelines the juniors - the residents - change every 6 weeks, and that's quite a lot to keep educating people, that's hard work" (Senior doctor, hospital 1)

Impractical recommendations were costly to implement, and cost was an issue in itself. Related to cost was volume, both of individual guidelines and of numbers of separate guidelines:

> "I think that there's a danger of trying to be too comprehensive, that you actually turn people off..." (Senior doctor, hospital 1)

> "frankly I was disappointed in the DVT guideline because I felt it gave too many options" (Senior doctor, hospital 1)

> "Guideline fatigue is a real issue I think at the moment." (Senior doctor, hospital 1)

The volume problem meant only guidelines with the most cost effective recommendations that were also simple and cheap to implement would be well implemented. Contentious guidelines would be expensive and difficult to implement because of disagreement from a number of clinicians:

> "Guidelines which are perceived to be not appropriate to actually not be building on peoples current practice but trying to be too prescriptive and change people too fast I think, or make statement and give advice which are perhaps regarded as not in the main stream of opinion." (Senior doctor, hospital 1)

This meant it was difficult to implement innovative new practice through guidelines.

Lack of understanding was a motivational issue, rather than an intellectual deficiency:

> "if people […] don't understand the reason why it's going to be better for their patients then that stops it, so that's the biggest thing - people not understanding." (Senior nurse, hospital 2)

9.6.3 Facilitating change

The questions about the facilitation of change in acute hospitals, and about barriers to change, helped to validate the data about barriers to the implementation of guidelines. They also gave interviewees a chance to reflect on ideas from earlier.

Change facilitating factor *N=62 for each code*	
Formal support by the organisation	21
Specific implementation activities	20
Supportive culture	18
Better quality guidelines	17

Table 9.30 General issues on facilitating change.

Formal support (time/resources) from the organisation was mentioned as a facilitating factor for change by significantly more doctors than nurses/midwives (tables 9.30 and 9.31).

Profession	**Would like formal support from hospital**	**Would not like formal support from hospital**
Doctor	12 (57%)	10 (24%)
Nurse or Midwife	9 (43%)	31 (76%)
Total	21	41

Table 9.31 significant difference for profession in formal support wanted from hospital X^2 5.16, df 1, $p<0.024$

Formal support included time and resources but also endorsement by clinical directors. Time and resource to implement guidelines were each mentioned 5 times, also resource for audit, staff to implement, time to discuss it with the team:

> "if it massively increases workload then nobody's going to implement them. But the whole point of the guidelines is usually that it makes life much simpler because people don't need to sit and wonder what the blazes they're supposed to do." (Senior doctor, hospital 1)

Culture was directly mentioned in comments about the need to remove a blame culture, to encourage a culture open to change, a more inclusive culture, and a non-threatening culture. In other cases where it was not directly mentioned it was the main factor in the comment, such as the organisation valuing staff looking at their own practice, and leading by example.

Explicit implementation activities meant especially better publicity; including advance warning, and ensuring that the views of all professions were included. Easier access included physical documentation as well as quick reference through IT. A named leader to push a topic was mentioned twice. Verbal presentation and time to read guidelines were mentioned. Better quality guidelines meant clear guidelines backed by good evidence of benefit.

9.6.4 Hindering change

Culture issues were as frequently thought to hinder change as resource issues (table 9.32). Culture issues included seeing guidelines as a threat, not being prepared to question or to accept questioning (for example not encouraging early involvement in implementation), unwillingness to share (for example non-participation in audit), a culture of clinical individualism, and dictatorial leadership, which had a negative effect.

Change hindering factors *N=62 for each code*	
Culture issues	22
Resources	22
Guidelines (lack of benefit)	16
Resistance to change	16
Education (lack)	14
Lack of motivation	13
Communication problems	10

Table 9.32 general issues on barriers to change

Resource issues particularly included lack of staff. Lack of facilities, volume of guidelines, and high treatment costs were mentioned. Medical politics (part of "having their own ideas") was mentioned by 2 nurses. One consultant swam against the stream on the resources issue:

> "I would be more comfortable with people going on about needing more resources and needing more money if I was still not aware that resources are not wasted on a day to day basis." (Senior doctor, hospital 1)

A consultant put resources second to disagreement; resources could presumably be gained more easily than agreement on best practice:

> "Well firstly if one disagreed with it, and secondly if there wasn't the resources to carry it out." (Senior doctor, hospital 2)

Lack of time to reflect on the guidelines was another resource issue. A minority said guidelines reduced workload. Resistance to change was much mentioned. Evidence-based change was thought to be more difficult to resist. The inertia of habit was part of the resistance. The following quote sums up the issues:

> "I think its getting through to the people. None of us like change, and I think that goes for old and young, and I think it's getting through to people that this is the right thing, it's research based and it's been approved and it does work, maybe breaking old habits more than anything." (Senior nurse, hospital 2)

Guidelines issues hindering change came in the three categories seen previously, lack of clarity (too complex), low benefit, and poor evidence.

Lack of motivation included lack of interest in the subject:

> "if you're looking at people who are not very interested in what they're doing then lack of interest. (Senior doctor, hospital 1)

Leadership was needed to motivate some staff to change:

> "you've got to be positive and show that you appreciate people the way that they're changing things because if not, if you go in and just tell somebody that's what you've got to do, and don't explain it, it's completely negative." (Senior nurse, Hospital 2)

> "you know - here you are, start this today, or start this tomorrow, and that - I don't know enough about it but you've to do it you know, a sort of apathy .." (Senior nurse, hospital 1)

Growing valuation of research activity was increasing nurse motivation to improve practice:

> "nurses used to be very much head in sand, I've done it this way and I will always do it this way and this is the way the nurses 20 years ago done it and there's nothing wrong with it, that is all changing very, very much so because nurses are very, very much into research now there is a lot of evidence based practice coming into the wards which was never ever there before..." (Senior nurse, hospital 1)

Lack of knowledge and understanding were included with lack of education. Understanding developed through discussion, questioning and explanation, and with understanding came motivation.

Communication could be poor for a variety of reasons. It could be untimely – too late, it might not cover everyone - also a dissemination issue:

> "it was probably getting round to all the staff." (Senior nurse, hospital 2)

Listening could fail: staff might not listen to instructions, on the other hand, senior staff needed to listen to new ideas:

> "I mean the sisters are more than willing to listen to any member of staff who's got a piece of information written information to say this should, this the way we're doing this in ward, this is wrong this is the way it should be done and I'm the very first one who'd be more than willing to listen to any member of staff who'd went to the bother to find out about something that they weren't happy about in the ward." (Senior nurse, hospital 1)

9.7 Summary

This summarises firstly the main activities and beliefs of 62 senior clinical staff about guideline implementation, and secondly, it summarises the significant differences between study samples (hospitals and professions) for their main guideline implementation activities and beliefs.

9.7.1 Main activities and beliefs

Dissemination

In both hospitals dissemination to the interviewee was for nurses usually by posters or folders of guidelines in the ward, while the doctors usually received their own copies direct from SIGN. These were supplemented by discussion. Multidisciplinary methods such as one-off training and more discussion were seen as the most desirable enhancements to dissemination. Support from management was mainly either to improve access to guidelines or provide opportunities for more discussion. There was an even split about whether different forms of dissemination would be used for another guideline, a majority wanted some support to dissemination from senior management. One way dissemination was used and wanted more than two-way dissemination.

Implementation

In both hospitals a majority had actively put guidelines into practice. The most frequent form of implementation activity was reminding others to comply, while the most frequent goal setting activity was agreeing a local protocol. Most recalled their own implementation effort rather than others' efforts

Clinical audit

About two thirds of interviewees in both hospitals said there had been an audit, but only about a quarter had been a member of an audit group. There was an even balance between single and multi-directorate audit groups, but little representation from primary care. Most audit aims were reported to be type 1, and the most common was checking up on practice. The most common type 2 aim was testing new interventions. Audit groups were both uni- and multidisciplinary. Quality improvement was most frequently understood in a broad sense as improving practice, but a substantial minority saw it as clinical audit.

Changes

Hospitals were similar in that audit results were most frequently communicated for the whole team rather than for individuals. A substantial majority reported changing their own practice by more effective delivery of treatment. Only a small minority said a new model of care had been developed.

Interviewees' learning was about both new ways of working within their own directorate and about practice in other directorates. The learning was mostly about improvements to processes of care and increased awareness of best practice. The main aid to learning was seen as educational activities separate from day to day work. Most learning was within directorates.

General issues about guidelines

Generally the most frequent view was that guidelines aimed to improve the consistency of care, especially in line with evidence-based best practice. The most frequently mentioned implementation activity was actually carrying out the guidelines, and checking this had been done, while the most frequently mentioned use was reference. There was a consensus that guidelines were effective rather than very effective. The main barrier to implementation was seen as dissemination difficulties. Formal support by the organisation was the most mentioned facilitator for change, while cultural issues such as resistance to change, and lack of resources were most often mentioned as hindering it.

The results summarised above represent the descriptive outcomes of the project about guideline implementation activities and beliefs. The identification and description of the different ways of enacting guidelines and the beliefs justifying them necessarily preceded and underpinned the qualitative and quantitative comparisons between study samples.

As the perspective on OL theory as an information system suggested, guidelines were mainly implemented in ways based on a single loop model of learning relying on primarily one-way methods of dissemination and communication. It was not surprising therefore that changes ensuing were usually also concerned with the acceptance of the goals as given in the guidelines (or perhaps the simple rejection of them) and with putting in place methods for checking and increasing compliance. Much more rarely, particularly at the change stage of implementation, there were examples of double loop change, creating and testing new goals. These were generally solidly based in previous detailed development work, equal dialogue between specialist nurses who knew the detail of the care process, and consultant medical staff who were experts in the medical science. This confirmed the effectiveness and relevance of the processual approach to understanding and driving change for these NHS acute

hospitals. Interesting though it was to confirm Argyris's predictions, and those of the processualists, this did not shed much light on the overall research question for the study. The hypothesis testing required an additional approach to strengthen it. As well as the logical analysis and comparative discussion of the cases, in a traditional humanistic mode, a quantitative comparison of the qualitative themes between the cases as suggested by Yin lent a statistical dimension which aimed to test and validate the purely qualitative humanistic work from another perspective. In the following final section of this chapter, the statistical differences in guideline implementation activities and beliefs are listed and then briefly discussed in relation to the humanistic analysis of the qualitative data about hospital context and guideline implementation and with reference also to the OL capacity comparisons of the hospitals. The analysis builds cumulative rung upon rung in this way toward an answer to the high level research question about whether there were two patterns of guideline implementation and if so whether they were differently associated with OL capacity.

9.7.2 Statistically significant differences between professions and hospitals in main guideline implementation activities and beliefs

There were eight statistically significant differences here, five between hospitals and three between professions. They are listed and discussed below.

Every one of these differences was capable of an interpretation backing the hypothesis that hospital 1, most likely to be the higher OL capacity hospital of the two (from contextual and OL scale score evidence) supported type 2 forms of guideline implementation more effectively. That doctors, who had higher OL capacity, (chapter 8) were more involved in audit (point 1 box 9.1, below) was in itself an indication that type 2 forms of audit would be more used where this was so, and this was further supported by point 2 in box 9.2 below, revealing that doctors were more involved in protocol creation, which audit was

at least potentially more able to influence through doctors' involvement in hospital 1.

1. There was a difference between hospitals regarding the professions mentioned as doing the audit. Doctors were mentioned most at hospita1 1, and the audit office at hospital 2.
2. There was more type 1 learning in hospital 2 teams and directorates than there was in hospital 1. Type 1 learning was the norm. Overall, nurses mentioned significantly more type 1 learning than doctors.
3. Inter-organisational learning through the communication of audit findings to another organisation was more frequently mentioned at hospital 1.
4. Nurses were more involved in adapting guidelines for local use in hospital 1 than in hospital 2.
5. Using the SIGN guidelines for setting clinical policy was mentioned more often in hospital 1 than in hospital 2.

Box 9.1 Significant differences between hospitals in guideline implementation

This interpretation was reinforced by their use of guidelines in policy setting (point 5 box 9.1). Doctors' involvement in protocol creation was likely to lead to more type 2 goal setting learning from guideline implementation, since nurses focused on type 1 learning (point 2 in box 9.1).

The more one-way dissemination experienced by nurses, especially in hospital 2 (point 4 in box 9.1 and point 2 in box 9.2) did not encourage a true dialogue on the treatment issues with doctors. Although dialogue at ward level about care provision and the most practical methods of delivery of treatment happened

among nurses in both hospitals it remained apparently limited by the immediate situational constraints and did not free itself from these by referring to a theoretical framework. The greater inter-organisational communication found at hospital 1 also implied that hospital 1 actively sought to share its own goals and the treatment and care delivery models that went with them, and to access other models for comparison and consideration for possible adoption in a type 2 approach.

1. Nurses were more likely than doctors to learn about the guideline through dissemination by a reference in the work area such as a poster or a folder of guidelines held on the ward. This was likely to be because doctors nearly always had their own copies of guidelines sent by post from SIGN.
2. Overall, doctors had a greater involvement in developing local protocols from guidelines. Doctors used significantly more type 2 methods of guideline implementation because protocol development was a type 2 method.
3. Doctors were more likely than nurses to identify a need for support from the hospital to the facilitation of change.

Box 9.2 Significant differences between professions in guideline implementation

It could also be argued that hospital 1 was in a sense more institutionalised than hospital 2 if it sought, rather nervously, other models of care delivery to imitate blindly. The imitation was not blind though, it was informed by the guidelines' evidence of effectiveness, and there were also the examples of hospital 1's self-generated efforts at improvements to treatment and care delivery structures.

Doctors' recognition and communication of a need for more resource may have betokened an unwillingness to be limited by arbitrary constraints, which implied a wider vision than nurses of possible treatment alternatives. The fact that

this need was often expressed in relation to providing more time for discussion of implementation matters was an indication of a desire to engage in type 2 OL activities, and this was voiced by both professions, especially in hospital 1.

As predicted, of the four possible combinations of hospital and profession (chapter 4 methods) the hospital 1 consultants scored their hospital highest on OL capacity, their high OL capacity was confirmed by their demonstrated leadership, based on specialist evidence, the value they placed on collaboration and the evidence of innovations related to SIGN guidelines through collaborative working between professions. The differences between hospitals in the type of change related to guideline implementation will be highlighted in the next chapter which compares guideline implementation activities, including change resulting, on the OL capacity score associated with them.

Chapter 10 - Analysis of combined datasets

10.1 Analysis framework

10.1.1 Background

To briefly recap, chapter 7 used a humanistic approach to qualitatively analyse the interview data, and the quantitative analysis in chapter 8 compared the main study samples' OL scale scores. The second analysis of the interviews (chapter 9) used a quantitative analysis of the qualitative interview data to statistically relate main study samples to guideline adoption patterns. This combined analysis now compares OL capacity scores associated with the main guideline adoption themes. It then investigates whether any significant differences in OL score between guideline adoption activities and beliefs are particularly associated with either hospital or either profession.

This analysis is organised by the three stages in the guideline implementation model plus an analysis of reported action on outcomes, learning and change. Beliefs are covered separately. Guideline adoption data found associated with significant differences in OL scores (t-tests) is then analysed to see whether any study sample was particularly involved (chi-square tests).

10.1.2 Aims

The aims of the combined analysis were:

- to discover the OL levels associated with different guideline implementation patterns,
- to interpret the meaning of differences in OL scores for the different guideline implementation behaviour and beliefs of the study samples.

10.1.3 Main comparisons

From the interviews, three distinct types of qualitative data were available:

- direct answers to closed questions,
- different substantive categories (these were driven by the meaning of the data in its context to a greater extent than by formal theory).
- different formal theoretical types, for example type 1 and type 2 learning (these were driven by formal abstract external theory applied to the data).

The OL scores were compared for categories in these three groups for each stage of guideline adoption. A final comparison within each hospital separately compared OL score between type 1 and type 2 changes reported.

10.1.4 Hypothesis

To briefly remind the reader, the type 1 / type 2 distinction applied Senge's categories of adaptive and generative learning. Adaptive learning meant the ability to change routines to meet unchanging goals in the face of changing conditions. Adaptive learning used single loop feedback. Generative learning meant an expansion in capability, and changing goals at any level. Generative learning used double loop feedback. It enabled "seeing the systems that control events".[370] Deutero-learning or learning how to learn, was a third type.[47 205]
Type 1 guideline adoption used methods which could support adaptive OL only; type 2 guideline adoption also used generative methods. Two-way dialogue supported the latter because it encouraged groups to adopt new perspectives and new goals. The hypothesis was that OL scores would be higher when both types of guideline adoption were present rather than either one or the other. In practice because adaptive (type 1) learning was more common than generative (type 2), the presence or absence of a potential for generative learning distinguished theory 2 guideline adoption.

10.1.5 Analysis method

The group used in the combined analysis was 92 interviewees who had also completed a survey (see table 10.1).

Profession	HOSPITAL 1	HOSPITAL 2	Total
Senior Doctor	10	7	17 (18%)
Senior Nurse or Midwife	16	23	39 (42%)
Senior clinical audit	1	0	1 (1%)
Senior total	***27***	***30***	***57 (62%)***
Junior Doctor	4	2	6 (7%)
Junior Nurse or Midwife	17	12	29 (32%)
Junior total	***21***	***14***	***35 (38%)***
OVERALL TOTAL	**48**	**44**	**92 (100%)**

Table 10.1 Group used for joint qualitative/quantitative analysis (totals may not add up to 100% owing to rounding)

The senior clinical audit officer was excluded from the analyses by clinical profession. Chi square was calculated and showed that there was no significant difference between hospitals in the balance of senior and junior staff in this group ($X2$ (Yates = 1.09, DF =1, $p<0.30$). The top level NUD.ist coding for each interview question was exported into the existing SPSS database to form a new database for interviewees only, combining the scale results with the qualitative coding.

The 5 sub-scales of the OL scale were:

- Clarity of purpose / mission
- Leadership
- Experimentation
- Transfer of knowledge
- Teamwork and group problem solving

They were measured separately, giving a total of 6 available comparisons between profession and hospital – the OL scale as a whole plus its 5 sub-scales. In some cases a lack of significant difference between groups needed

interpretation because a difference was expected. For example different learning capacity was expected to be associated with membership of a guideline implementation group. This was expected because adapting the guideline and possibly amending goals, was a generative (type 2) learning process. This difference was not found.

Table 10.2 shows the numbers of t-tests between groups for the complete OL scale:

Test class	t-test on closed questions	t-test on theoretical categories*	t-test on data-derived category	Total t-tests
Total Individual tests	20	30	50	**100**
Total sig. Individual tests at p<0.05	6	5	7	**18**
Level of significance needed after correction	<0.0026	<0.0017	<0.0011	
Total significant tests after correction	0	0	0	**0**

* Type 1 or 2, direction 1 or 2, single or multi-profession, structure or task base.

Table 10.2 Breakdown of t-tests done for complete OL scale, significant at p<0.05 before and after Bonferroni correction. The comparison of interviewees with non interviewees was not included in the count as it was a validation test, not a test of hypothesis.

Table 10.3 shows the same information for the OL sub-scales:

Test class	t-test on closed questions	t-test on binomial categories*	t-test on substantive category	Total t-tests
Total Individual tests	100	150	250	**500**
Total sig. Individual tests at p<0.05	17	14	29	**60**
Level of significance needed after correction	<0.0026	<0.0017	<0.0011	
Total significant tests after correction	1	0	2	**3**

* Type 1 or 2, direction 1 or 2, single or multi-profession, structure or task base.

Table 10.3 Breakdown of t-tests done in the 4 stages of guideline adoption and for beliefs for OL sub-scales, significant at p<0.05 before and after Bonferroni correction.

Bonferroni corrections were applied to allow for the large number of statistical tests (see statistics section 4.6).

Interpretation of OL scores

OL score was a composite of organisational and individual learning capacity. Individuals' perceptions reflected their preconceptions, but these were in turn influenced by their experience.[421] Differences in OL scores had therefore to be interpreted in context. A lower score might have suggested aspirations higher than experience. A higher score implied a better match between the two. It did not indicate the absolute level of learning in the group, and so to take the comparison of OL score as being a comparison of the absolute level of OL was meaningless. However, higher scores were taken to indicate satisfied OL potential and if lower OL capacity was taken to indicate an unfulfilled OL potential, the size of the potential could be compared across groups.

Comparison of interviewees with those surveyed but not interviewed

The interviewees' scale results were compared with those who refused interview. This was a validity test for an actual difference, and so bonferroni correction was not required.

Scale name	Interview and survey		Survey, no interview		t	Sig.
	N	Mean	N	Mean		
OL	92	4.17	107	3.83	2.87	<0.006
Formalisation	91	4.36	107	4.60	1.83	<0.069
Job satisfaction	91	5.04	107	4.57	3.02	<0.004
Hospital culture	90	3.28	105	3.07	2.31	<0.023
Clarity of Purpose	92	4.44	107	4.22	1.50	<0.136
Leadership	92	3.94	107	3.63	2.02	<0.046
Experimentation	92	4.00	107	3.60	2.86	<0.006
Knowledge Transfer	92	4.17	105	3.80	2.40	<0.018
Teamwork	92	4.45	106	4.07	2.62	<0.011

Table 10.4 Interviewees' scale means in comparison to those responding only to the survey.

Interviewees who returned a survey had significantly higher OL scores than those who returned a survey but refused interview (table 10.4). They were significantly higher scoring on 4 of the 5 sub-scales. They were significantly higher on collaboration score and had significantly higher job satisfaction. The non-significant differences between interviewees and non-interviewees were in the clarity of purpose and mission sub-scale, which interviewees continued to score more highly, and formalisation, which they scored lower.

10.2 Analysis of guideline adoption data by OL score

10.2.1 Dissemination

Dissemination experienced and used

Dissemination methods experienced were correlated with those used, by a Chi square test. Those who had experienced both one-way and two way dissemination were significantly more likely to use both methods for their staff than those who had experienced only one type of dissemination. See table 10.5.

		Dissemination to staff	
		One direction only	Both directions
Dissemination to self	Both directions	53 (82%)	7 (50%)
	One direction only	12 (18%)	7 (50%)
Total		65	14

Table 10.5 Correlation between experiencing and using both one and two way dissemination. X^2 = 6.27, DF 1, p <0.013

10.2.2 Implementation

Membership of implementation group

There was no significant difference on any scale between those who were (19) and were not (73) members of a guideline implementation group. This was a surprising finding, indicating that guideline group members were not significantly different on OL capacity than interviewed staff generally. They therefore reflected the learning culture of the whole hospital, and this perhaps

had advantages for an implementation group. Compared with a higher OL group, they were likely to be more realistic about implementation needs such as education.

10.2.3 Audit of guidelines

Perceptions of professional involvement

There was a significant correlation between being a doctor and saying that the medical profession had been involved in the audit (X^2 = 5.54, p<.033, 1 said no, 10 yes). There was no such correlation between being a nurse or midwife and saying that the nursing profession had been involved. This implied doctors as a profession felt greater ownership of audit than did nurses and indicated higher professional cohesion among doctors than nurses.

Aim of audit of guidelines

Those who said the aim of the audit was to check practice gave significantly lower transfer of knowledge scores than those giving only other substantive responses classified as type 1 to this question (table 10.6).

		Check Practice		Other Type 1 aim		t	Sig. (2-tailed)
		N	Mean	N	Mean		
OL		37	4.05	13	4.72	2.67	<0.014
	Clarity of purpose	37	4.52	13	4.75	0.71	<0.482
	Leadership	37	3.90	13	4.38	1.54	<0.137
	Experimentation	37	3.79	13	4.60	2.50	<0.022
	Transfer of Knowledge	37	3.89	13	5.12	4.01	<0.000
	Teamwork	37	4.32	13	4.90	1.83	<0.080

Table 10.6 OL score differences between those who mentioned checking practice as the aim of audit and those who did not

This applied in both hospitals together and in hospital 1, but there was not a significant difference in hospital 2, though the direction was the same. Those seeing checking practice as an aim of audit also had considerably lower

leadership and experimentation scores than those who did not, though not significant at 5%.

Audit group membership

There was no significant difference in scale scores between those who were in the group doing the audit and those not. Except for the transfer of knowledge sub-scale, scale scores were all higher for those in the audit group. This result mirrored the finding of no significant difference for members of guideline implementation groups. As the transfer of knowledge scale was opposite in direction to the others, a potential to improve this aspect was possible.

10.2.4 Guideline usage

There was a significant difference in each hospital between those who said they used the guidelines and those who did not. Both overall, and in each hospital, those saying they used the guidelines were significantly higher scoring on the leadership commitment scale (table 10.7). There was also a significant difference overall on the transfer of knowledge scale, with those who used guidelines scoring higher. This was significant in hospital 2 but not hospital 1.

		Do not use SIGN guidelines		Use SIGN guidelines		t	Sig. (2-tailed)
		N	Mean	Mean	N		
OL		16	3.63	4.30	74	3.08	<0.007
	Clarity of Purpose	16	4.00	4.56	74	1.98	<0.060
	Leadership	16	3.04	4.17	74	4.15	<0.000
	Experimentation	16	3.66	4.09	74	1.69	<0.106
	Transfer of Knowledge	16	3.67	4.28	74	2.23	<0.036
	Teamwork	16	4.02	4.55	74	1.56	<0.135

Table 10.7 OL score differences between those who said they did not use guidelines and those who said they used them.

This important result suggested that the organisational leaders used SIGN clinical guidelines. Since they were more dissatisfied with OL, those who did

not use them perhaps saw more potential for OL improvement, because they were more dissatisfied with the OL capacity.

10.2.5 Change implementation

Encouraging change with formal support from the organisation

The OL scores of those who said change was helped by formal support by the organisation, differed from those who did not (table 10.8). Formal support covered increases in time and resources, organisational initiatives such as publication and the support of consultants and managers. It was a general question and so not classified as a type of guideline adoption.

		Formal support		Not formal support		t	Sig.
		N	Mean	N	Mean		
OL		27	3.90	65	4.28	2.16	<0.036
	Clarity of Purpose	27	3.76	65	4.72	4.16	<0.000
	Leadership	27	3.92	65	3.96	0.16	<0.871
	Experimentation	27	3.73	65	4.12	1.84	<0.073
	Transfer of Knowledge	27	4.02	65	4.23	0.77	<0.446
	Teamwork	27	4.17	65	4.56	1.61	<0.114

Table 10.8 Differences in OL scale scores between those saying change was helped by some formal support from the hospital and those not mentioning this

The group wanting more formal support from the hospital were significantly lower on clarity of purpose/mission. This also held true in both hospitals individually. This suggested that those high on this aspect of OL capacity used guidelines in less resource-intensive way, or that they already had the resources they needed to accomplish all of their aims.

10.3 Study samples and guideline adoption

To recap, the three OL capacity distinctions were between those who

1. said the aim of audit of guidelines was to check practice, and others mentioning other type 1 audit aims,
2. used guidelines, and those who did not, and

3. wanted more formal support for guideline implementation from the hospital and those who did not.

These were analysed for differences within the two study samples (hospitals and professions) using chi square. There were 4 Chi square tests in this group, so bonferroni correction meant a significance level of < 0.0125 was required.

One chi square was significant at that level:

	Profession	
	Doctor	Nurse
Did not mention support from hospital	11 (48%)	46 (82%)
Support from hospital would help change	12 (52%)	10 (18%)
Total	23	56

Table 10.9 Comparison of professions mentioning formal support. N=79
X^2 = 7.92, DF1, p<0.006

Significantly more doctors than nurses mentioned matters involving formal support from the hospital as an encouragement to change (table 10.9). This was the case in each hospital separately as well as overall. This had already been found with a slightly different comparison group, in chapter 9. No direct examples of learning how to learn, or deutero-learning were found.

10.4 Comparison of OL score for type of change within hospitals

As the primary cases were the hospitals it was appropriate to look at differences in OL scores between type 1 and type 2 changes within each hospital. There were two questions on changes, the first was about changes to the interviewees' own practice and the second was about other changes. The main point here was that senior clinical respondents in the higher OL capacity hospital 1 reported type 2 guideline related change to their practice, while those in hospital 2 did not. Even within the higher OL context (hospital 1), there was a significant difference in OL capacity between those reporting type

2 change only, and type 1 change only. Scores for each type are shown in tables 10.10 (hospital 1) and 10.11 (hospital 2).

Question	Type 1 Score	N	Type 2 Score	N	T	P
Change to own practice as a result of the guideline	4.07	22	5.23	5	2.8	<0.01
Other changes from this guideline	4.12	12	4.53	5	0.59	<0.58

Table 10.10 Hospital 1: Comparison of means for OL score associated with type 1 change only and type 2 change only (overall N =48)

As the tables show, the OL score associated with type 2 change (only) to the interviewees own practice was greater than that associated with type 1 change only. The small numbers of type 2 changes made it difficult to compare them statistically with type 1 changes, but despite this there was a significant difference in OL score between those reporting the two types in their own practice in hospital 1. Experimentation, transfer of knowledge and teamwork were the sub-scales involved.

Question	Type 1 Score	N	Type 2 Score	N	T	P
Change to own practice as a result of the guideline	4.14	28	-	0	-	-
Other changes from this guideline	3.94	10	4.38	1	0.66	<0.53

Table 10.11 Hospital 2: Comparison of means for OL score associated with type 1 only and type 2 change only (overall N = 44)

There was a large difference in the same direction in the OL capacity scores of those reporting type 2 change at all and those reporting only type 1 change, especially in hospital 1, (4.1 type 1, and 4.6 type 1) and this was significant at $p<0.05$ for the experimentation subscale, but not for the OL scale as a whole. There was a significant difference between the hospitals in the proportions of those reporting any type 2 change to their practice, whether or not they also

reported type 1 change. Thirteen in hospital 1 and 3 in hospital 2 reported any type 2 change, and X2 for this was 5.6 ($p<0.019$) (see table 10.12).

	Hospital	Type 1 change only	Any Type 2 change	Total
	1	23	13	36
	2	30	3	33
Total		53	16	69

Table 10.12 Numbers reporting type 1 change only versus any type 2 change to their practice (type 1 and type 2 or type 2 only), by hospital.

There was no association between reporting of any type 2 change and profession.

10.5 Conclusion

Interviewees who returned a survey had significantly higher OL scores than those who returned a survey but refused to be interviewed, and this tended to support the idea that the higher response rates in hospital 1 were themselves an indication of higher OL capacity. The disseminees reproduced dissemination methods they had experienced when they disseminated in their turn, in that those who had used both single and two-way methods tended to have had both used on them when guidelines were disseminated to them before. The use of two-way methods diminished as dissemination filtered through from respondents to their staff (chapter 9), and this may have been owing to a need for more support from the organisation, for example, more time for dialogue.

Change

The type of change reported showed differences in OL capacity levels and between hospitals:

- There was a significant difference in OL scale scores after bonferroni correction between the types of change reported in hospital 1. Those reporting only type 2 change to their practice scored generally higher.

This was statistically significant in hospital 1, although relationship was not statistically proven overall (because of the lack of type 2 change in hospital 2).

- There was significantly more type 2 change in hospital 1 than in hospital 2, but doctors and nurses reported similar proportions of type 2 change.

Guideline usage

There was a relationship in each hospital between guideline usage and OL score:

- in both hospitals those using guidelines scored significantly higher on leadership commitment than those who did not use them.
- in hospital 2 only, those using guidelines scored significantly more highly on transfer of knowledge than those who did not use guidelines.

Beliefs

Significant differences were found in the OL score associated with 2 particular type 1 beliefs and other type beliefs about the topic concerned:

- Those seeing the function of guideline based audit as to check practice had lower transfer of knowledge and experimentation scores.
- Those wanting the organisation to support them in guideline implementation were lower on clarity of purpose.

Study samples involvement in implementation activities or beliefs with OL capacity differences

Two study samples were significantly involved in any of these differences – doctors were more likely to want organisational support with guideline implementation. This confirmed results reported in chapter 9. There was also a significant correlation between being a doctor and saying that the medical profession had been involved in the audit. Hospital 1 carried out more type 2 change.

The comparisons of OL scores associated with substantive categories were carried out within the relevant type (type 1 or type 2) of guideline implementation. This was intended to show which within-type categories were active in creating any significant differences between types. It may have obscured OL capacity differences that would have been identified if comparison had been made with all other substantive responses to the question. Those comparisons were not made because they were not connected to the hypothesis, which was concerned with OL differences between types of guideline adoption.

The high level research question asked whether two theoretical activity and belief patterns surrounding guideline implementation existed and if so were differently associated with OL capacity. The contribution made by the analysis presented in this chapter was to test the differences in OL capacity associated with each pattern part by part across the stages of implementation. Here, the patterns themselves rather than the study samples were the focus of attention.

The OL differences found between guideline implementation activities did tend to support rather than disprove the hypothesis, checking practice was very much a type 1 activity and of lower OL than other type 1 implementation activities. The higher OL score associated with type 2 change speaks for itself. The higher OL scores of those who used guidelines centred on leadership and transfer of knowledge rather than experimentation, but these activities would support innovative learning.

The study samples analysis, carried out where OL capacity differences between patterns were found, tested the overall hypothesis, (that there was a difference) by checking whether study samples with high OL capacity were or

were not associated with guideline implementation activities identified as associated with high OL capacity using an analytical frame independent of the study samples.

This test of the hypothesis did not disprove it. The two study samples involved were doctors, who asked for more support to implementation of change (a belief that this was needed being associated with lower OL capacity scores) and hospital 1 which did more type 2 change (an outcome associated with higher OL capacity scores, as was hospital 1). It was at first sight anomalous that doctors, generally a higher OL capacity group, were associated in each hospital with a lower OL capacity belief. When the subscale involved actively in creating this significant overall difference was taken into account it was less surprising, it was the clarity of purpose scale. The low score given among doctors on this indicator was recognised as a more general issue in chapter 6 and attributed there to a perceived mismatch between professional and organisational imperatives. Each doctor wanted more resources for their own practice, which professionally came first, before the organisation. Specialisation did not prevent this tendency.

The three different analyses presented in the previous three chapters, in combination with the rich contextual illumination provided by the humanistic analysis in chapter 7, have cumulatively made a strong case for the overall research hypothesis that there were indeed two types, type 1 and type 2, of guideline implementation, and that these were differently associated with OL capacity, type 2 implementation generally being associated with high perceptions of OL capacity. It now remains to discuss each of the individual research questions in the context of the other relevant evidence described in the literature review, and to show in detail how my study contributes to that overall scholarly effort.

The implementation of SIGN guidelines in relation to organisational learning capacity in two NHS acute hospitals

by

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Volume 2

Discussion

Appendices

References

Section 4 - Discussion

Chapter 11 - Discussion

11.1 Introduction

Although the literature review found little or no directly relevant research on the relationship of evidence-based clinical guideline implementation to organisational learning culture, there was a body of work on the implementation of strategic change, and a small number of theoretical papers commenting on the possibilities for OL in the NHS[77;298], and on related cultural issues. There was a larger amount of research on the implementation of guidelines in health services.

The implementation of change work reviewed the main approaches to understanding and creating strategic change in organisations. The most suitable approach to apply in hospitals came from a tradition of careful analysis of processes or 'processualism' which saw change as emerging from detailed attention to process rather than as a result of top level directives, and as having plural outcomes. It saw the strategy creation fundamental to the generation of innovative change as collective sensemaking.[323] For Ferlie and Shortell this was facilitated in a context of small autonomous units.[122]

Three main approaches to OL were distinguished. The most appropriate OL frame for understanding guideline implementation was a perspective on OL as information creation and use by organisations. As a result of the deaths in Bristol of children owing to heart operations,[220] it was recognised that although there was an abundance of data about the quality of care, it was not being used to prevent error. A learning culture was then accepted as a key factor in improving health care throughout the NHS.[382] There was little help from the Bristol report on what to change structurally to achieve this. Extra resources were necessary but not sufficient. Lessons from Bristol included the

importance of clinical leadership, accountability and monitoring.[418] Clinical audit did not work in isolation, it had to be connected to other organisational cycles, such as a standard setting cycle, a patient care cycle and a change cycle.[333] Agreed guidelines could help to knit together some of these processes. Guideline implementation had been found to be the most frequently used approach to implementing organisational change in hospitals.[414] Another lesson from Bristol was the suggestion that progress in quality improvement might be a useful marker of wider organisational function and health.[418] One way of testing this idea was to measure the association of OL score with guideline implementation in individual hospitals.

The guidelines implementation work was summarised in SIGN guideline 50, as shown in table 11.1:

Variable effectiveness	**Largely Effective**
Audit and feedback	Reminders
Local consensus conferences	Educational outreach (for prescribing)
Opinion Leader	Interactive educational workshops
Patient mediated interventions	Multi-faceted interventions

Table 11.1 Effectiveness of interventions to promote implementation of guidelines[378]

Multi-faceted interventions included more than one of any of the interventions in the table.

Throughout the discussion the key themes of communication, innovation, clinical audit and leadership are discussed where appropriate for each research question. As well as this, the findings are also interpreted with reference to the institutional context. The information perspective on OL is used as another organising framework for discussion of guideline adoption. Hospitals are the primary case for the analysis and professions are discussed as nested cases within hospitals where appropriate (where there were differences between

hospitals in the behaviour of the professions). Each part of the guideline adoption process is covered as necessary in two sections: issues in common for both hospitals, and issues that showed a difference between hospitals.

The specific sub-questions for the hypothesis were divided into preliminary questions and main hypothesis testing questions, and the discussion was organised by research question. Preliminary questions were concerned with validation of the OL scale and identifying hospitals of significantly different OL capacity to test the association of OL and guideline implementation.

11.2 Discussion of findings

11.2.1 OL capacity

Research question 1a (preliminary) - Was the OL capacity scale valid in the acute NHS hospital environment?

Correlation between the OL scale, the job satisfaction scale and the hospital culture scale was statistically significant. This showed the OL capacity scale had criterion validity when used in an NHS acute hospital. The correlation of the OL sub-scales and main OL scale was evidence of the OL scale's reliability and validity in the NHS setting. All five sub-scales of the OL capacity scale were associated highly significantly with each other.

Predictive validity was tested using the predicted association between seniority and higher OL score which was mentioned by the developer (personal communication from Goh S.) and this was confirmed in my study as part of the main data gathering. Also as predicted, senior doctors in hospital 1 gave the highest mean scores. The scale could have been further tested for validity by using correlation with another OL scale. But no other OL scales had been developed to apply to NHS hospitals. Perhaps the correlation of the OL scores with a criterion such as complaints could have been tested across a number of acute hospitals. This would have been a separate project, and would have been

subject to its own problems. For example, were hospitals in middle class areas likely to get more complaints because middle class people were more likely to complain?

Formality and hospitals

The formalisation scale did not show a significant negative correlation with the OL scale, as was expected. Unexpectedly, clarity of purpose was correlated positively and highly significantly with formalisation and slightly less strongly with other items on the OL scale. Possible explanations for this were:

1. the hospital mission was not functioning fully as a part of OL capacity,
2. formalisation was in fact not antagonistic to OL capacity in these NHS acute hospitals,
3. hospital leadership was perceived by clinicians as too formal to function as needed in the OL process.

All of these may have been true in some way. Certainly, at the time of writing there was great interest in the connections between leadership and quality improvement. An issue of Quality in Health Care devoted a whole supplement to the topic. There were lessons here about the difference between conditions in the NHS, and business, which was much simpler.[133] Hospitals possibly needed sound formal structures to retain clarity of organisational purpose.

There was a demand for more formal support from each profession in each hospital, with the proviso that nurses overall had a lower demand than doctors. Using institutional theory to interpret this, it could be seen as a sign that doctors were able respond to institutional pressure for change implementation in hospitals with requests for more resources because they had their own professional rationale which did not include any responsibility for supplying resources. These pressures operated on individual doctors through medical

professional clinical structures (directorates) within the hospital, which were always led by doctors, not nurses.

Research question 1b (preliminary) - Were the OL capacity scores of the hospitals significantly different as theoretically predicted?

No significant difference was found for the whole senior comparison group between hospitals. When a more detailed analysis was done differences emerged for certain aspects of profession and age. These are discussed in separate sections.

Hospitals and professions

The much lower OL capacity of consultants at hospital 2 in comparison with those at hospital 1 was the main OL difference between hospitals. This lower OL capacity may have been self-reinforcing. "Magnet" hospitals (N=39) which attracted nurses were identified in the US. They had better nurse job satisfaction, nurse relationships with physicians and nurse autonomy. For Medicare patients their mortality rate was 4.6% lower than for 195 control hospitals.[1] It was quite possible that magnet hospitals may have counterparts at the other end of the scale, which could be termed "sink" hospitals.

Doctors in hospital 1 reported higher OL capacity than nurses in hospital 1. This was as expected in hospital 1 and in line with doctors' greater responsibilities and the greater complexity they had to deal with. But it was unexpected that this did not apply in hospital 2. This may have been because hospital 2 was less well aligned with helping professionals to meet the research-driven pressures of their professional institutions than hospital 1. Doctors needed to solve the problems of the complex adaptive organisational systems of 21st century healthcare[328] so on that count, professional pressures from the medical Royal Colleges may have been behind the times, as hinted at above.

Senior nursing staff generally reported higher OL capacity than junior nurses, but this was significantly higher only in hospital 2 nurses. In hospital 2 therefore it may have been senior nurses who were taking on this learning and problem solving role in their own way for the hospital. Hospital 2 must have enabled them to meet the pressures of their professional institutions better than it enabled doctors to meet their professional pressures.

The more important the group in the organisation the more their OL score reflected on the organisation as well as the group. Thus the low scores of consultants in hospital 2 were likely to reflect serious problems with OL capacity. Senior nurses at H2 were significantly higher than the H2 consultants on clarity of purpose and mission, team-working, and experimentation. Senior nurses were known sometimes to cover up for consultants,[175] and this may have raised their OL scores in hospital 2. For example, to reduce "cognitive dissonance" or tension caused by a mismatch between reality and expectations they may have unwittingly adjusted their espoused theories to make them more in line with their actions. The fact that the difference in OL capacity between junior and senior nurses was significant in hospital 2 continued a pattern of division there, which must have adversely affected communication for junior nurses as well as their team-working, because these were other subscales in the OL capacity scale.

High stress levels may have been both a cause and an effect of low OL in some consultants. Petrie noted that senior doctors in Scottish hospitals were often over-stressed.[321] He blamed lack of resources. The logic of rationing was that pressure on resources made organisations more efficient. But it has been argued that when reengineered to do just what was necessary with maximum efficiency, organisations had little spare capacity.[47] Spare capacity was needed for learning, learning was essential for improving services and so providing spare capacity for learning was justified even in a situation where resources

were insufficient to meet the immediate demand for service. Hospital 2 was under funded in comparison with hospital 1. The Maclean report confirmed hospital 2 to be funded at the lowest level of all Glasgow hospitals. It had a deficit of 3.5%-11.0%.[256] Low funding limited the ability to introduce OL mechanisms such as time for dialogue. The NHS too, had little spare capacity. For example it was underfunded in comparison with the European average spending on state health care.[212] A number of co-ordinator roles were introduced to facilitate the learning process, but what was really needed especially in very under funded hospitals was time, and with it willingness for all staff to take on these activities, and to be trained in OL skills, especially dialogue.

Age comparisons between hospitals, and relation to OL score

Doctors' view of OL capacity peaked at age 31-40. The peak was earlier in hospital 2. Doctors' view of OL capacity declined overall with age in both hospitals, while nurses' generally rose or reached a plateau. The general decline in the view of OL capacity of consultants with age was concerning, as because of their seniority they may have blocked change and OL. They were also as discussed for research question 1a above, likely to be, in most hospitals, the most important drivers of change.

At hospital 2 consultants aged 30-50 had lower OL scores than those 51-60. If the OL scale was an index of satisfaction, they were less satisfied and saw more potential for improvement at hospital 2 than older consultants. This was a special factor for hospital 2. These younger consultants could have had different (higher) standards for hospital functioning in the areas measured by the scale than the older ones. That this difference was most apparent in the middle age ranges not the oldest in hospital 2 was interesting. Did it imply the older ones were habituated to their environment in hospital 2 and accepted it, or that they had joined hospital 2 longer ago, when it had had a better

reputation, and this still influenced their view? Had their standards slipped or become outdated? Or were they simply less motivated because they felt they had already "made it" in their careers, or learning had ceased to motivate them? Interviews contained several references to reluctance to change by both nurses and doctors often primarily targeted at older consultants, though nurses were included in this.

In doctors generally the peak in their perception of OL capacity was most strongly influenced by the peak in their clarity of purpose/mission at age 31-40. After this they seemed to lose belief in the hospital. This could well have been related to disappointed hopes for funding their innovations, one interviewee said how discouraging this was. Were they choosing the wrong innovations to push? This could be seen as a misalignment of hospital and professional institutional pressures on consultants. Hospitals were the local delivery vehicles for treatment and care, but the professions had a national organisation (the Royal Colleges) where prestige and position were gained by international research reputations rather than by prowess in delivering local services efficiently and effectively. Hospitals accepted the value of international research reputations, but the converse did not apply: Royal Colleges had no way of recognising and rewarding local heroes.

Other evidence suggested that a similar decline occurred elsewhere with purely clinical or technical performance, and that this was related to keeping up to date clinically. A study of 1135 physicians (mainly obstetrics and gynaecology and paediatrics) measured their performance on optimal clinical criteria on five sites in the mid west of the USA. It found "Physicians with fewer years of practice performed somewhat better than physicians with more years since medical school graduation."[311]

11.2.2 Question 2 (Preliminary) - Guideline adoption - Was it possible to identify different guideline adoption patterns (reflected in dissemination, implementation and audit activities and beliefs) as theoretically predicted?

Did the two patterns exist?

The characteristics looked for as criteria for coding a response as indicating either a single or double loop organisational process for that activity were given in chapter 3. These were relatively easily applied to responses about all stages of guideline dissemination and implementation. It was not possible to link statistically the individual stages together in different patterns for type 1 and type 2 and compare the resulting groupings statistically between hospitals. This was because individuals would often respond in both categories, and would not consistently (or exclusively) report either type at all stages of guideline adoption. So what was gathered was information on the amount of emphasis put on each type of adoption at each stage, rather than numbers of responders who mentioned exclusively either one or the other.

Coding issues for guideline implementation patterns – did all responses fit the categories?

Answers to some questions, particularly about audit, were about neither type 1 nor type 2 learning as the categories did not apply. In other cases they did apply, but neither type of learning was referred to. For example, ten interviewees (five from each hospital) said very little or nothing had been done to disseminate the guideline to them. They tended to be junior staff or staff who had come into post after the guidelines came out, or night staff or ITU staff.

The patterns were identified using one overall coding structure, and this worked, there were no special factors which made it impossible to apply the concept of two types of learning in the same way to the data from each

hospital. This meant it was easier to compare the patterns quantitatively. In a sense it was too easy to make quantitative comparisons of common themes, and there was a risk of losing the powerful illumination that full context could give. The qualitative contextual analysis in chapter 7 helped to retain perspective.

Although examples of activities and beliefs supporting a type 2 learning process were found, type 2 was far rarer than type 1 in both hospitals. This accorded with Argyris's findings that model 2 organisations were rare. The mixing of type 1 and type 2 responses in practice showed that they were both part of the same model, type 2 did not exist independently of type 1, rather it was a special form of behaviour that was displayed within the context of day to day type 1 routine.

Institutional pressures to imitate other hospitals were not necessarily inimical to type 2 learning provided there was enough organisational headroom and available evidence for informed dialogue.

11.2.3 Question 3 (Main hypothesis testing) - Types of guideline adoption and OL

Research Question 3a – Did the hospital of higher OL capacity have significantly more emphasis on generative guideline implementation patterns than the lower OL capacity hospital?

The stages of guideline adoption make the framework for this part of the discussion, with a further section on general beliefs about guideline adoption. The descriptive results about the main guideline implementation activities and beliefs are discussed in the context of other guideline implementation research, to test external validity of the findings.

Dissemination

Common issues for both hospitals.

There was some demand by G – grade nurses for their own copies of guidelines. For them, concerning this, consultants were the representatives of the organisation. SIGN sent the guidelines primarily to its Royal College members, (in hospitals, mainly hospital consultants). Consultants got sent only a copy for themselves by SIGN and did not have spare copies to pass on. SIGN did not disseminate them through the hospital structure. The transfer between individual and organisational learning was seen by Romme and Dillen[346] as the most important problem for OL to solve. One way of encouraging this transfer was by making contributions to OL a driver for career progression. In medicine, individuals were motivated to do audit by career advancement through publication, rather than altruism.[210] The other side of the coin, perhaps a necessary precursor to this, was the transfer from the organisation to the individual. Without their own copies of guidelines, individual reflection and group learning was difficult for nurses as personal perspectives could not be developed, and questions and criticisms could not be thought of in advance of group meetings to allow more two-way communication. As Schuck said,

> "Learning how to think means developing the intellective skill required for original independent problem solving." [357]

After describing "play", or liberation from the constraints of objects, as the first condition for learning, Schuck describes the role of the group in learning:

> "A second condition for learning is social mediation. Learning is a social experience; it is accomplished through interactions with and assistance from other people."[357]

Social mediation did not mean abandoning autonomous individual learning, rather, it enhanced it. The demand especially from nurses, for discussion about guidelines, could thus have been motivated by a wish for increased autonomy.

Without the group, individual learning was less action-focused, because the purpose of social thinking was action.[421] So, to distinguish too sharply between individual and social /group learning led to confusion:

> "Those who forget that sensemaking is a social process miss a constant substrate that shapes interpretations and meaning."[421]

That there was a statistically significant association between experiencing and using both one and two-way methods of dissemination together rather than either one alone indicated that not only the content but also the method of dissemination was transferred. This was a form of learning how to learn. Perhaps the ease of forgetting the social nature of sensemaking explained the tendency to lose the social side of it, and therefore the conditions supportive of type 2 learning, as information was cascaded through the hierarchical tiers of the clinical structures. Resource limitation would have an effect here too in limiting time for discussion.

Thus there was less explicit support than might have been expected for social diffusion through informal networking. This is worthy of discussion, as social interaction has been found the most effective way of getting research into practice in health[153] and other contexts.[346;439] Because of the high value on evidence currently espoused in the clinical culture, (and by health service researchers) the role of evidence may have been over-emphasised by clinicians as a factor in encouraging change. This may be seen in the emphasis by Kitson et al (mostly from nursing backgrounds) on evidence as an important contextual factor in the implementation of change,[224;351] and equally in the contradictory view found by Dopson et al,[100] (mostly managerial and public health backgrounds) that evidence was not actually as important as other cultural factors (see chapter 3). Organisational "hallways" for informal and open discussion have been identified as essential for OL.[97]

Hospital-specific factors

In hospital 1 the effect of the different dissemination methods employed by the nursing and medical professions may have been masked by the involvement of consultant staff in the guideline development groups, which may have meant they had more copies of the guidelines to distribute to nurses, earlier warning of what was coming, and the ability to influence it.

In hospital 2 the ward information about guidelines was described as chaotic, which could well have been related to an information bottleneck which also existed in hospital 1, but was there attributed to operations managers and nurse managers more than to inter-professional communication difficulties.

Two way (type 2) dissemination tended to mean discussion, which was single rather than multi-disciplinary, in hospital 2 and vice versa in hospital 1, where inter-specialty medical discussion was also more of a feature. In hospital 2 especially, it was through existing structures (for example ward briefings by G grade nurses) rather than special project groups.

The reduction in two-way methods in dissemination used as compared with dissemination experienced, which was especially apparent in hospital 2, gave some support to Argyris's idea that defensive practices were self-sealing. The external evidence represented by guidelines might or might not help to fight this "cultural censorship".[175] Whether effective would depend on whether other aspects of context were supportive. The guidelines were used in a more open way in hospital 1, which had a range of contextual factors more amenable to change, especially expectations of openness and collaboration (chapter 7). These seemed to have led to more innovation, which was associated with inter-speciality and inter-professional collaboration between those involved, since fellow specialists perceived similar problem situations.

Implementation

Issues in common for both hospitals

Doctors implemented guidelines by developing protocols (a form of generative or innovative learning) and in both hospitals they were significantly more involved in this than were nurses. Nurses wanted to be more involved in protocol development to put the practical nursing perspective. This was an issue of inter-professional communication. In both hospitals fewer nurses than doctors had been members of implementation groups. In both hospitals patient representatives were never on protocol development groups. This contrasted with the SIGN policy of including them on national guideline development groups[377] and seemed illogical until the high cultural value placed on research evidence rather than patients' experience locally in hospital 1, and the protectionism and lack of time which seemed to exist in parts of hospital 2 were taken into account. Both factors may have had the same effect.

In both hospitals nurses made much more mention of type 1 implementation methods such as auditing the delivery of the protocols, while doctors mentioned both type 1 and type 2 methods. Few clinicians emphasised a goal of changing clinical practice in specific projects.[210] Those who did were doctors who mentioned discussing audit feedback. This implied that the medical rather than the nursing profession was able to make a difference to hospitals' OL capacity. The medical profession led others through their specialist knowledge, but while remaining open to inputs from other specialists. Nurses had a clearer organisational perspective as indicated by their higher clarity of purpose scores. The two perspectives were complementary within a specialism.

The combined analysis (chapter 10) showed that those who said the aim of audit was to check practice had significantly lower transfer of knowledge scores than those who did not. Checking practice was an activity usually focused within units and professions rather than across them.

Richards and Goh found consistently low transfer of knowledge scores in the organisations in which they tested the OL capacity survey. They attributed this to "de-layering" and that the use of information technology had not been fully optimised.[338] "De-layering" would be threatening to staff in the way that audit seen as checking might be (that is to say, job security might be affected). If so, it was bound to lead to a failure of audit even to detect error. The hospital mergers mentioned at interview were another threatening contextual factor which may have discouraged transfer of knowledge about internal performance within units.

Professional conceptions of innovation perhaps needed to be extended to include innovations to the delivery of care as well as innovations to the care delivered. Innovative OL had to be grounded in solid clinical data, but needed a wider vision of the organisation encompassing data from outside it, including data on cost. One way to achieve this was to involve nurses more actively with doctors and managers in multidisciplinary audit, for example contributing to setting goals, not just data gathering, their main involvement in clinical audit,[279] or reminding doctors to consider guideline recommendations.

Nurses brought a perspective of practical caring rather than curing.[226] They were also more aware of organisational mission statements than were medical staff, and so able to catalyse an innovative process by putting together their knowledge of real problems at the most basic level in delivering care and an understanding of high level organisational goals.

In both hospitals doctors' main interpretation of quality improvement was limited to clinical audit, while for nurses it was to improve practice more generally in both hospitals. Doctors' lead audit role was confirmed by research in North West England,[58] where nurses, although seen as enthusiastic, were

perceived by audit staff, chairs of audit groups, and audit leads as participating less than doctors in clinical audit. Organisational and cultural reasons perceived included that historically audit had been introduced in medical practice before being extended to cover other professions, hierarchical relationships between doctors and nurses, and lack of commitment to involve nurses from some senior doctors and managers. Lack of protected time, practical support, knowledge and skills, together with too great a workload pressure were other reasons. Again, nurses appeared an under-tapped audit resource for hospital OL.

Audit findings were most commonly communicated about team rather than individual compliance. It was possible that this blocked any motivation to improve, because individuals could still avoid recognising their own personal failings, which, in the context of a supportive team, they might remedy. Measurement by individual clinician outcomes would not easily apply in most specialties, which were team based. Their feasibility has been criticised even in surgery on features such as low numbers of cases for each individual surgeon, wide confidence intervals and biased data collection.[419] Even surgery was in reality also a team activity.[289] Although publication of outcomes has been criticised,[262] in its favour was that as we have already seen, social mediation enhanced individual learning, and publication was a form of social mediation. The distinction between individual and organisational learning was found problematic too, in recent work on measurement of organisational learning, which recommended that studying them as intertwined elements of organisational learning be considered.[233]

Hospital-specific issues

Senior nurses interviewed in hospital 2 were significantly less likely to feel they had been involved in adapting guidelines for local use than were these nurses in hospital 1 (chapter 9). This may have been because some nurses were involved in the research for the development of the SIGN guideline itself in

hospital 1. But there also seemed to be a greater feeling of autonomy among the hospital 1 nurses, which was reflected in the greater leadership role of specialist nurses (chapter 7). Despite having been less involved, OL scores in hospital 2 senior nurses were similar to the hospital 1 senior nurses. Perhaps this lack of involvement was felt particularly among the hospital 2 junior nurses. This group was important because it had most patient contact.

The main type 2 clinical audit aim seen was testing interventions, but type 2 aims were much less frequently mentioned than type 1 aims and especially rare in hospital 2. The institutional theorist's viewpoint on this could be that the pressure to implement scientific evidence was a powerful force in all local contexts, but worked through pressure from Royal Colleges as well as from the NHS. The NHS national environment for bringing to bear evidence of good practice on hospitals had become much more "interconnected" and uncertainty about best practice had been reduced. This met two of the conditions Oliver hypothesised as likely to reduce resistance to institutionalisation from organisations.[300] From Greenwood and Hinings' perspective,[154] hospital 1 was more tightly coupled with the NHS executive than hospital 2, but instead of increasing pressures for conformity as they predicted this seemed to have worked the other way. In that hospital, the Royal College institutions were influencing the NHS executive on behalf of the medical profession, and in the process winning more leeway to research and be innovative. Through SIGN, the permeability between the Royal College and the NHS Executive institutional fields had been enhanced, allowing, as Greenwood and Hinings predicted theoretically, higher rates of radical but evolutionary change. Hospital 2, on the other hand, was less permeable with Royal Colleges and as a result of this, with the NHS Executive. As would be predicted by Greenwood and Hinings, it was approaching radical change as a result of the MacLean report's recommendation that it be replaced with a new hospital.

The orthopaedic surgeons showed (chapter 7), that evidence could be challenged more easily by a united professional consensus across hospitals. The value of producing SIGN guidelines containing recommendations backed by "C" grade evidence (see appendix A3.1) was called into question if it was less likely to be implemented. An evaluation of the Promoting Action on Clinical Effectiveness programme (PACE) found that strong evidence greatly improved chances of successful change to clinical practice.[101] PACE was a late 90's English initiative for funding local pilots that reviewed evidence and put it into practice without using centrally generated guidelines.

The main group seen as doing the audit in hospital 2 was the audit office, in hospital 1 it was doctors. The dominant model in hospital 2 was therefore one of the audit office checking professionals' practice, not of professional innovation. This difference between hospitals was significant before bonferroni correction (see chapter 9). This was a quantitative view of the qualitative evidence in chapter 7, confirming the extra commitment of hospital 1 doctors to implementation through audit in contrast to hospital 2. Nurses had not taken over the audit process in hospital 2, the audit department had done it.

Of the 8 doctors who saw their own profession as doing the audit (the majority), 7 were from hospital 1, no doctor from hospital 1 saw the audit office as doing it, while in hospital 2 the majority (4) of doctors who replied to this said the audit had been done by the audit office. This underlined the difference between the hospitals in senior doctors' perceptions of their profession's role in audit. They valued clinical audit in hospital 1.

Learning and changes to practice

The main uses of information (especially audit-based) from the implementation of guidelines in changing practice are discussed below under the categories of error prevention (adaptive learning) and innovation (generative learning).

Information creation and use were intertwined in practice. Information was used to create more information – new protocols and audit data for example.

Common factors in both hospitals

Type 1 changes to individuals' own practice were much more common than type 2 changes in both hospitals.

Hospital-specific factors

Type 2 change to personal practice was mentioned in hospital 1 more than in hospital 2. This supported the hypothesis that hospital 1 was of higher learning capacity than hospital 2, and that changes resulting from guideline implementation were thus associated with a higher OL capacity.

Error prevention

Common factors in both hospitals

Error prevention was a higher priority in the NHS than in commercial businesses because health care was higher risk for patients than most business activities were for their customers. It was perhaps for this reason that type 1 learning (compliance) improving accuracy and hence safety was so emphasised by respondents. Clinical managers were overloaded with data. They needed to separate signal from noise. However, they could not risk the business manager's tactic of distorting data to filter out the noise more quickly, in the hope that any decision was better than none and would validate itself in time by automatically creating the reality that accorded with it.[421] Such an approach was even riskier in clinical decisions than management ones because clinical decisions were about individual patients, and most diseases ran a predictable course, which implied there was a right decision to be made. The patient had an important part to play in sharing responsibility for the final decision.[109]

More effective delivery of treatment was the main change to practice in each hospital (see chapter 9), and classified as type 1. Other research on implementation of the DVT guideline had investigated implementation methods but not changes to practice.[413] Indications that there were still important variations in practice, even post SIGN guidelines, came in April 2001 when Petrie cited continued inconsistency in Scotland in DVT prophylaxis and unstructured care of adolescent and pregnant diabetics.[321] The existence of variation meant some practice must be sub-optimal, and so could be unsafe. Petrie did not give the evidence on which these statements were based, but my research implied it was likely that such variation from best practice would exist in hospitals less closely linked in to the Royal Colleges, because institutional pressures from them to improve clinical practice by implementing best professional practice would be diluted.

Hospital-specific factors

More effective delivery of care was mentioned more at hospital 2, as was increased awareness, the next most frequent category (also type 1). This usually seemed to mean extra vigilance in preventing error in individual practice, and the accompanying knowledge of best practice. Such an approach was likely, in the absence of resources to implement best practice, to increase the stress for individuals and so might actually have the unintended effect of increasing the likelihood of error. For example, a systems approach to the causes of poor patient care showed a non-learning blame culture would impair clinicians' performance through increased stress, depression, alcohol and drug abuse, so creating more error and increasing blame and impairment.[128] This scenario was more likely in under funded hospitals such as hospital 2.

More effective delivery included for example more reliable, quicker prophylaxis meaning safer treatment. Safer treatment was not always the same as better treatment. The patient for example might prefer to take a greater risk for a

greater chance of success. One felt such a choice would be unlikely to be offered to patients, especially in hospital 2.

Learning about other hospitals was mentioned a number of times, mostly by doctors, in hospital 1 but not at all in hospital 2. The more active role of hospital 1 doctors was again underlined.

There was a significant difference between hospitals in the balance of type 1 and type 2 learning in individuals' own directorate or team. There was more type 2 learning (by both nurses and doctors) than expected at hospital 1, and less type 1, in comparison to the position in hospital 2 (see chapter 9). Double loop learning would have been encouraged by multi-directorate fora and inter-specialty collaborations which were seen at hospital 1 but little seen at hospital 2 (chapter 7).

In hospital 1 as compared to hospital 2, nurses emphasised the importance of simplicity and clarity in guidelines, and guidelines were nothing if not a way of simplifying complex information. However, a little recognised danger was that, as highlighted by Weick, guidelines might increase narrow competence at the expense of OL capability:

> "Any device that reduces information load pre-structures what people will notice and affects the sense they can then make."[421]..... "As we have seen before, seeing what one believes and not seeing that for which one has no beliefs are central to sensemaking. Warnings of the unbelievable go unheeded."[421]

This implied that guidelines could cause errors, rather than reducing them, by blinkering perception, because health professionals who saw only what they expected to see would be less likely to notice anything unfamiliar which might be a warning sign that something was wrong. Most interviewees thought of

uniformity as consistency which promoted reliability. The blinkers were evidence-based, but they were blinkers nonetheless.

The cultural change needed to design human systems that prevented and trapped error was an important feature of the report on the Bristol case. There could have been similar reports about other parts of the NHS.[382] The systems had to be embedded in an open culture because as "An organisation with a memory"[87] comparing safety cultures and blames cultures said:

> " 'Blame cultures' on the other hand can encourage people to cover up errors for fear of retribution and act against the identification of the true causes of failure, because they focus heavily on individual actions and largely ignore the role of underlying systems. The culture of the NHS still errs too much towards the latter."

Guidelines might encourage an established blame culture, but shift the main value towards compliance rather the doing the best for the patient. If errors were then defined in a limited way as non-compliance with a guideline, serious real errors could go unrecognised more easily than in a non-guideline environment. There were signs that this might be a tendency in hospital 2.

Innovation

In this section a more general perspective is taken, rather than splitting discussion between factors common to both hospitals and hospital-specific factors, as most of the innovations mentioned happened in hospital 1.

Hospital 1 did more generative (innovative) learning in teams or directorates than hospital 2, and more inter-organisational learning. Guidelines could help to foster 'generative' or creative relationships between aligned (similarly focused) but heterogeneous actors by providing permission, space and time for talking,[235] if used to support exploratory dialogue. This was more than competence, which was having knowledge or ability to act.[137] The collaborative consensus culture in

hospital 1 could be expected to support this behaviour better than the more closed, narrowly individualist medical culture in hospital 2.

There was a great variety of type 2 changes, both to team and individual practice. The introduction of specialist nurses was important. Nurses were also said now to take more initiative in starting prophylaxis in both hospitals. This gave support to the idea that guidelines helped to increase the autonomy of the nursing profession.

From an information perspective it was striking that devising new systems that would improve care[29] and trap error[31] was not mentioned, except by the hospital 1 clinical audit co-ordinator.

General views on aims, systems, culture and guidelines

In this section differences and similarities between hospitals are discussed together.

Uniformity of care and safety

Improving the consistency or uniformity of care was the main purpose seen for SIGN guidelines. It was mentioned to the same degree in both hospitals, but in hospital 2, especially by nurses. Perhaps this was in reaction to the more varied consultant practice there. Uniformity was seen as an error prevention system in itself – health professionals did not have learn more than was necessary when they transferred between units, directorates, and even between wards. Therefore they were less likely to make errors. This was an example of the institutionally-driven safety culture which valued safety above most other virtues, even innovation and patient choice. Neither innovation nor increased patient choice was mentioned as an aim of guideline implementation in either hospital. Litigation risks for negligence were the institutional mechanism

involved, but this was the institutionalisation of a value system rather than a specific practice.

Uniform practices made feasible the design of supposedly failsafe error prevention systems.[31] The problem was that if the systems encouraged routine behaviour they would breed error by narrowing peoples' vision.

Best clinical practice and error prevention

Interviewees in both hospitals also saw implementing best practice as an important aim for SIGN guidelines. The disadvantage of this was that as a result most health professionals appeared to espouse perfection, which was in turn perhaps a reason for the existence of a destructive blame culture. Solutions used in other high risk industries were accessible if medicine was seen as such.[30] Otherwise the blame culture prevented communication, and that in turn increased the likelihood of error.

To prevent errors, it was necessary to identify the most common errors and reach an agreed understanding of why they happened. This required breaking the ingrained connection of error with incompetence in the medical culture.[31] Local error reporting systems reported on their own success in error identification rather than on actual frequency of error.[113] A national system for anonymous error reporting was launched in January 2001 in the UK.[410] But uniformity in care procedures could help only the reporting, counting and comparison of the most common errors through routine statistics.

Own perceived uses for guidelines

Interviewees saw their own main practical uses for guidelines as reference and setting or agreeing the clinical policies, which formed the local rules (see chapter 9). Again this confirmed a picture of doctors involved in active policy creation and innovation with specialist nurses in hospital 1, while nurses

followed the rules set out in the guidelines in hospital 2. SIGN intended guidelines to be applied to individual cases with discretion "particularly in diagnosis where absolute certainty is often unobtainable."[255] so these comments may have shown a tendency to formalise guidelines as tablets of stone in hospital 2 – which SIGN did not intend.

Implementation and learning styles

Implementing guidelines was generally seen as carrying them out, but also as adapting them, knowing about them and checking compliance. Each of these could be argued to be associated with a phase of the learning cycle, no one being the complete story. To facilitate effective implementation, as guideline implementation was a learning process, a unit needed (as Kolb suggested[231]) to create dialogue including people with learning styles covering all stages of the learning cycle, and beliefs about the nature of guideline implementation. Multidisciplinary directorate meetings were held in theory at hospital 1, not only lack of time prevented many nurses from attending, it was perhaps also a fear that their lack of specialist knowledge of relevance to the debates that went on would make them feel out of place, because specialisation was so highly valued.

Barriers to the implementation of guidelines

Senior clinicians said the main barrier to implementation of guidelines was difficulties in dissemination followed by cost and by resistance to change (see chapter 9). Other Scottish research in the mid-1990's.[69] showed 69% of consultants thought lack of training was the reason for failure to follow guidelines. The reason for this may have been that joint training was a consensus building process. The finding that 88% felt guidelines would restrict clinical freedom was clearly connected to my finding that disagreement with

guidelines was an important barrier. Ninety percent of consultants were worried guidelines would increase the risk of legal action against them.[318]

Facilitators and barriers to implementation of change generally

These were often seen as two sides of the same coin – the presence or absence of a condition.

Facilitators to implementation of change generally

Formal support from the hospital was important in both hospitals. Within this, time was the main factor – for example having time to discuss the guideline with others. This was in line with the Scottish research dating from the mid 1990's which found that 76% of hospital consultants and 72% of nurses said they had too little time to follow protocols. More recent research found time and resource needed to be devoted to a period of local negotiation and adaptation of the evidence for the local context.[101] Opinion leader support was also important.[36;101] This agreed with my findings – the support of the consultant, clinical director and management was mentioned as part of this formal support process facilitating change, change management.

Issues raised about change in a study of communication in an NHS study included lack of time to discuss problems, lack of feedback, lack of two-way communication, lack of involvement in change, and overload with irrelevant (especially bureaucratic) information.[407]

There was some evidence that learning styles varied across professions. Some of the misunderstandings about the functions of guidelines between doctors and nurses (for example nurses' view of doctors as rather inconveniently "having their own ideas") were explained by conflicting learning styles:

> "When managers have learning styles similar to another group they have little trouble communicating with that group. When style differences are great, communication difficulty arises."[231]

The need for time for nurses to train without adversely affecting ward functioning was corroborated by a study of multi-professional training in Continuous Quality Improvement (CQI).[178] Interestingly, this study placed most importance on:

> "Cultural barriers over perceived differences in learning approaches, especially articulated by Doctors and Nurses, and the pace of learning."

The replication in 1990 of a study from 1934 confirmed that physicians still had a bias toward action, leading, for example to problems such as unnecessary tests and interventions for patients.[12] The problem with this for OL was that if one or two phases of the learning cycle dominated others, the cycle would not work:

> "we can conclude that the most effective learning systems are those that can tolerate differences in perspective."[231]

Since most work systems left too little time for reflection,[29] the action-oriented work of nurses could imply an action-based learning style preventing them from contributing reflectively to local protocols on nursing issues.

Barriers to implementation of change generally

Other research on barriers to audit-based change showed staff attitudes were the most mentioned problem.[211] This agreed with my finding that cultural issues were mentioned (especially in hospital 1) as a main barrier to the implementation of change. The other barriers were very similar to those which came out about the implementation of guidelines, and this in itself underlined the important insight that guideline implementation was about the implementation of change.

11.2.4 OL and guideline implementation activities

Research Question 3b - Were potentially goal changing (generative) guideline implementation and dissemination methods and beliefs (model 2) connected to significantly higher OL capacity from adaptive beliefs encouraging compliance?

There was a significant difference in OL score between those reporting the two types of change in their own practice in hospital 1. The OL score associated with type 2 change was always greater than that associated with type 1 change, and in spite of the low numbers this consistency in direction improved the reliability of this finding. The finding was in accordance with the hypothesis, in that it showed guidelines could be associated with type 2 change and that higher OL capacity accompanied this more creative change. That type 2 and higher OL capacity were associated also incidentally helped to validate the coding of these activities as type 2.

Those clinical managers who had experienced both types of dissemination (one way and two way) were significantly more likely than those who had experienced only one type to use both of them to disseminate to their staff in their turn. This added support to the view that type 1 and type 2 learning went naturally together in the hospitals.

Research Question 4 (Hypothesis testing) - Substantive activities and beliefs involved in guideline adoption and OL.

This section asks whether the main guideline implementation activities and beliefs were connected to significantly different levels of OL capacity from others. This analysis was carried out within type, so OL capacity of beliefs of either type was compared with OL capacity associated with all other beliefs of that type mentioned for that issue.

Involvement with guidelines

Use of guidelines was significantly associated with a higher OL score in both hospitals together and in each hospital, and particularly with leadership, again in both hospitals together and in each (see chapter 10). There was also a relationship with transfer of knowledge, guideline users giving higher scores than non-users, especially in hospital 2. Interviewees quite probably reported higher OL capacity than others in the hospital, since they reported higher OL capacity than those who responded to the survey alone.

The higher OL scores of those using guidelines suggested guideline use was especially connected to leadership and transfer of knowledge. Implementation group membership was not associated with any significant differences in OL capacity. This disagreed a little with an association between involvement in successful quality improvement teams and "organisational citizenship behaviour" which was found in a Canadian study.[200] Organisational citizenship was not the same as OL however, for example the latter did not include experimentation or any obviously double-loop learning-related items, it was much more about achieving good relationships with colleagues and customers.

Beliefs and OL score

The two type 1 beliefs associated with significantly lower OL scale score than other type 1 beliefs were:

1. Those seeing the function of guideline based audit as to check practice had significantly lower transfer of knowledge scores. This was true in both hospitals together and in hospital 1, but there was no significant difference in hospital 2, though the direction of the difference was the same. Those seeing checking practice as an aim of audit also had considerably lower leadership and experimentation scores than those who did not, though not significant at 5%.

2. Those wanting the organisation to support them in change implementation were significantly lower on clarity of purpose. This was the case in both hospitals together and in each hospital separately.

Only one study sample was significantly involved in any of these differences – doctors were more likely to want organisational support with guideline implementation. This held true overall and in each hospital. Perhaps doctors did not feel they knew what hospital purposes were as distinct from professional purposes. The differences are discussed below under the themes of leadership and support structures for change (for example audit and guidelines departments).

Leadership

The right leadership has been noted as a key aspect of improving OL. Tannenbaum found for example, when comparing a Health Maintenance Organisation (HMO) with a division of a bank, that supervisors tended to operate in more of a guidance/enforcement role than in the coaching role exhibited in the HMO.[393] The HMO had a more effective learning environment. It was plausible to see a key role of the OL leader as connecting individual learning purposes to organisational priorities.[233] The correlation between the clarity of the purpose OL sub-scale scores and formalisation scores found in my study both overall and in each hospital implied that many were going about this in a non-learning way. The correlation was strongest for hospital 2 doctors, though not significant for any profession alone within a hospital. The organisational "mission" was therefore perhaps being imposed (particularly in the view of hospital 2 doctors) in a one-way model rather than resulting from a two-way dialogue between staff and those setting the strategic direction at the top of the organisation. In that case, senior nurses and consultants needed to learn to facilitate such a dialogue to lead OL.

The general movement for quality improvement in health care has supported the recognition of organisational collaborative skills as necessary clinical skills,[33] but on the evidence of this study, this agenda had yet to find its way into hospital 2.

Both the guideline and protocol developers were designers (strategists), and therefore leaders in Senge's sense: "In a learning organisation, leaders' roles differ dramatically from that of the charismatic decision maker. Leaders are designers, teachers and stewards.".[313;370] The project results showing guideline users scored highly on leadership implied that guideline use was part of this new OL type of leadership role.

The main support needs found for guideline implementation were educational. This suggested that an educational type of leadership was needed. This meant, for Senge "helping everyone in the organisation, oneself included, to gain more insightful views of current reality."[313;370]. An organisational learning strategy, a design for learning, was required to help hospitals like hospital 2 where organisational learning was not happening very well naturally.

Such a strategy would recognise distinctions such as one made by Weick, between ignorance, which was reduced by one-way communication, and confusion, which needed two-way interaction:

> "there is a difference between ignorance and confusion. To remove ignorance, more information is required. To remove confusion a different kind of information is needed, namely, the information that is constructed in face to face interaction that provides multiple cues."[421]

This suggested that confusion was a major aspect of the lack of understanding often cited as a barrier to implementation and change, especially in nurses.

> "People mistakenly try to reduce their confusion with formal information processing that is not rich enough or their ignorance with a group meeting that is too rich."[421]

Nurses had access to the guideline folders on the wards, so ignorance was not a large problem for those interviewed. A reflective comparison of possible goals and the eventual agreement on what the guidelines were for, how they fitted in to existing practice, why certain uses or interpretations were not appropriate or practical was an educative process as well as training. For Downie and Charlton, education concerned matters of intrinsic importance, it took a wide perspective and was related to other activities thought valuable, and it created in those who were engaged in it a sense of caring about what they were doing.[103]

Support for change implementation wanted from the organisation

Those wanting more time and resources from their hospital to support guideline implementation gave lower scores to clarity of purpose and mission. This needed careful interpretation. Clarity of purpose was clearly related to leadership. The mission involved was the organisational mission, which doctors, perhaps because of their more effective professional networks, regarded as less important than nurses. Their professional individual responsibility to do their best for their own patients perhaps reinforced the division between individual and organisational learning for some clinicians. As Berwick et al said "Nurses improve nursing, doctors improve doctoring. But part by part improvement will not in general achieve the improvement of systems as a whole." This, and other traditions of professional behaviour were predicted to "prove dysfunctional in the world of quality management".[33]

To bridge this gap between traditional professional behaviour and the learning organisation, clinicians would need to be helped to identify and argue for clinical priorities that matched their skills and were also clinical priorities for the hospital. Donaldson discussed the need for education in leadership skills for

clinicians. These skills included not only diagnosis and treatment and care, but also the ability to communicate, inform and educate, to assess and improve quality of care, recognise unsafe practice and act to prevent it, and to work in multidisciplinary teams. He called for a more systematic approach to identifying clinical leaders.[99]

This all supported the view that clinical audit needed to be implemented in support of clinical leadership, for example by clinical directors as in hospital 1, rather than as a centrally driven replacement to it as in hospital 2.

11.3 Limitations of the study

11.3.1 Case selection methods

Hospitals

Although hospital 1 was higher on the OL capacity scale than hospital 2 (especially for consultants), numbers in senior comparison group were low and did not show a statistically significant difference. But the criticism of the consultant body in the MacLean report on hospital 2[256], which came out in 1999, 6 months before data gathering for my project, implied it was important. The specific criticism was that despite the hospital recently having high complaint levels,

> "Because of other commitments consultant staff are not readily accessible to relatives, so that communication is usually by the specialist Registrars or SHO's."

MacLean praised the implementation of SIGN guidelines but queried recording about TED stockings and criticised surgery and Clinical Nurse Managers:

> "With respect to prophylaxis against deep vein thrombosis and pulmonary embolism, better completion of the Risk Assessment forms is required in General Surgery and Clinical Nurse Managers need to ensure

> that there is better compliance with recordings of the use of compression stockings."

My study had found qualitative evidence of variable practice in surgery, and had highlighted a general lack of involvement by clinical nurse managers in the implementation of SIGN guidelines at any level. There was implicit criticism of hospital 2 culture in the use of capitals for the report's self-avowedly most important recommendation:

> "ALL CLINICIANS SHOULD NOW PARTICIPATE OPENLY AND CONSTRUCTIVELY IN THE DEBATE ON RESHAPING ACUTE CLINICAL SERVICES..."

In itself, the lower response rate in hospital 2 could be taken as an indicator of lower OL capacity, showing unwillingness to reveal information (defensiveness) and to be involved in knowledge creation and sharing as an OL activity.

Guidelines

The guidelines were implemented later in hospital 2 than hospital 1, so hospital 2 may have been a year or so behind in an extended change process. The low response rate from those implementing diabetes guidelines in hospital 2 meant the implementation of the two guidelines, which were meant to contrast on the amount of OL capacity required for their implementation, could not be compared. This turned out to be strength rather than a weakness, as it allowed some welcome simplification to the research design. The selection process for the guidelines was retained in the methods section to show that the selection process had a rationale, and that the main guidelines had different characteristics, thus were more representative of SIGN guidelines than if only one implementation had been examined.

Health professionals

Difference in health professional selection between hospitals

No reminders were possible in hospital 1 because of reliance for sample selection on the personnel department in hospital 1. The sample was made larger than originally planned in both hospitals in order to give a greater chance of obtaining the numbers required. Exhaustive demographic comparisons showed similarity on the main demographic indicators. That it was more difficult achieve the same response rate in hospital 2 did not invalidate the comparison of responders' attitudes about learning capacity between hospitals.

The use of telephone as well as written requests for participation in hospital 2 was the main difference in contact method between hospitals. It meant those asked could not deny receiving the request in the first place. Telephone reminders increased the response rate. A number of those reminded said they had not received the letter requesting participation. There could have been a number of reasons for this:

1. The postal system in hospital 2 may really have been inefficient.
2. The letter could have gone to the bottom of the in tray as a low priority, and been thrown away later as too late to respond to.
3. The claim of non-receipt could have been a deliberate strategy to reduce unnecessary workload.

If any behaviour like this reflected OL capacity it was likely to be evident from the scale score of respondents after reminders. There was, in fact, no significant difference on any of the scale scores between the first and second time responders in hospital 2. There is a possibility that the reason for needing a reminder was lack of time, particularly as this was the main reason given for non-participation. In this case, the busiest and most influential doctors and

nurses may have been under-represented, but if this was the case it would presumably have applied in both hospitals and so the comparison would have remained sound. Those who did not respond at all could have had different attitudes from the responders in either hospital. That was a different problem and was addressed through the interviews by asking about colleagues' opinions. Most said others would agree with their views.

The more positive clinicians may have responded. The results may therefore have over-estimated OL scale scores and the more positive attitudes and beliefs about guidelines. This has been noted elsewhere as a difficulty in descriptive research in clinical audit.[71] For comparative research such as this, where response rates between groups were similar it was less of a difficulty, because the most positive segments, or the top slices, were compared. The comparisons of OL scores for study samples were also limited to senior clinical staff, and this group (after reminders) had a similar response rate in each hospital.

Role of senior clinical staff in influencing the learning culture

Consultants trained junior doctors. Consultants were likely to represent organisational culture as they tended to be long serving in the same organisation. They also helped to create it and pass it on.[175] G grade senior nurses were in charge of wards. They were responsible for the quality of the nursing care and the delivery of treatment. They were long serving and so likely to absorb, reflect and pass on organisational culture. They assessed ward staff. The study did not examine the speed with which junior staff took on the culture.

11.3.2 Response rates in context

The percentage response was relevant to the survey rather than the interviews because the surveys were used only for quantitative analysis and needed to be statistically representative. The rate among senior clinical staff, the group used to make the quantitative comparisons of OL scale score between study samples, was acceptable for research in this setting. The balance of senior and junior staff in the group used to relate interview data and scale scores was not significantly different between hospitals. The senior staff group used to compare guideline implementation activities on OL score (chapter 9) was 62. This was smaller than for the other comparisons and so had a lower power to detect differences.

The lower response rates were among junior staff. The overall response rates were as expected for research in this context. This was evident from the amount of research attention given to maximising response rates for this type of research in this setting.[79] Other studies of health professionals with low response rates gave a benchmark for the minimum acceptable (publishable) response rate in this type of setting. Using the search term "low response rate" six databases (CINAHL, BIDS ISI (SOC SCI), MEDLINE, BIDS EMBASE, BIDS IBSS and Web of Science (SCI and SOC SCI)) were searched, In total, 17 papers were identified. There was some overlap between databases. Tables summarising numbers of hits and the research subject and response are given in appendix A6.1. Some of the papers commented on response rate issues at a methodological level, rather than (or as well as) reporting the results of a specific study. The importance of assessing reasons for non-response was highlighted.[215 396] This was done in the present study, see results, chapter 6.

11.3.3 Directorates included

There was a difference in the directorates included in the study in each hospital. ITU was included in hospital 2, but there were no responses from ITU

in hospital 1. As part of anaesthetics and theatres directorate, it was excluded on the grounds that they were unlikely to see either diabetes or DVT cases. The OL capacity scores from ITU were higher than average, so boosted the OL score of nurses in hospital 2 slightly overall. For the hospital comparison, the inclusion of the 6 ITU nurses (all senior) put the senior nurses' average in hospital 2 up from 4.14 to 4.20, and the average for the hospital as a whole up from 3.94 to 4.01. The mean for all senior nurses was increased from 4.17 to 4.20. This did not affect the overall conclusions.

11.3.4 Analysis

The use of a single coder (the researcher) may have been a cause of inaccuracy or bias as the coding was not publicly tested. The limited success of the type classification could have been caused by idiosyncratic interpretations. However, coding was checked some months after it was initially carried out, and the single coder was aware of the importance of making explicit decisions about coding categories. The advantage of a single coder was that differing interpretations by multiple coders were avoided. The coding is available from the author for verification by any interested party, subject to confidentiality requirements.

The large number of groups and stages of the guideline implementation process that had to be included meant comparison of the whole guideline adoption process between study samples was difficult. Guideline adoption had to be compared bit by bit, leading to large numbers of tests, and this meant the significance level required was more rigorous owing to the need for bonferroni adjustment. The bonferroni approach may well have been too conservative, leading to type 2 errors.

Selection effects rather than actual changes could have caused the differences with age in individuals' OL capacity as they got older. For example,

higher OL capacity individuals may have worked to a later age than others, who may have taken earlier retirement or left the organisation for other reasons. Differences in schooling experienced between generations may have caused the differences. For example older generations often had more formal schooling involving more rote learning, more repressive discipline and less emphasis on group work.

11.3.5 Research strategy

The multiple methods approach was labour intensive. Data gathering, data entry and qualitative coding were very time consuming. The mix of qualitative and quantitative methods produced a great deal of combined data. The data were combined and analysed quantitatively as well as qualitatively, but always as cases in accordance with the case study strategy. The advantages of triangulation remained, and a comprehensive picture of attitudes, beliefs and activities was obtained and confirmed from multiple data sources.

11.3.6 Scale reliability

Another item-total correlation could have been carried out to supplement the developers' tests of the OL scale, and to re-test its reliability in the NHS acute hospital environment. Reliability was tested through the correlation between subscale totals and scale totals, and through the graphical comparison of the mean scores for individual items between each hospital. The validity testing in the NHS hospitals largely removed the need to do exhaustive reliability testing again, since a valid measure is necessarily also a reliable measure.

11.4 Final conclusions

The study samples had the predicted differences in OL scores, doctors higher than nurses, and hospital 1 higher than hospital 2. OL score was related to age

range overall, and this was not unexpected. It increased with age for senior nurses, but not for senior doctors. The research showed that in each stage of guideline implementation activities and beliefs could be divided into two types operating broadly in either single or double loop learning modes. Overall, those individuals who implemented or used guidelines had significantly higher OL score than those who did not.

OL capacity associated with type 1 and type 2 change was significantly higher for those making type 2 changes to their own practice in hospital 1 but not overall. There was more type 2 change associated with guidelines in hospital 1. This suggested that guidelines did not necessarily prevent type 2 change. OL capacity was not a measure of compliance with guidelines, but a higher OL capacity was associated with generative learning that was linked with guideline implementation. There was a separate dynamic or set of causes associated with change operating in each hospital. The cultural context in hospital 1 was more favourable to innovation, with more supportive clinical leadership, a less centralised audit approach, more control of working protocols within directorates, better communication and team working between professions and specialties and more reliable basic information systems (for example the internal post). Nurse specialists appeared to play an important leadership role in collaboration with specialist doctors in hospital 1 innovations to service delivery. Consultants' links to Royal Colleges were better in hospital 1. It was likely that the higher OL capacity was an outcome of all these contextual factors, and culminated in the organisational payoff of higher levels of innovation both generally and in association with the implementation of SIGN guidelines.

The hospitals were not different in everything and there were a number of similar issues and themes, it was a question often of emphasis rather than presence or absence of a theme in each hospital. There were broadly similar

external institutional pressures from legislative policy and political requirements on each hospital. Hospital 1 appeared to be much more closely linked to the Medical Royal Colleges, and it used these links to become more involved with national NHS bodies. It did this through, for example, SIGN. This enabled it to participate in setting the agenda of national health service priorities, and in the process make sure they were in accordance with hospital and professional priorities.

Doctors initiated innovation through cross-boundary working between specialities and professions. Cross-boundary working was not the exclusive preserve of doctors. It often involved collaboration between specialists – there was an example in hospital 1 of collaboration in audit between physiotherapists and midwives, each of which can be thought of as a specialist profession, and the increase in number of specialist nurses is likely in future to increase collaborative innovation involving them. Specialists were likely to lack a strategic view of the mission of the organisation as a whole. Generalist nurses and perhaps GPs could be more involved in generative learning processes in both hospitals to bring an organisational perspective to it, and other ways of connecting individual and organisational learning for more staff needed to be found by those in leadership roles, especially in hospital 2.

11.4.1 What this study found

To recap: the research asked whether two different activity and belief patterns surrounding guideline implementation in two Scottish acute hospitals were differently associated with a culture of organisational learning. The null hypothesis was "There are no differences in the SIGN guideline implementation process between hospitals of different OL capacity."

The study has found evidence in hospitals and professions to falsify this null hypothesis. The evidence came from two data sources, these were firstly a quantitative scale measuring OL capacity, completed by doctors and nurses, and secondly semi-structured interviews, also with doctors and nurses about their guideline implementation activities and beliefs. The interviews were analysed in two ways, both to identify contextual differences and similarities between the hospitals qualitatively and also, using a quantitative comparative case study approach, to describe, compare and contrast the main patterns of guideline implementation between the hospitals. Three analytical perspectives were used, the two hospitals were compared on OL capacity score to see whether the differences in OL capacity predicted from the selection process and from the contextual analysis were confirmed, the guideline implementation activities and beliefs were then compared between the hospitals, and finally the main guideline implementation activities and beliefs were compared with others of the same OL type to see whether they were associated with a different OL score. The main findings emerging from these different analyses and data sources pointed to the same conclusion, that higher OL capacity and type 2 guideline implementation were associated with each other, the consultants in hospital 1 were both predicted and found to be of highest OL capacity. The comparisons of the guideline implementation activities and beliefs between the hospitals found that, as predicted, where there was a significant difference, type 2 implementation was found in the hospital of higher OL capacity. Where there were significant OL capacity differences between the main individual guideline implementation activities in an implementation stage and others of the same type in that stage, these were as predicted, for example a view of audit as a checking process was associated with significantly lower OL capacity score. The consultants in hospital 2 did not score higher than hospital 2 nurses. It had been predicted that they would score higher, and that they did not was an interesting and unexpected finding. It implied perhaps that consultants as a

group were more sensitive than nurses to both OL capacity and incapacity in their hospitals.

Methodological learning about qualitative analysis

It was realised that chi-square tests could be used to compare the guideline implementation activities and beliefs between study samples. This was a way of making analytic induction a more explicit and rigorous process following accepted statistical rules. Yin's quantitative approach to case study, (which was used in chapters 8, 9, and 10, after a separate more humanistic approach to the analysis of context in chapter 7), gave no guidelines as to exactly how many cases were needed to show a difference between rival theories although he accepted that the disproved theory may contain or be shown in some of the existing cases tested in the research, without negating a claim of difference.[439]

The case study approach was vindicated by the different findings in each hospital, some of which would have been lost in a simple aggregation of the data. The finding of a significant difference between OL capacities associated with type 1 and type 2 learning in hospital 1 but not overall demonstrated this.

11.4.2 The contribution made by this study to OL and guideline implementation theory

Organisational Learning theory

The main contributions made by this study were to the practical measurement of OL capacity in acute hospitals and in pragmatically assessing the relationship of this theoretical concept to the real activities involved in evidence based clinical practice guideline implementation in acute hospitals. Evidence of a relationship helped to validate the scale for use in acute hospitals. The OL capacity scale chosen for the purpose was a useful measure in the hospital context, though a particular peculiarity was found in relation to the scores for the sub-scale about organisational mission, in that these were unexpectedly

significantly correlated with the formalisation scale. Less surprisingly, in view of the many unsuccessful efforts through the history of the NHS to exert managerial control on the medical profession, it also confirmed that doctors were not always aware of the organisational mission of their hospital.

The OL literature, especially Senge, sometimes treated single and double loop learning as if they were separate entities. My study reinforced the view that there was in fact no separation between the single and the double loop OL in practice; they worked together, type 1 being a necessary but not sufficient condition for type 2, but not vice versa. For this reason my research would imply that a solely "model 2" organisation is unlikely ever to be found, although in confirmation of Argyris's findings, type 2 learning was much rarer than type 1. Paradoxically, since specialisation was logically associated with type 2 learning, specialist skill, especially in surgery, was developed by repetition - a form of type 1 learning. Carroll and Edmondson[53] noted that expertise like this was a "competency trap" preventing organisational growth and change. The expert practitioners got bored and younger staff avoided the predictable and routine work. My study suggested that other perspectives (for example from other professions) could help to prevent specialists falling into this competency trap.

One organisational solution was to keep research and innovation activities separate from routine activities by using a separate R&D arm. Separation was likely to result in impractical or irrelevant innovations which would be resisted when it finally came to implementation. An organisational attempt to entirely separate the two parts of learning activity was therefore likely to limit hospital performance. My study lent support to this view from the insight that specialist nurses and specialist doctors working together created useful and feasible innovation to the delivery of care and treatment. Making nurses into specialists freed them from some of the routine of nursing care, and helped to

connect specialist doctors to the wider issues involved in routine care and treatment delivery. Specialist doctors appeared from comments (by ICU staff for example) in my study, to take more account of the views of specialist nurses than the views of general nurses or junior doctors.

For Downie and Charlton,[103] type 2 learning in industry and business was about expansion, competitive advantage in a turbulent world. Was it therefore less relevant to hospitals than an incremental type 1 learning which applied information and knowledge that had been generated outside the hospital? From the two hospitals it appeared not, an active involvement in knowledge creation with an element at least of control over choice of goals seemed essential to encourage whole-hearted adoption of evidence from elsewhere. Meeting health care and treatment needs rather than expansion or competition was the rationale for the NHS, and there was no practical limit to the amount of health care need or to the improvement possible in health care delivery, and thus no limit to the amount of OL desirable to meet the needs and create the improvements.

Strategic change and guideline implementation

These two topics are considered together since, as the literature review made plain, guideline implementation was best understood as an example of the implementation of a strategic initiative. One practical issue for organisational design was that in hospital 1 a smaller span of control was recognised by both doctors and nurses to make dissemination easier. Royal Colleges, particularly associated with hospital 1, were small units too. These features were in accordance with Ferlie and Shortell's views about factors encouraging change.[122]

Much of the evidence about the most effective methods of implementing guidelines referred to the importance of choosing methods suitable to the

context for the implementation. In my study, contextual issues such as the role of the Royal Colleges in relation to hospitals sprang out as major influences on the acceptance of the guidelines, which were, ostensibly at least, a product of a collaboration between the Royal Colleges and the NHS. This was where my study had some relevant evidence to the field of institutional theory. In a turbulent environment of increasing uncertainty about what was best practice, owing to the high volume of research evidence and new treatments, hospital 1 had managed, with other important hospitals, through its consultants' connections with the medical and surgical Royal Colleges, to influence the standards of best practice accepted by the central policy making bodies of the NHS to such an extent that any deviation from these standards would require justification in the event of a legal challenge. It had thus been able to manage the uncertainty, so that although it followed best practice it was not institutionalised by the received standards, since it had in large measure created them through an evidence-based but also peer-agreement-based process of SIGN guideline development. This insight enriches and supports Burgoyne's contention that some hospitals were, like some large old companies (MacDonald's and Coca-Cola for example) able to stabilise the context in which they operated, which he saw as the highest level of OL.[47]

Discussions with respected colleagues or consultants have been rated as the most important information source affecting clinical decision-making by 83% of 3000 Canadian physicians.[177] Guidelines were rated as having a major impact by only 44%. It was of pre-eminent importance to doctors to be respected by colleagues because they had to work flexibly with them. So, most doctors needed to see the evidence ratified in their own context and by their own team before they would implement it. The science base underpinned the culture, and was espoused, but these other variables were more important in the implementation decisions of most practising doctors.

As far as guidelines were concerned, their availability did not automatically mean doctors' compliance partly for these cultural and contextual reasons. The study results confirmed this, for example the hospital 1 process of directorate-based collaborative protocol creation was such a peer ratification process, as well as addressing other implementation issues. The study also extended this cultural change model to nurses – who voiced considerable demand for more discussion at ward level. The recent spate of articles in nursing journals on reflective practice, problem-based learning and self-directed learning[130;208;345] confirmed nurses' interest in type 2 learning.

An evaluation of the implementation of SIGN guideline No. 2, on the prophylaxis of venous thromboembolism, confirmed that the majority of Scottish trusts had developed local protocols.[413] Although audit of DVT prophylaxis was relatively common, few trusts were using audit in a systematic way to evaluate the effectiveness of local protocols, a potentially goal changing (type 2) activity. This was confirmed by the rarity of type 2 guideline implementation activities found by my study.

Type 2 guideline implementation activities and type 2 change as a result did occur, guidelines did not prevent them happening, in fact they were one route for the supply of the type of valid information that Argyris cited as a governing variable for his model 2 "theory-in-use", (chapter 2, table 2.1). Such information enhanced the probability of learning by being concrete, clear, consistent, congruent and available (Chapter 2, box 2.1). Guidelines promoted learning by providing standards of this standard, against which to measure data about clinical processes as the start of either single or double loop learning cycles. But in an institutionalised hospital such as hospital 2, where the culture tended towards model 1 "theory-in-use", even evidence-based guidelines struggled to achieve their full potential in supporting even type 1 learning, and it was even more difficult for them to support type 2 learning and change.

Future implications for the NHS

In his reference to a new sort of NHS a "values based system"[89] Alan Milburn, UK Minister for Health in January 2002 implied the NHS identity would perhaps eventually be maintained solely through quality assurance. "Strengthened independent inspection" would replace some financial and management controls. In England, for example, this would include external accreditation by a Commission for Health Improvement with more powers.[98] The challenge would be to keep this valid – as seen recently in the fraudulent reduction of waiting lists.[168] The measurement of OL capacity by profession may be one framework for inspection and accreditation if, as this study suggests, higher OL capacity is associated with the generation of innovation and improvement from within. Unlike compliance to external criteria this would be more motivating, and less easily faked. On the evidence found in this study, there is still a long way to go before type 2 OL will be sufficiently developed in all acute hospitals to give them the autonomy needed for a less controlling relationship by central government.

A number of my findings pointed toward an OL role for Scotland's managed clinical networks (MCNs) operating independently of hospital organisational boundaries.[114] MCNs were a uniquely Scottish initiative to improve effectiveness and efficiency unconstrained by the organisational structures through which care was delivered.[293] Their exact purposes needed to be worked out in action through funded pilot schemes.

Wider patient focused groups such as MCNs would help to overcome such unhelpful specialty boundaries. An MCN could be an innovating organisation, as recommended by Galbraith.[141]

> "Organisations that want to innovate or revitalise themselves need two organisations, an operating organisation and an innovating organisation"

MCNs could not be fully separated from organisations providing healthcare, as otherwise the learning would not benefit them as much, but reservations of protected time could accomplish sufficient separation. The role of guidelines would be to provide a common (uniform) base for discussion about better methods of delivering the care recommended in them. MCNs may become a way of ensuring that the current emphasis on learning from mistakes does not trap the NHS in a further cycle of single loop (type 1) learning, a danger highlighted in the small but developing literature on OL in the NHS.[298]

Type 2 learning from guidelines may in future be a role for MCNs. Certainly, MCNs would provide the essential social context for learning, and the time to "create, examine and redefine meanings".[357] Social learning could encourage new ideas better than could individual learning because "the best person to help you with your problem was someone who cannot see your problem in the same frame as you because he or she was ignorant of your world."[38] Through MCNs guidelines could bring together specialists with different frames of reference to spark the innovative ideas which "occur when knowledge of the essential specialties was coupled in as few heads as possible."[141]

SIGN national guideline development groups perhaps fulfilled the role of structural defence mechanisms or parallel organisations allowing open communications and sharing of mental models away from the restrictions and possibly some of the rivalries of the work situation. This no doubt had benefits for the work situation, but also importantly, the individuals who participated in or led these national development groups were very effective local champions for their guidelines, which explained the earlier uptake and enthusiasm at hospital 1. The SIGN groups also intensified the pressure on professionals and hospitals to implement best research-based practice, and to match outcomes obtained elsewhere. What these national SIGN groups lacked as innovating

organisations was an ability to experiment with ideas generated from practice, some, but not all hospitals had sufficient capacity to do this.

Further research needed

The most obvious further research would be to develop an OL scale specifically for use in acute hospitals, with relevance to both clinical and organisational missions, and perhaps with a sub-scale measuring clinical mission in addition to or instead of organisational mission. Other subscales could be identified pragmatically using groups of clinicians to generate, test and select items.

In further research comparing guideline implementation and OL capacity, it would be helpful to reduce the numbers of differences needing significance testing. This could be achieved by concentrating on larger numbers of consultants only, since they differed most between hospitals, and researching single stages of guideline adoption. As the directorate appeared to be the main learning unit for clinicians, in future research it would possibly be fruitful to concentrate on directorates or units hypothesised to be of different OL capacity such as ICU in comparison with Care of the Elderly. To verify the relationship of type 1 and type 2 learning to OL score, a future study could confine itself to the learning outcomes of implementation. There was no one implementation. Each stage of implementation had its own problems, each of which might be expressed differently in different contexts.

An additional analysis I could have done, but was not directly relevant to the research question, would have been to compare the OL capacity scores for the main beliefs and activities associated with each stage of guideline implementation with all other responses by seniors and /or juniors, instead of as I did, comparing them only with the OL scores of those responding with replies on that topic categorised within the same theoretical OL type.

Appendices

A1 Research Instruments

A1.1 The OL Survey

Swee C Goh & Associates
Strategic Change and Learning Consultants

THE LEARNING ORGANISATION SURVEY

CONFIDENTIAL WHEN COMPLETED

The purpose of this survey is to gather information concerning organisational factors and management practices that may influence the learning capability of organisations. The survey has been tested with over 1000 employees and has been found to be statistically valid and reliable.

There are no "right" or "wrong" answers. Please reflect carefully and answer all questions as honestly as possible based upon your knowledge of the organisation. Your response will be kept confidential and will be aggregated with the responses so individual respondents cannot be identified. Some questions in this survey might sound similar to others. Please answer ALL of the questions. Thank you for taking the time to fill out this questionnaire. Please return your completed form in the envelope provided.

		1 Strongly Disagree						7 Strongly Agree
1	I often have an opportunity to talk to other staff about successful programs or work activities in order to understand why they succeed.	1	2	3	4	5	6	7
2	There is widespread support and acceptance for the organizations mission statement .	1	2	3	4	5	6	7
3	I can often bring new ideas to the organization.	1	2	3	4	5	6	7
4	Failures are seldom constructively discussed in our organization.	1	2	3	4	5	6	7
5	Current organizational practice encourages employees to solve problems together before discussing it with a supervisor.	1	2	3	4	5	6	7
6	From my experience people who are new to this organization are encouraged to question the way things are done.	1	2	3	4	5	6	7
7	Senior managers in this organization resist change and are afraid of new ideas.	1	2	3	4	5	6	7
8	Line managers in this organization encourage employees to experiment in order to improve work processes.	1	2	3	4	5	6	7
9	New work processes that may be useful to the organization as a whole are usually shared with all employees.	1	2	3	4	5	6	7
10	Innovative ideas that work are often rewarded by management .	1	2	3	4	5	6	7
11	Managers and employees of this organization share a common vision of what our work should accomplish.	1	2	3	4	5	6	7
12	In my experience, new ideas from staff are not treated seriously by management .	1	2	3	4	5	6	7
13	Managers in this organization frequently involve employees in important decisions .	1	2	3	4	5	6	7
14	We cannot usually form informal groups to solve organizational problems .	1	2	3	4	5	6	7
15	Managers in this organization can accept criticism without becoming overly defensive.	1	2	3	4	5	6	7

16	We have a system that allows us to learn successful practices from other organizations .	1	2	3	4	5	6	7
17	Line managers in this organization often provide feedback that helps to identify potential problems and opportunities.	1	2	3	4	5	6	7
18	I do not understand how the mission of this organization is to be achieved .	1	2	3	4	5	6	7
19	We have opportunities for self assessment with respect to goal attainment .	1	2	3	4	5	6	7
20	The organization's mission statement identifies values to which all employees must conform.	1	2	3	4	5	6	7
21	Most problem solving groups in this organization feature employees from a variety of functional areas or divisions.	1	2	3	4	5	6	7
22	There is very little overlap in work between different units in the organization .	1	2	3	4	5	6	7
23	Most of our work must adhere to formal rules and procedures .	1	2	3	4	5	6	7
24	In my opinion, this organization has too many levels of hierarchy.	1	2	3	4	5	6	7
25	We require approval in writing for the introduction of new work activities .	1	2	3	4	5	6	7
26	Our work is usually closely monitored and inspected by management .	1	2	3	4	5	6	7
27	Information and decision making must always go through proper channels.	1	2	3	4	5	6	7
28	Standard operating procedures have been established for almost every work situation .	1	2	3	4	5	6	7
29	I feel I am in a dead end job.	1	2	3	4	5	6	7
30	I feel isolated at work.	1	2	3	4	5	6	7
31	I am satisfied with my supervisor.	1	2	3	4	5	6	7
32	I do not feel as if I am an integral part of this organization .	1	2	3	4	5	6	7
33	I have opportunities to work on challenging assignments.	1	2	3	4	5	6	7
34	My work makes full use of my skills and abilities.	1	2	3	4	5	6	7
35	I have opportunities to improve my knowledge, skills and abilities in order to undertake new work assignments.	1	2	3	4	5	6	7
36	I know that failure will have negative repercussions on my career.	1	2	3	4	5	6	7
37	My work group is supportive of the work I do.	1	2	3	4	5	6	7
38	Overall I am satisfied with this job.	1	2	3	4	5	6	7

Instructions: This section asks for personal data related to your work experience. Please respond by filling in the appropriate blank

1 How long have you worked in this organization? _____ (# of years)
2. What position do you currently hold in this organization?_____(title)
3 Please indicate your division/department_____
4 How long have you been in this position? _____(# of years)
5 In how many different organizations have you been employed _____
6 In how many different functional areas (e.g. personnel, finance, etc) have you been employed? _____
7 Have you had experience in any other industry? Yes _____ No _____
Please specify _____
8 If yes, how many years before joining your present organization? _____
9 Gender: Female _____ Male _____
10 Age group: 20-30 _____ 31-40 _____ 41-50 _____ 51-60 _____ 60+ _____

Thank you for taking the time to fill out this survey. Your responses will be kept completely confidential and all information will be statistically aggregated before being put into the final report. If you have additional comments please use the back of this page.

A1.1.1 Items for scales within Learning Organisation survey tool:

Learning Capacity scale: items 1-21,
Formalisation scale: items 22-28,
Job satisfaction scale: items 29-38.

A1.1.2 Items for sub-scales of the learning capacity scale

Clarity of purpose and mission: items 2,18,20 and 19,
Leadership commitment and empowerment: items 7, 11, 15, 17, 13,
Experimentation: items 3, 6, 8, 10, 12,
Transfer of knowledge: items 1, 4, 9, 16,
Teamwork and group problem solving: items 5, 14, 21. [151]

A scale total for OL was calculated by reverse coding items 4,7,12,14 and 18, summing the scores and dividing by the number of items in the scale (21 for a complete scale).

A1.2 The Hospital Culture Scale (Rows compressed)

	The Hospital Culture Scale	SA	A	N	D	SD	N/A	D/K
1	The Physician-Nurse relationship is team orientated							
2	Physicians treat Nurses as handmaidens, not partners							
3	Physicians are the rulers of this hospital							
4	This hospital often makes changes to improve the delivery of healthcare							
5	When physicians are with patients they often talk to other health professionals in the room as if the patient did not exist							
6	Physicians go to great lengths to explain treatment programs to patients							
7	The Nurse-Physician relationship is characterised by mutual respect							
8	The success of health care professionals in this hospital depends on how willing they are to play hospital politics							
9	Health care professionals' advancements are based on their commitment to patient care							
10	The goal or mission of this hospital has been determined by upper management without employee involvement							
11	Physicians are open to recommendations offered by Nurses							
12	Patient complaints are often dismissed by physicians							
13	Physicians often take the time to listen to patient concerns							
14	Health professionals at this hospital inform patients of alternative medical treatments							
15	This hospital has a clear, well accepted mission							

Answer N if you know that you neither agree nor disagree with the statement.
Answer D/K if you do not have the knowledge to answer the question
AS = strongly agree, A = agree, N = neither agree or disagree, D = disagree, SD = strongly disagree, N/A not applicable, D/K = do not know. (Klingle et al 1995, Evaluation and the Health Professions, 18, 2, 166-186)

A1.3 Personal Details survey

Office Use

Further information (Fully confidential)

How many SIGN Clinical guidelines have you helped to adapt for local use? _____**1**

2. What is your main job? Clinical Manager **6**
Audit facilitator **3** Medically qualified practising Doctor **1** Nurse **2**
Profession allied to medicine **4** Other **5** (Please specify)
_____

3. Do you normally work as part of a multidisciplinary clinical team?
Yes**1** No **2** Don't Know **3**
(if No, please go to question 6)

4 If yes, what is the size of your team (or your main team if you work for more than one)? 1-5 **1** 6-10 **2** >10 **3**

5 Which of the following professions does your main team contain?
Medical Doctor **1** Nurse 6 **2**
Audit/clinical effectiveness facilitator 7 **3**
Profession(s) Allied to Medicine(PAM) 8 **4**

Please specify which PAM(s)
_____

9 Have you implemented one of the following guidelines
SIGN DVT prophylaxis **1** A SIGN diabetes guideline **2** Don't Know**3**
(If Diabetes please give the name here)
_____
_____
Please indicate and give brief details if any of the following happened:
10 A The guideline was audited **1**
_____
11 B Change to clinical practice **2**
_____
12 C Other change to your work **3**
_____

13. Have you implemented any other SIGN clinical guideline?
Yes **1** No **2** Don't Know **3**
Please give the name of the guideline(s)
14_____
15_____
16 Have you implemented any other clinical guideline? Yes **1** No **2**
DK **3**

A1.4 Interview Schedule

Question	Reason asked
1 Extent of previous involvement (all respondents)	
1 How many SIGN guidelines have you helped to adapt for local use?	To compare those with previous involvement in implementing guidelines with those without
2 Dissemination	
1 Which guideline would you like to answer specific questions on? **2 What was done to disseminate the guideline** **(a) to you?** **(b) to your staff?**	To compare complex with less complex implementation of a guideline To compare methods of dissemination, to compare adaptations made by managers to the dissemination methods they experience
3 Would you do anything differently about dissemination next time?	To compare learning about dissemination methods. To compare ideal with real dissemination methods
***4 What explicit support would you like from the senior management team?**	To compare needed improvements to dissemination
3 Implementation	
1 Were you a member of an implementation group?	Comparison of level of involvement in implementation.
2 Did you do things to make sure the guideline recommendations were put into practice?	To compare active methods of implementation.
***3 Was anything else done to implement the guideline?**	To compare perceptions of others activity to implement the guideline
4 Audit	
1 Was practice audited?	To compare awareness of audit
***2 Who did the audit?** **(Which staff groups/directorates were audited?)**	To compare knowledge about the involvement of others in audit.
***3 What were the aims of the audit?**	To compare aims of audit.
***4 Were you in the group conducting the audit?**	To compare those involved in planning the audit and those not actively involved
***5 Was that group a multiprofessional or uni-professional?**	To compare uni-professionally controlled audit with audit where more than one profession has control over the process
***6 Did it include more than one directorate?**	To compare audit carried out in one directorate only, with inter-directorate audit
***7 Did it include primary care?**	To compare audit confined to an acute trust and audit including primary care. To find out whether/how primary care was included.
***8 What were the good and bad things about being/not being in the group?**	To compare motivations and justifications for active involvement in audit.
9 What do you understand by a quality improvement project in a hospital?	To compare understandings of quality improvement (e.g. whether guideline implementation is seen as such)
5 Implementation results	

1(a) Were the findings communicated to you for your own practice? **1(b) Would it have been communicated for your team – for their practice?**	To compare kinds of feedback.
2. If there was a change to your practice as a result of the guideline, can you describe the most important change?	To compare valuations of types of change, and to compare changes.
3 Can you describe any other changes to practice from this guideline?	To compare general changes.
***4 Were the findings of any audit communicated to anyone outside the clinical team?**	To compare whether the team communicates about the wider impact of the findings and to whom.
6 Team Learning	
1 Did you learn anything about the practice of other teams or directorates from implementing the guideline?	To compare whether communication/learning in-coming to the team/directorate. To compare the information received/learnt
2 Have you found that the guidelines led to any new ways of working in your team or directorate?	To compare whether the learning was put into practice.
3. Was primary care involved in any of these new ways of working?	To compare whether changes extended to external organisation (primary care)
4. How the organisation help this learning process?	To compare barriers and ideal solutions to them for the creation, communication and use of practical information
7 General issues on guidelines - all respondents	
I'd like to ask you now about any previous experience of clinical guidelines you may have had.	To construct and compare ideals for using clinical guidelines.
1 What do you think SIGN clinical guidelines are for?	To compare ideal aims
2 Do you think other clinicians (nurses/medical staff) think the same?	To compare beliefs about other members of the profession, and other professions
3 What do you think can stop guidelines from working?	To compared general beliefs about constraints
***4(a) How do you use SIGN guidelines?**	To compare general perception of personal uses
4 (b) Do you think doctors use them in the same way? **Do you think nurses use them in the same way?**	To compare general perceptions of use by the other professional group with perceptions of own professions use and own use.
4 (c) Do you think your manager uses them in the same way?	To compare managerial use and clinical use
5 What are your general opinions on the effectiveness of SIGN clinical guidelines?	To compare attitudes to SIGN guidelines' effectiveness
6 What does implementation of a guideline mean to you?	To compare understandings of the concept of guideline implementation
***7 What factors helped the implementation of change?**	To compare facilitating factors to implementing guideline based change generally
***8 What factors stopped changes from working?**	To compare barriers to implementing guideline based change generally

* shows questions for contextual issues

A1.5 Correspondence with authors of scales

A1.5.1 Email to Prof Goh 15/5/2000

Dear Professor Goh,

I refer to your letter of June 18 1998, to me, giving permission for the use of the Learning Organisation Survey in my research. Thank you for this, and the information in the letter. I have now gathered the data and am recoding the reverse scored responses. There is one point I do not understand, you say in the letter items 29, 30, 32, and 36 must be reverse scored (8-response). I do not understand the reference to 8-response. Could you explain?

With all best wishes,

Andrew D. Millard,
53, Thornly Park Avenue,
Paisley,
PA2 7SF
Tel 0141 884 3620

A1.5.2 Letter from Prof Goh 16/5/2000

Hi:

For those items I indicated that has to be reverse scored (8-response) means if the subject marked 5 on the scale in response to the item, the correct score should be (8-5) which is 3. What you have done is to reverse the 7-point scale, i.e. if the response had been 1 the correct score should be(8-1) which is 7, the other end of the scale.

I hope it clarifies what you have to do to code the responses on the survey.

I would be very interested in your results and the data. If you can share it with me it would be much appreciated. You can send me the raw scores in an EXCEL file and a codebook on what the rows and columns mean and also some information on the sample you used.

Thanks and good luck. Keep in touch.

Swee C. Goh, Ph.D.
Associate Professor

A1.5.3 Email from Prof S Goh 18/5/00

Hi Andrew:

An SPSS data file is fine. However, I have SPSS for Windows 98 Version 10.0. Make sure it is the same or a lower version.

You can deal with the missing values described for the overall scale. However, you should do the five sub-scale values as well in your analysis. T-tests between the two groups is fine, if that is what you are hypothesizing, that there will be a significant difference.

The data is sensitive by level, that is more senior people tend to score higher, but it should not be highly significant. You may want to control for sample size differences.

Did you measure job satisfaction and formalization as well? You may want to do a simple correlation between these two measures and the learning scale.

Swee Goh
GOH@profs.admin.uottawa.ca

A1.5.4 Email to Prof Klingle 28.4.2000

Dear Professor R. Klingle,

I am a PhD student at the Department of Public Health, Glasgow University in Scotland.

Some while ago, I discovered your interesting 1995 paper in Evaluation and the Health Professions (18, 2, 166-186), Communication among Physicians, Nurses and Patients in Hospitals.

I am looking at Organisational learning capacity and its relationship to the implementation of evidence based clinical guidelines. For this I have gathered data using a scale developed by Goh and Richards (See: Benchmarking the Learning Capability of Organisations, European Management Journal 1997 15, 5, 575-583).

Unable to contact you previously, I discovered you at the university in Hawaii through a web search. I would like to use your scale to validate the learning capacity scale (predicting that they will correlate).

I have gathered data but would like your permission to use the scale in this way.
Could you please confirm which items should be reverse scored? Any comments or suggestions would be welcome. Has your scale been used in any other studies and are there any other peer reviewed publications about it?

With many thanks for your help, and best wishes,
> >
> >
> > Andrew D. Millard,
> > 53, Thornly Park Avenue,
> > Paisley,
> > PA2 7SF
> > Tel 0141 884 3620
> >
>

A1.5.5 Email from Prof R. Klingle, 16.08.00

Dear Mr. Millard:

I apologize for the late response but I've been working on some grant work and away from my office for most of the summer.

You are correct, items 2, 3, 4, 8, 10, and 12 are the ones to be reversed.

There have been a lot of requests to use the scale and I know that it has been used. However, I don't know if anyone has published their data. A lot of the people that have used it have done so to improve hospital communication.

Renee Klingle

A2 Literature Review search strategy

A2.1 Guideline implementation/audit

A2.1.1 Exploratory searches (1997)

Embase 1988-90 practice guideline (limited) 108 refs (on implementation)
Embase 1991-93 Practice guideline (limited) 134 refs (on implementation)
Embase 1996-7 Practice guideline (limited) 243 refs (on implementation)
Bids ISI 1988-97 guidelines+audit 34 refs
Bids ISS 1988-97 guidelines+audit 7 refs
Bids ISI 1981-97 clinical audit + guidelines 49 refs
Bids Embase 1981-97 health care quality + practice guidelines 67refs
ASSIA 1986-96 clinical guideline 164 refs
Medline (Pubmed) 1995-97 guidelines and clinical audit 42 refs
Medline (Silver platter) 1986-95 research and (practice-guidelines or practice-management-medical) 115 refs

A2.1.2 Update searches 2001

Medline (Silver platter) 1995-2001 research and (practice-guidelines or practice-management-medical)
Embase 1997-2001 practice guideline
ASSIA clinical guideline 1997-2001

A2.2 Organisational learning

A2.2.1 Exploratory searches (1997)

Bids embase 1981-1997 Organisational learning or clinical learning 11 refs
Bids embase 1981-87 organisation and health and development 41 refs embase
Bids isi soc sci 1981-97 organisation + health + development 2 refs
Bids ISI (sci) 1981-97 Organisation + healthcare + development 15 refs
ASSIA 1987-96 organisational + learning 71 refs
BIDS IBSS 1988-2000 organis (z) ational learning, learning organis (z)ation marked list 128 refs (Computer file)
Cinahl learning culture or learning capacity 1982-00, 15 refs (Computer file: learn_cult_capac)
Embase learning culture or learning capacity 1980 -2000, 72 refs (Computer file: learn_cult_capac)
Medline learning culture or learning capacity 1982-00 46 refs (Computer file: learn_cult_capac)
Ovid ISI/Web of Science sci and soc sci (all yrs) learning culture or learning capacity 139 refs (Computer file: learn_cult_capac)
Ovid ISI ISTP learning culture or learning capacity 1980-2000, 78 refs (Computer file: learn_cult_capac)
(BPO) Learning 1994-5 (1) 48 refs selected, 15 further selected
(BPO) Learning 1994-5 (2) 99 refs selected, 18 further selected

(BPO) Learning and health care industry 1986-97 29 refs
(BPO) Learning and management 1986-97 129 refs
(BPO) Organisation and health 1986-92 18 refs
(BPO) Organisation and health 1993-4 22 refs
(BPO) Organisational Development, Organisational change, organisational behaviour, organisational theory. (Thesaurus terms) 1994-5 15 refs
(BPO) Organisation and health 1996-7 104 refs
(BPO) Organisational learning 1996-7 3 refs
Medline (Pubmed) 1981-97 Organisation /learning/development 43 refs
Medline (Pubmed) 1981-97 organisation* learning 21 refs
Medline (Pubmed) 1981-97

A2.2.2 Update searches 2000-2001

Medline learning culture or learning capacity 1966-2000, 46 refs.
(BPO) 1997-2001 Organisation and health
(BPO) 1997-2001 Organisational learning
ASSIA 1997-2001 organisational + learning
Medline learning culture or learning capacity 2000-2001 (Computer file: learn_cult_capac)
Ovid ISI/Web of Science sci and soc sci (2000-2001) learning culture or learning capacity (Computer file: learn_cult_capac)

A2.3 Clinical learning

ASSIA 1987-96 clinical + learning + quality 22 refs
Medline (Pubmed) 1981-97 Clinical learning /education+ audit 8 refs selected
Medline (Pubmed) 1981-97 education 70 refs selected
Biomed best evidence learning (28/7/00) 34 refs (Computer file)
BIDS ISI Soc sci 1981-1997 Clinical education 18 refs
BIDS Embase 1981-97 Clinical education and practice guidelines 45 refs
BIDS ISI Sci 1981-1997 clinical education 53 refs
BIDS ISI sci 1981-1997 clinical learning 14 refs
BIDS ISI soc sci 1981-97 clinical learning 15 refs

A2.4 Management learning

Bids isi soc sci 1981 - 97 Management learning/education 32 refs
Bids embase 1981-97 management education 13 refs
Bids ISI SCI 1981-97 Management education 8 refs
ASSIA 1987-96 management + learning 54 refs

Note: Update searches were not relevant for clinical or management learning because the study was now focused on OL and guideline implementation

A3 Methods

A3.1 strengths and weaknesses of routinely collected data as indicators of OL capacity

Data Item	Strength
Planned procedures not carried out,[63;194]	Falling levels showed improving organisation, for example better communication with patients, and greater accuracy of diagnosis.
Waiting times[193]	Reductions in these could have been the result of an active effort by the hospital.
Day surgery cases[197]	Increases in these could have shown the hospital was learning to put the national policy to increase day surgery into effect.
Bed usage/occupancy rate[198]	Increases could have shown increasing organisational efficiency.
Complaints[198;196]	Falling complaints could have shown increasing patient satisfaction. It was reasonable to assume that successful organisational learning could lead to higher patient satisfaction.
Wound infection rates	Falls in wound infection rates could have shown better hospital hygiene generally.
Readmission rates	Falls in these may have shown improving clinical outcome, which may have been the result of a learning process.

Table A3.1.1 Data items – strengths as learning indicators

Data Item	Weakness
PROCESS	
Reduction in planned procedures not done	Could have indicated decreasing sensitivity to the condition of the patient at the time of admission.
Waiting time reduction	Could have been result of a single consultant's new policy. An indicator of increased productivity rather than learning.
Increasing day surgery rate	Could have been strongly affected by the individual policy of a single consultant.
Increasing bed usage rate	Did not guarantee clinical learning or effectiveness. The beds could have been fully used, while patients still received inappropriate care.
OUTCOME	
Increasing complaints	Could have merely shown good systems for gathering and recording complaints.
Decreased wound infection rate	Depended on good professional technique more than an organisational learning process. Applied in surgery only.
Decreased readmission rate	May have been determined by casemix and bed availability as much as clinical need. Also changing GP referral patterns.

Table A3.1.2 hospital selection indicators – reasons for rejection as independent indicators of learning capacity.

A3.2 SIGN classification of evidence levels

Ia Evidence obtained from meta-analysis of randomised controlled trials
Ib Evidence obtained from at least 1 randomised controlled trial
IIa Evidence obtained from at least 1 well-designed controlled study without randomisation
IIb Evidence obtained from at least one other type of well designed quasi-experimental study
III Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies
IV Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities

A3.2.1 Classification of grades of recommendations

A Requires at least one randomised controlled trial as part of a body of literature of overall good quality and consistency addressing specific recommendation
(Evidence levels Ia, Ib)

B Requires the availability of well conducted clinical studies but no randomised clinical trials on the topic of recommendation
(evidence levels IIa, IIb, III)

C Requires evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities. Indicates an absence of directly applicable clinical studies of good quality.
(Evidence level IV)[368]

A3.2.2 Organisational and clinical complexity of SIGN guidelines – results of selection process

	Implementation	Development – group members				
Guideline Number.	Groups recommended.	Med. Spec.	Prof'ns	Care types	Pat rep	**Total (Complexity)**
2 (DVT)	4	9	2	2	0	**17**
4 (Diabetes)	4	3	2	2	0	**11**
9 (Diabetes)	4	3	2	2	0	**11**
11 (Diabetes)	.	3	3	2	0	**8**
12 (Diabetes)	4	4	2	2	0	**12**
19 (Diabetes)	4	1	3	1	0	**9**
Means (all 17 guidelines)	3.81	4.12	3.00	1.76	0.12	**12.59**
SD (all 17)	0.54	2.39	1.87	0.66	0.33	**3.54**
95% CI (all 17)	3.55-4.07	2.98-5.26	2.11-3.89	1.45-2.07	-0.4-0.28	**10.91-14.27**

Table A3.2.1 Organisational complexity indices for DVT prophylaxis and Diabetes pilot SIGN guidelines

GL. No.	"A" Grade recommendations
2 (DVT)	30
4 (Diabetes)	1
9 (Diabetes)	1
11 (Diabetes)	6
12 (Diabetes)	2
19 (Diabetes)	4
Mean (all 21 guidelines)	5.67
SD (all 21)	6.78
95% CI (all 21)	2.76- 8.58

Table A3.2.2 Clinical complexity indices for DVT prophylaxis and Diabetes SIGN guidelines

A3.3 Results of search for measurement scales

Database (all through Athens service, carried out 26-28 July 2000)	Years searched	Search strategy ref. *	Number found	Number with possible relevant measurement scales	Refer-ences for scales
Ovid Medline	1966-2000 search date 27/07/00	1	21	3	14;164;427
	1966-2000	2	46	0	
Bids Embase	1980-2000	1	40	1	164
	1980-2000	2	72	0	
Bids CINAHL	1982-2000	1	20	1	427
		2	16	0	
Bids IBSS		1	0	0	
		2	5	0	
	1980-2000	Organis(z)ational learning, Learning Organis(z)ation	123	0	
Web of Science (SCI and SOC SCI)	1981-2000	2	139	1	186
Web of science (SCI and SOC SCI)	1981-2000	1	44	3	14;164;234
ISTP	1990-2000	2	78	0	
		1	3	0	

Table A3.3 Results of search for relevant scales
*Note 1 = "Measurement scale" and (quality or learning or culture)
2 = "Learning capacity" or "Learning culture"

A3.4 reasons for rejection of other learning capacity measures

Method	Reason for rejection
Nominal group process. Statements made about learning in the organisation could have been ranked on how favourable they were.	The nominal group process did not give direct quantitative comparability between groups. There were difficulties in organising time for health professionals to do this.
Repertory grid techniques could have been used to elicit and compare personal constructs about organisational learning.[219] in 344	This was not appropriate, as a quantitative measure was required. Qualitative comparison between cases was carried out through the interviews.
Discourse analysis. Argyris[6] used a type of discourse analysis in his analysis of the said and the unsaid in work conversations. This revealed skilled defensive strategies, which prevented learning from taking place.	The problem in a busy hospital was that it was time consuming for participants. Its concentration on detail made it unsuitable, as an overview of the organisational learning process was required.[329 in 344]

Table A3.4 reasons for rejection of other learning capacity measures

A3.5 Types of scale – strengths and weaknesses

Scales were classified into two types – those asking the respondent for a direct assessment of the strength of their views and those measuring them indirectly. The merits and demerits for use in my study are summarised in tables A3.5.1 and A3.5.2.

A3.5.1 Direct estimation methods

Scale type	Strengths	Weaknesses
Categorical scale - two or more choices for respondents.[115]	If the issue was black and white, and factual, this was the best approach.	Categories restricted respondents. Dichotomous variables did not allow expression within a range. Respondents may think the categories were ordered.
Adjectival scale - used adjectives which referred to a range of points along some continuum.[115]	Less restricting than a categorical scale. Analysis with rankings allowed significance testing.	Intervals may have differed for respondents if adjectives were interpreted differently.
Likert scale – can overcome the problem unequal intervals to an extent, by standardising the adjectives to the strength	Summed to produce a scale total. Item scores showed strength of agreement /disagreement with	Likert scales might have confused different dimensions of an attitude in the same total score. Pattern of responses as well as the total score was needed.

Scale type	Strengths	Weaknesses
of agreement or disagreement with a statement. Used to measure strength of belief or attitude.[241;344]	individual scale items. Reliably ordered people about a particular attitude. Respondents preferred to express a degree of agreement or disagreement	Questions had to be phrased about extremes of an attitude because: moderate statements did not encourage strong responses, agreement/ disagreement with a moderate statement had two meanings - the respondent had a stronger or a weaker attitude. Social desirability bias, as intentions were usually obvious. The midpoint on the scale was not necessarily the midpoint between two extreme scale scores.
Visual analogue scale[115]	As for the Likert scale but addressed the problem of unequal intervals by allowing respondents to mark their response along a line.	As for the Likert scale with the exception of the ability to deal with unequal intervals
Semantic differential scale - a development of the visual analogue scale using multiple linear scales. Coded by measuring along the lines.[304;344]	A useful tool in finding out what a concept means to a respondent.	Not useful for finding the strength of the respondent's belief in a concept.

Table A3.5.1 Strengths and weaknesses of direct estimation scales

A3.5.2 Indirect comparative methods

These did not use direct estimation, (as did the preceding methods) but asked respondents to choose between two options. This avoided the problems of ordinal bias, where there was a tendency on the part of respondents to choose values they thought were higher, and social desirability bias, where respondents tended to choose responses they thought were expected, putting them personally in a good light.

Scale type	Strength	Weakness
Guttman scale - Developed a unidimensional scale by collecting a large number of statements and testing them on a standardisation group. The respondents had to agree	The unidimensional assessment gave firmer ground for interpretation and statistical analysis	This type of scale was unsuited to measuring multidimensional phenomena. The number of items agreed to was not foolproof as an

Scale type	Strength	Weakness
or disagree. The cumulative order of the statements was worked out. Statements with a consistent order in relation to each other were retained in the scale. The measure of the strength of the attitude was then usually the number of items accepted or agreed to.[163;344]	than multidimensional scales.	attitude measure. The same number of items from 2 respondents could be differently composed
Thurstone scale - a large number of judges was used to sort a large number of statements from least to most desirable. The median rank of each statement was its scale value. About 25 statements were selected from the pool as representing equal intervals along the scale. These statements became a yes/no scale.[344;406].	Not obvious to respondents which answers would give a high score, so less open to social desirability bias than the Likert scale. Equal intervals.	Particularly sensitive to the attitudes of the judges used in its development. These were possibly different from those of the research population
Q-Sorts –Used to rank individuals on a range of concepts using picture cards[386in344]	Less subject to biases caused by differing interpretations.	Analysis was complex for large numbers. Difficult to draw abstractions. The pictures limited the responses (see adjectival scales above).
Sociometric scales –Used to describe relationships in a group. Members of a group made choices among other members of the group (e.g. who they liked).[72in344]	Straightforward for describing small networks. Results could be displayed as sociograms.	Not appropriate for gathering opinions about organisational culture and behaviour. Complex in large organisations.

Table A3.5.2 Strengths and weaknesses of comparative methods scales

A3.6 Participation request letters

The requests for participation in the main study all carried the Glasgow

University Letterhead and the Department of Public Health address.

A3.7 Participation request letter used for pilot

Dear,

I would like to ask for your help in a research pilot on learning from the implementation of clinical guidelines.

The background issue to the study is whether, in the rapidly changing world of healthcare, the ability to learn or a quality control system using fixed parameters is likely to be the more successful.

The purpose of the pilot is to test the interview schedule, to decide which of two survey questionnaires to use, and how to amend the one chosen for the health service.

The main project will take place in another trust. Its aim will be to illuminate whether and how the learning culture of the organisation and teams in which guidelines are implemented has any effect on the success of the implementation. This will be measured by coding the variety, type and scope of changes reported.

The pilot would involve a 30-40 minute interview pilot asking about your experience of the SIGN guidelines for Diabetes (all or any), and/or prevention of Deep Venous Thrombosis. I would also like you to complete and comment on the enclosed pilot questionnaires.

I hope you will be able to see me.

Yours etc.,

Andrew Millard
Research Fellow
Scottish Clinical Audit Resource Centre.

A3.8 Project Summary enclosed with requests for participation in main study

What are the effects of hospital learning capacity on the implementation of SIGN clinical guidelines for Diabetes and Prophylaxis for DVT?

Aim
The aim is to test whether there are differences in the methods used for the dissemination, implementation and audit of clinical guidelines in two acute hospitals with different organisational learning capacity.

Objectives
1. Compare guideline implementation, dissemination and audit in the hospitals selected.

2. Classify and compare the guidelines - related changes in the two hospitals

3. Compare the learning capacity of the two hospitals.

Scientific background of study
The concept of organisational learning has existed for over 10 years, but has come to the fore since more high profile and prescriptive change methodologies such as Total Quality Management (TQM) and Business Process Re-engineering (BPR) have failed to deliver.

The health service has yet to explicitly apply the concept. We see many of its features in the emphasis placed by clinical governance on lifelong learning and organisational development.

Methodology
The two hospitals for the main study will be chosen on the basis of their likely ability to detect and correct error (learn), using well accepted routinely gathered data from SMR1 statistics. The hospitals selected will be further tested by administration of the survey and interviews.

Pre-piloted, semi-structured interviews will aim to find out how SIGN guidelines have been implemented and to what effect. Examples focused on, but not limited, to Diabetes and the prevention of Deep Venous Thrombosis will be sought.

The learning capacity of each organisation will be measured using validated questionnaires. They will be given to the individuals interviewed, and to a random sample of trust staff.

The size of the survey sample of health professionals and clinical managers is c100 in each trust to give confidence intervals of +/-7% (p=0.05) (for a fifty/fifty split on a binomial variable). The number of interviews (c100 in total) will allow confidence of +/- 10% for statistical analyses (same conditions). The interview data is mainly for qualitative use in discovering new variations and patterns in learning processes, rather than for quantitative comparisons.

Analysis will show whether the guidelines are implemented and audited in different ways or to different effect (triggering qualitatively different changes) in the different hospitals.

Principal inclusion/exclusion criteria.

Exclusion: Trainees or new staff less than 10 weeks in post.
Inclusion: Nurses/midwives D grade and above, Medical staff, all levels.

A3.9 Participation request for main study (version 1)

Date

Dear Colleague,

I would be grateful for your participation in a research study looking at the wider effects of clinical guidelines ion the hospital. The project has been approved by the trust research committee and endorsed by the Medical and Nursing Directors. It is for a PhD at Glasgow University. A summary is overleaf.

I wish to contact those involved in any way with providing prophylaxis for DVT or with treating diabetes. The project may affect support given to guideline implementation in the future. Participation is of course voluntary. If you are willing to participate, you will be asked to complete two short surveys taking about 15 minutes in total, and perhaps also to do an interview lasting not more than 30 minutes.

Please complete and return the reply slip to the Personnel department at [Hospital] address below to indicate whether you would be willing to help.

Yours sincerely,

Andrew Millard

To: Andrew Millard, c/o Personnel Department, [Hospital].

DVT Prophylaxis/Diabetes guidelines study

Name:_____Date_____

I am willing to participate in the research Yes/ No (Please circle response applying)

Telephone _____ Post title _____

Ward number _____ Diabetes / DVT (Please circle your preferred topic to focus on)

A3.9.1 Reply to acceptance of participation request version 1

Date

Dear

Thank you for agreeing to take part in my PhD research, your help is greatly appreciated. I enclose the survey, please complete all three sections before the interview if possible, and I will collect it when we meet. Some further information is enclosed. I got your name by random selection from the list of trust staff. All information you give me will be treated confidentially.

Yours sincerely,

Andrew Millard

A3.10 Request for participation in main study (version 2)

SIGN Guidelines implementation study

Date :

Dear Colleague,

I would be grateful for your participation in a research study looking at the wider effects of clinical guidelines in the hospital. Your name was randomly selected from the list of trust staff. The project has been approved by the trust research committee. It is for a PhD at Glasgow University, where I was until recently a research fellow. The information is confidential. A summary is overleaf.

If you are willing to participate, please complete the enclosed short surveys taking about 10 minutes in total. It is not necessary to have implemented any guidelines to complete the surveys. If you would rather not participate, it would help greatly if you would briefly say why.

I would like to interview those involved in any way with providing prophylaxis for DVT or with treating diabetes. Additional experience in the implementation of other SIGN guidelines is also relevant. The project may affect the support given to guideline implementation in the future. Participation is of course voluntary. If you would be willing to be interviewed on audio-tape (lasting not more than 30 minutes), please tick the appropriate box. I will then arrange a time and place with you for the interview. If you would rather not be interviewed, it would be of great help if you would briefly say why.

Please complete and return the reply slip and completed surveys using the internal mail and the return envelope enclosed. It should be sent to the Personnel department at [hospital] (address below). Thank you,

Yours sincerely,

Andrew Millard

To: Andrew Millard, c/o Personnel Department, Queens Park House, Victoria Infirmary.

Guidelines implementation study

Name:_____Date_____

Telephone _____ Post title _____Ward number _____

I enclose completed surveys. Yes No

If no, a reason will help the analysis_____

I am willing to be interviewed. Yes No

If no a reason will help the analysis _____

Diabetes DVT (Please tick preferred focus)

Note : There was no written reply to participation request version 2, as there was no need to send surveys, they were send with the request.

A3.11 Participation request letter reminder to junior nurses and doctors in Hospital 2

(Seniors reminded by telephone)

SIGN Guidelines implementation

Date :

Dear

I would like to ask for your help in my PhD research which is being conducted through the department of Public Health at the University of Glasgow. I am looking at the influence of hospital culture on the implementation of SIGN clinical guidelines. The study focuses on but is not limited to DVT prophylaxis or diabetes. Names were randomly selected and confidentiality will be kept.

The surveys enclosed measure organisation culture. They take 10 to 15 minutes. They do not assume any experience of implementing or using SIGN guidelines. Please complete and return in the addressed envelope. The implementation of the guidelines is researched through a taped structured interview, lasting approximately 30 minutes.

Please return the reply slip below even if you do not participate.

Thank you for your help,

Andrew Millard.

To Andrew Millard, c/o Personnel Department (Hospital name)

Guidelines implementation study

Name_____ Date_____

Telephone _____ Post title _____ Ward Number _____

I enclose completed surveys Yes No

If no, please give the reason _____

I am willing to be interviewed Yes No

If no, please give the reason _____

Please tick preferred focus : Diabetes DVT Prophylaxis

A4 Pilot

A4.1 Initial interview schedule

Introduction

I'd like to talk with you about SIGN clinical guidelines and whether they help you as an individual, your work team, and ultimately the hospital, to learn and develop.

General issues on guidelines
Previous involvement with guidelines
Your attitudes to guidelines
Change and guidelines

Your specific involvement with this guideline
Dissemination, implementation, audit, and the effect the guideline has had on your team

Interview areas

First, I'd like to ask some questions about guidelines generally and then move on to the specific guideline
1General issues on guidelines - all respondents
I'd like to ask you first about any previous experience of clinical guidelines you may have had
1 What purposes do you think clinical guidelines are used for by others?
2 What do you see as constraints on the effectiveness of guidelines?
3 How does your use of guidelines relate to the uses others put them to?
4 Can you discuss briefly how you feel about guidelines?
5 What are your general opinions on guidelines -
prompts: importance, effectiveness, wider purpose, practical issues
6 What does implementation of a guideline mean to you?
7 What does a quality improvement project in a hospital mean to you?
2 Extent of previous involvement (all respondents)
1 Based on your experience of them, how successful do you feel guidelines are in improving healthcare?
Very successful Fairly successful Don't know Not very successful Not at all successful
Probe: Why? _____
2 Have you been involved in implementation of any other SIGN guidelines before the DVT/Diabetes one? Yes No Don't Know
3 Can you estimate the number? 1 2 3-5 6-10 >10
4 How many guidelines have you been involved with in the last 6 months?
3 Attitudes to guidelines (all respondents)

1 How worthwhile is to implement guidelines in your view? (Do you think it is worth the effort?)

Very worthwhile	Fairly worthwhile	Don't know	Not very worthwhile	Not at all worthwhile

Probe: Why?

4 Change and guidelines (clinicians, service managers)

1 What can encourage you to implement any changes caused by guidelines?

2 What can prevent you from implementing changes related to guidelines?

The following questions relate to the SIGN DVT or one of the SIGN Diabetes guidelines only

5 Dissemination (Clinical staff, clinical managers only)

1 Which guideline applied to your practice?

SIGN DVT A SIGN Diabetes guideline

If Diabetes, which one? _____

Which did you apply to your practice?

SIGN DVT A SIGN Diabetes guideline

If Diabetes, which one? _____

Which would you like to answer questions about?

SIGN DVT A SIGN Diabetes guideline

If Diabetes, which one? _____

2 What was done to disseminate the guideline?

Prompts: Uniprofessional meeting, multiprofessional meeting, newsletter, team meetings, mailshot, electronic mail, other.

3 Was the dissemination process typical?

Yes No Don't Know

Prompt : (If it differed) in what way?

4 Would you do anything differently about dissemmination next time?

Yes No Don't Know

Prompt : (If yes), what would it be and why?

6 Implementation (GIG members, audit facilitators, service managers, clinicians)

1 Did you actively implement the guideline - did you do things to make sure you or others complied with its recommendations?

Yes No Don't Know

2 If yes, what did you do?

3 If no, could you discuss why you did not actively implement it?

4 If a local version/protocol was developed, could you discuss how satisfactory it was from your point of view?

5 Was anything else done to implement the guideline?

7 Audit

1 Was your practice audited in relation to the guideline?

Yes No Don't Know

2. Could you discuss briefly how you felt about this?

3 What were the aims of the audit?

4 How successful was the audit?

Very successful	Fairly successful	Don't know	Not very successful	Not at all successful

5 Probe: Why? _____

6 How worthwhile did you think the audit? (Did you think it was worth the effort?)

Very worthwhile	Fairly worthwhile	Don't know	Not very worthwhile	Not at all worthwhile

7 Probe Why?

8 Did anyone provide input for the audit without being part of it (eg were not in the audit, but provided advice or help?

Yes No Don't Know

9 If so, what did you find useful and/or not useful about the help?

10 Were you in the group conducting the audit?

Yes No Don't Know

11 What were the good and bad things about being in the group/not being in the group?

12 What use did you make of the audit results?

8 Audit results (GIG members, audit facilitators, service managers, clinicians)

1 What came out of the baseline audit for you?

2. and the audit after implementation?

3. If there was a change to your practice as a result of the guideline, can you describe the most important change, and how it was implemented?

4 What encouraged you to make the change?

5 Can you estimate roughly how many of your patients are affected by the change (<1, <10, <20<30<40<50<100).

6 Can you estimate roughly what proportion of your caseload this would form

7 Age range of the patients affected All, 0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80-89, 90-99.

8 What was the significance of this change for patients?
Prompts: Life or death, increased survival time, increased quality of life, lowered morbidity)

9 Can you describe any other findings from the audit?

10 Were the findings of the audit communicated to anyone outside the clinical team?
Yes No Don't Know
11 If yes to whom?

12 With what purpose?

13 Did the audit results lead any change involving anyone outside the clinical team?

Yes No Don't Know

14 If yes what were the changes?

I'd like to ask you more about the effect of the guideline in your team.

9 Team Learning

1 What effect do you think the guideline has had on the way of working in your clinical/management/audit team?

2 Can you comment on the way audit results are shared by the team?

3 Do you communicate more with other members of your team as a result of the guideline?
Yes No Don't Know
4 Prompts Within the team?
5 Between the team and other levels of the organisation?
6 Between the team and other teams?

7 Did you learn anything about the practice of other members of your team from auditing the guideline?
Yes No Don't Know

8 Have you found that improved dialogue led to any new ways of working?
Yes No Don't Know

9 If so, what was the change?

10 Has the guideline changed the way you work with the rest of your team?
Yes No Don't Know
11 If so how?

12 Do feel that you need to learn anything more about any aspect of your practice or your organisation, to be a more effective (professional)?
Yes No Don't Know
13 If yes what is it you need to learn?
Has the guideline helped you to recognise this?
14 Does your team need to learn anything to be a more effective team?
Yes No Don't Know
15 If yes, what is it?
Has the guideline helped you to recognise this?
16 Does your organisation need to change in any way to provide a more effective health service to the local population?
Yes No Don't Know
17 If so how?
Has the guideline helped you to recognise this?

18 Do you think there have been any changes in the ways clinicians and managers work together as a result of the guideline?

A4.2 The ordered pilot coding frame

The responses to the initial interview schedule were put into categories for each question. The categories were then put into logical groups as shown in the following table

Code	Description	Code	Description
1	Information, involvement and control	5	Control over information use
1.1	Consultation and dialogue		
1.2	Void		
1.3	Checking involvement	6	Clinical audit
1.4	Theory/practice gap		
1.5	Providing information	7	Time
1.6	Requesting action		
1.7	Expressed need for more information	8	Limitations of information
1.8	Inform/involve (one way)	8.7	Reduction of limitation
1.9	Inform as reference information.		
1.10	Information overload	9	Equity (Monitoring this is an information use)
2	Quality of information, evidence	10	Generating information
		10.1	Generating information which can justify and trigger local action
3	Motivation to use information	10.2	Using local information generated by others
3.1	Information on how to motivate	10.2.1	Creating new activity
		10.3	Creating new activity using locally generated information
4	Using information	10.4	Help in generating information
4.1	Uses threatening to staff	10.7	Information needs
4.2	Uses supportive to staff		
4.2.1	Methods of using information supportively	11	Team uses of information
4.3	Information for patients' use	11.1	holistic understanding
4.4	Closed information system. Team complacency – closed to new information inputs		
4.7	Specific information need		

Table A4.2 The ordered pilot coding frame

A4.3 Old and new questions / coding table

The questions from the initial interview schedule were revised to remove those unnecessary and keep those relevant to the coding frame developed from the pilot. The following table makes explicit the links between the codes and the initial and revised interview schedules buy giving the question number in each, a description of the coded item and a comment on how the item coded related to the code.

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
1.1	7.1	4.1	Although audit and implementation were said to be done a number of staff were not sure if their work had been included.	Shows involvement and control in audit are low. Instead of asking whether their practice was audited, ask respondents to describe the most important change to their practice, and whether the findings were fed back to them individually or as part of a group	1
1.10	1.2	7.3	Information overload	To reduce information overload and target the information effort more efficiently, the right information needs to be available to the right person at the right time. What information, when and to whom? How do we decide these issues?	2
1.1 1.1	6, 3.1, 9.16 5.4 1.5 1.6	3.2 - 6.3(a) - 7.6(a) 7.7	Involvement consultation Wide involvement needed for effectiveness Awareness + putting into practice = implementation	Wide involvement in deciding the local protocol = involvement in constructing part of an information system, (because the audit indicators recommended in a local protocol are items of control information). What is there to learn from information system design theory? Theories about the connection between theory and practice, and social creation of the self, which has intentionality and can act underlie this item	3 4
1.1	2.1	-	The more attention and familiarity with guidelines, the more successful they are.	This view was expressed by a nurse. Familiarity probably means familiarity in a group setting, where discussion and the opportunity to give ones own views and receive those of others have taken place. A setting is perhaps a factor in familiarity and ownership. Drawing out the implications of the theory for the local setting has to be done socially, not just because everyone then will be involved, but because an a team application is best thought through as a team.	5
2	4.2, 4.1(*2)	-	Evidence, evidence strength	This was cited as an encouraging factor for implementation. The information has more meaning apparently because it has been agreed by a wider group on the basis of wider and more systematic experience in a variety of settings. Thus it is thought to be on the whole preferable to put it into practice in the local situation than to go by the local experience of individual clinicians. This runs the risk of replacing reasoned local cases with	6

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
				"evidence-based" dogma which is not applicable locally.	
3	4.2, 5.2	- 2.2(a)	Inertia, prejudice, lack of evidence	These motivational factors imply that there is not enough external challenge to local consensus	7
4.1	1.2,(*2)	7.3	Defensiveness – fear of	When asked about himself, the respondent answered for "us". "You" taken	8
	9.3, 9.5	- 6.1	deviation	as plural. This is interesting because it indicates the strength of	
			Loss of flexibility	identification with the professional group/work team.	
	4.2	-			
			Nurse practitioners have more	There is a tension between wanting more flexibility - rules for the creation of	
	1.3	7.4(a)	flexibility	rules - rather than rules themselves - and wanting the protection of following	
	1.4	-	Litigation	substantive recommendations.	
			Risk management		
	1.6	7.7	- managers' responsibility	Qualitative evidence can be created and applied locally better than	
	4.1	-	fear of criticism/legal liability as encouragement to implement	nationally or internationally. If the use of these methodologies were strengthened in local settings, qualitative research could be the means for	
	4.2	-	insurance policy	generating rules governing the application of the quantitative evidence about causality	
5	3.1	-	Clinical freedom	Comments as above	9
1.1			variety of practice		
			new activity developing		
	1.2	7.3	uncritical compliance		
6	6.2	3.2	Patient review on admission	Information used to control the health care process - clinical audit. Patient review is carried out as a team, nurses physios, decision by MO. An issue is the role of individual feedback in team-informed decisions. Should it be to the individual, and to the full multidisciplinary team (who may then get information about multiple members of the same profession), only to the members of the same profession on the team, only to the individual and the leader of the full team, or to the individual and his or her professional line manager on the team or outside it	10
4.2	9.1,1.6	- 7.7	Multidisciplinary consensus	A supportive use of information is consensus building. If the information is created together this equates to learning together, a good way of building consensus.	11
4.2	9.7, 9.1	6.1 -	Discussion, team decisions	Confidence to challenge care decisions or to raise concerns in the interests of the patients, and the skills to do it non-confrontationally, may be boosted if a team member is able to cite external evidence in the form of an agreed	12

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
				guideline, and is accepted/respected having built good relationships in the team.	
4.2.1	9.8	-	Special Interest Group	One way of creating qualitative evidence and consensus locally	13
4.2.1	9.18	6.2	Core team/ bigger team for bids “Clout” for bids.	Guidelines based evidence can be used supportively in bids for resources. But this has to be put in a setting of local priorities and capacities	14
	(*2),3.1, 1.1	- 7.1			
4.2	1.1	7.1	Clinical purposes	This is the view that guidelines say what should be done	15
	1.1*2	7.1	Promote best practice		
	1.1, 3.1	7.1	Improve patient care		
	1.1	7.1	Follow best practice		
8	1.2, 1.1	7.3 7.1	No reference to resource needs weakens guidelines – for extra care,	Resource needs refers to local constraints and local settings, and thus is a qualitative rather than a quantitative issue.	16
	4.2, 1.2 (*3),	- 7.3 7.3	for implementation	Information is limited when it is not wholistic - it is less easy to apply locally if it does not include an idea of resources needed to implement.	
7	1.2, 9.7	6.1	more time needed for co-ordination of clinic – **administration**		
1.2	1.2,*2	7.3	lack of time	Time is the problem - give the job to someone else and you lose the ownership, give the time and you increase the cost. One solution is to redefine the health care jobs and embed information creation and use in the culture. Also need to redefine nature of local knowledge - what justification is required for statements about own or team practice.	
4.4	1.4	-	getting agreement to follow		
	1.2	7.3	- argue have always done it		
7	9.8	-	time <u>saved</u> (change)	Another wider perspective on the time issue. National development saves time developing them locally	17
	1.4	-	- and in national rather than local development		
0	1.3	7.4(a)	A strange question	Phrasing not understood - other professionals practice not a concern?	18
1.3	1.6	7.7	Checking Awareness	Checking that staff were aware of guidelines was seen as a method of implementation. No involvement and control.	19
1.1	2.1	-	Distance	The theme of remote theory and distant experts not relevant to real local practice. Suggestion of funded pilots: funding seems to signify serious intention, real action rather than unreal passive accident. Also overtones of	20
1.4			Theory		
	2.1	-	Experts		

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
	2.1	-	Like to see funded concrete pilot implementations	official recognition and legitimacy, perhaps a critical assessment to quality assure the pilot. But could be a gold standard for implementation. Unfunded pilots might be more realistic.	
9	3.1, 4.1, 1.5	- - 7.6(a)	Equity of care	Encouraging equity by setting an across the board standard was a use for information seemingly accepted. There was no criticism of equity as a principle	21
1.5	5.2 (*2)	2.2(a)	Postal dissemination	Dissemination methods seemed underdeveloped. The nature of dissemination and its distinction from implementation was not always clearly understood.	22
	5.2		Mention to colleague		
	5.2		No hospital-wide discussion		
	5.2		Departmental implementation only		
	5.2		circulation of draft		
	5.2		multi disc meetings		
1.4	6.1	3.2(a)	Needs to be active response to local problem	Implementation as active with a specific intention to address a local issue.	23
	4.1	-	Triggered by problem		
10	7.1	4.1(a)	Audit seen as work	If audit is seen as work, the issue is then how can it be seen as good work?	24
1.5	9.16	-	Better IT	A need to allow better provision of information. The organisational focus is changed to a focus on the learning team or directorate.	25
3	1.1	7.1(a)	Imposition	Change seen as preventing the clinician doing what they do	26
1.4	1.1,1.5	7.1(a)	Theory vs practice	This gave an interesting perspective on the issues in mapping a pure system on to the messy real world, for example in co-morbidity which condition do you choose to treat and how do you make the choice? Criteria could be the seriousness of each problem for the patient, the effectiveness of the combinations of intervention that you can use together - how can clinical judgement be supported?	27
	1.2	7.3	Complexity of real life not dealt with in guidelines		
3	1.5	-	Effective because mandatory	What does mandatory mean when implementation can be messy?	28
1.1, 7,	1.6	7.7	No time for discussion to make local	Time as above	29
1.4, 10	1.6	7.7	Communication of objectives	Not agreement of objectives (Nursing)	
8 10	2.1	-	Initial success, then unstuck on fine detail or resource needs	This is the reason why local adaptation is needed - so the fine detail/resource constraints do not make guidelines fail	30

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
0, 1.4	4.2	-	Inappropriateness to local circs	Need to adapt information (criteria, standards) to local circumstances. There is a need for information on local circumstances to do this.	31
1.1	5.4	-	Ideally involve people affected	Need to involve/inform people who may have to change their practice in local protocol development	32
10	6.4	-	Focused attention on clinical topic	Helped a group to stand apart from a topic and look at it anew	33
4.2	9.1	6.1(a)	teamwork	Better teamwork, better arranging of cover when colleagues off work and agreement of a common approach were seen as benefits by nurses. The new question is less leading.	34
	1.5, 9.1, 9.6	- 6.1(a) -	cover		
	9.1	6.1(a)	agree approach		
4.2	9.2	-	Sharing = discussion CD takes steps if gross	Sharing of results was seen as discussion at directorate meetings. The only action was seen as control action by the clinical director - no mention of whether downward to address problems of negligence/incompetence or up for more resources, or involving group in agreeing more efficient working practices	35
11	9.3	--	Reluctant to attribute causes for behaviour of team	Factors affecting team performance are not researchable at local level. Possible reasons: 1. Not enough numbers - and no qualitative methods 2. Too dangerously personal	36
11	9.3	-	Team is more cautious	Team requires stronger evidence for action than an individual would?	37
4.1	9.5	-	Practice review committee would be unpleasant	Again, dangerously personal if in house. The external peer review idea of managed clinical networks seems an appropriate way of lessening the danger of the personal element.	38
4.1	9.8	6.2	Interprofessional rivalry - extend clinical specialty power base	Evidence and power locally. Will the strongest evidence always be the deciding factor in choosing alternative clinical practices?	39
4.2	9.15	-	Minor improvements	These were approved of	40
4.1	9.16	6.3	Friction if snr management have to impose gls	If quality improvement among each other is too risky for local clinicians, they fear that trust management will take punitive and insensitive action - again external peer review is a solution. What information will the external peers need?.	41
4.2	1.1, 1.4	7.1(a) -	Decision support	Decision support seen as a helpful use of guidelines especially by nurses	42
4.2 (all)	1.2	7.3	More rigid working to gls as part		43

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
			of role	Nurses emphasised consistency as a benefit and one accepted that nurses	
	1.3, 1.4 (*4) 3.1 9.6, 9.1	7.4(a) - - - 6.2(a)	consistency – e.g. consultants policies to Jds, (beneficial to pts)	would work more rigidly to guidelines than doctors	
	9.15	-	clinical techniques	How beneficial to patients is consistency really? What about validity - applicability?	
	1.5 9.8	- 6.2(a)	continuity	Agreement on processes may be more important than agreement on aims for day to day working	
	1.4,	-	setting boundaries		
	1.4	-	support actions against challenge by other HPs	setting boundaries is a conceptual modelling process information creates the models and is then created by them in their own image. Supporting actions against challenge is the beginning of the security needed for productive dialogue, which can further develop conceptual models.	
	1.3	7.4(a)	active vs passive use – suggesting things to do (consultant role)	Some roles have specific information functions - consultants role is currently seen as to recommend changes/ new activities (presumably out of comparison of an implicit model and real situation. Guidelines present models of care shorn of local constraints and should inject new vigour into the local modellers thinking. By making a common generic model available more widely, they would encourage others to participate in the modelling process.	
1.1	1.6	7.7	Implementation = selling	Selling was seen as implementation - not the most collaborative model, but shows there is a need for development of more sophisticated and widely shared models in this area	44
10	1.7	7.8	QI as betterment of how's rather than changing what's	Echoes the idea that research is about finding new facts, while audit is about improving current practice	45
4.2	2.1	-	Success = more consistent treatment, better outcomes	Reliability and validity	46
3	3.1	-	Worthwhile because better for patients	Professional motivation is to do a good job, and to improve and develop professional skills. Need for information to confirm whether practice is being done well is therefore a professional information need, and essential to the notion of professionalism.	47
	4.1	-	Encouraged because better for patients -		
	4.1	-	good feedback from patients, nurses, courses	The encouraging/preventing factors will now come out of the analysis, and not direct questions.	
1.1	4.1, 5.4	- -	consulted re protocol =	Consulting all professions and staff about audit protocols involves them in	48

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
			committment to implement results of audit	an essential professional activity where they participate in the process of developing their own profession, and their own personal professionalism	
4.1, 3, 8	6.1, 5.2 6.1	3.2(a) 2.2(a) 3.2(a)	adoption as policy - staff told to do it	This implementation by dictat is anti-professional (and anti learning organisation)	49
4.2	9.1	6.2	streamlining care	Need to be careful streamlining does not become conveyor belt because professionals then become bored and deprofessionalised, and patients dehumanised. This is a danger with conventional information systems - they are standardised to particular fields, codes and often interpretations, and may conceivably make professionals narrower and less able to fully respond to the rich variety of unique individuals they meet as their patients.	50
4.2	9.3	6.2	more discussion, flexibility, can raise patient problems in team	Again, having evidence-based information to support them can give individuals confidence to join in with local dialogue about individual patients.	51
	9.11	6.2	baseline to raise questions		
	9.5	6.2	team contains whole clinical hierarchy	That the clinical team is conceived as including the full clinical hierarchy from top to bottom must be remembered - all those in it have operational roles - there is no one with a strategic planning role only. So all must be familiar with operational problems, especially with operational information, and hence perhaps the reluctance of consultants to plan using this information. In few other organisations are the senior policy makers also hands on workers	
	9.10	6.2	read more guidelines, have them available		
	9.15	6.2	Learning is by nature continuous - e.g. working at relationships	The continuous and developmental nature of learning, means foundations need to be there before other constructs can be put in place. In a local setting in a local organisation this can mean many things - a good and self sustainingly positive culture informed by wider societal and professional values for example.	52
holism 11	9.17	6.3	Change currently planned will be detrimental “stupid” – fragmentation owing to 2 trusts in same hospital.	It is perhaps difficult for the individual organisations in the NHS to build positive values when the NHS keeps reorganising, but on the other hand this may help to prevent negative self-serving cultures.	53
1.1	2.1	-	Adherence to GL important for success	Deprofessionalisation	54
1.1	5.4	-	Increase accessibility of GLs to	Information delivery needs improving	55

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
			P/t staff		
4.2 4.4	6.1	-	Perception that they were doing it anyway	Cultural/educational issues - in an information culture knowledge is based on data	56
4.3	9.1	6.2	More explaining to the patient (ECGs, for diabetics in annual review)	Implications for information to patients/service users	57
4.4	9.3	6.2	Communication problems – with junior doctors/new team members	Team closed to new information from new members	58
3.1	9.13	-	Management skills	Learning needs mentioned were the people management skills	59
4.2	9.18	-	Clinical manager saw herself as a manager		60
4.4	9.16	6.3	Organisation gives excellent service – high level of one stop clinics, low waiting times.	Does not mean the clinical service is good, though the administration may be.	61
10.1	1.3	7.4(a)	Reactive only	Service department - operating theatre in this case - was isolated. Shows need to ensure each departments role and information needs are understood by the other departments when implementing their own guidelines. Implies a need to consult first before assuming a guideline is not relevant to another department.	62
4.2	1.6, 1.7	7.7 7.8	audit	Audit seen as involved with quality improvement and with guideline implementation	63
2	2.1	-	More effective because printed	Printing/publishing adds authority to information - perhaps because assumed to be more widely accepted (print runs are longer than photocopy runs).	64
4.2	3.1	-	Strengthens case for making improvements	Empowerment locally for operational staff	65
	8.4	5.4	gave evidence for case to ambulance service		
8	4.2	-	Lack of resources	This implies a particular activity model implying particular resources. Has the wider issue been defined and alternative solutions examined?	66
1.6	5.2	2.2(a)	Direct request from clinicians	Conceptual modelling and analysis is carried out by clinicians (medical staff) to enable them to make reasoned requests. Nurses for some reason do not do this.	67

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
1.7	5.4	-	Would have commented at sisters meetings	In retrospect, a nurse wanted to comment to her peers. Why didn't she?	68
1.7	6.4	-	No information. isolation	Theatre - an information island	69
1.7	9.7,9.6	6.2 -	Need to improve communication	Greater consistency in information should help the reliability of day to day communication, but may reduce the variety and richness of debate about better solutions to problems - and may prevent perception of opportunities for development	70
4.2	9.11	6.2	Awareness of patient requirements	Greater awareness of what patients might need is a benefit. May improve patient-nurse dialogue	71
4.7	9.12	-	More feedback of results, what's being changed	Local information feedback systems needed	72
4.7	9.17	6.3	Give information about existence of guidelines	Information about information needed	73
8.7	9.17	6.3	Provide the means to implement guidelines	Information on implementation, or resources for implementation?	74
4.2	9.18	-	Correct skill mix	Managers need to understand skill levels required. Implies divergence of view between management for efficiency/cost saving and management for quality of service. Common models of the service and the roles needed to provide it are needed to give more agreement on this. There will always be a tension, but rather manage it through a dialogue than conflict of resource power vs technical (skill) power.	75
4.2	1.3	7.4(a)	Staff adaptation, rather adaptation of working practices to staff (A+E)	Nurses had their own model of a good department, which was a smooth running one with no misunderstandings where each patient was treated consistently. It tends towards Handy's role culture. It implies a standardised information system, and that staff (and perhaps patients) must fit into the structure rather than the other way round. But there must be an ability to cope with exceptions, so there has to be another more open information system and culture, and easy transition from one to the other, for patients as required, and for some staff.	76
1.8	1.6, 5.2	7.7 2.2	training	Implies the transmission of a pre-set model of guideline use, which cannot be added to or adapted	77
10.2	1.7	7.8	QI is more than compliance	A broader perception of quality improvement from a nurse - doing new things, maybe on the same external clinical evidence as before, but managerially innovative about implementation - eg one stop clinics, use of	78

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
				facilities by other professional groups, disease prevention services for population groups rather than reactive treatment for individuals one at a time.	
11	2.1	-	GLs more successful with CG	Clinical governance as the framework for creating consensus models between clinicians and managers to get agreement on what to do and how to do it.	79
10.3	4.1	-	Triggered by complaints	The patient as a prime source of local information driving development - why wait for complaints why not set up suggestion/comment systems - to feed the task culture for all professionals	80
8	4.2	-	My job to solve problems	What is solving problems? What counts as a problem? What as a solution? Do solutions need to be wider?	81
1.8	5.2	2.2	Team brief	Team brief is top down information transmission - for news and information on operational implications of planning decisions, eg new operational procedures	82
1.9	5.2	2.2	folder in each dept.	Information kept separate from daily work	83
1	5.4	2.3	Open sessions to question an expert	A demand for expert interpretation of guidelines exists among nurses	84
10	6.1	3.2(a)	Devised audit form	Guideline triggered local information gathering. Audit information is essentially local case study. To be meaningful and useful in as a base for development, knowledge of other comparative cases is needed. For checking compliance alone this is not required. Comparative cases can be presented through clinical networks. Compliance information is only one part of the data gathered for such case study. Examples of other kinds of information needed are patient vignettes (as ideal types), accounts of ways of conducting dialogue between groups, new models of services, how they were developed, accounts of local constraints and their effect, descriptions of patients' needs and views and how they are addressed.	85
10	6.2	3.2	Adapted GL	Again, generating local information out of the fusion of local data and nationally created evidence	86
4.2	6.2	3.2	Improved records	Example of improvement to local information system	87
4.2	6.2	3.2	Amended standards	Example of improvement to local information system	88
4.2	9.5	5.4 6.2	Freedom to develop clinic organisation	An example of empowerment to a clinical manager to enable her to streamline a clinic	89
4.2	7.2	-	good - triggered local policy	Aim of the audit was to assess compliance but it triggered local policy	90

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
				nevertheless	
4.2, 10	7.3	4.3	assess compliance	Aim of the audit. Perhaps broader aim - to drive local policy - needs wider recognition locally	91
4.2, 10.3	7.5	-	adaptation of practice	Audit seen as successful when caused local practice to be adapted. (This adaptation must be validated by open debate and dialogue though - a good stage (among others) at which to include patients). Individuals involved in the situation cannot be wholly objective about success. A more valid assessment can come from analysing all the responses as a whole.	92
10.4	7.9	-	keep it simple	Most useful advice received about audit methodology was to keep it simple. This has implications for information systems.	93
7	7.11	4.8	time for extra paper work	Need to reconceive healthcare as essentially an information processing activity.	94
4.2	8.4	-	- realised better paperwork improved patient care achievement as a group		
10	7.12	-	for reaudit	Use of audit information for reaudit seems to imply no specific action taken after the first stage, other than perhaps feedback. The question was reformulated to focus on what was learnt from the results rather than how they were used.	95
10	8.9	5.3	saw whole picture for patient	The audit enabled an appreciation of the whole system of care. Seems to imply an iterative process between audit and systems thinking	96
10	8.12	8.4	results communicated to directorate for personal development objectives	An explicit connection between information for managing personal learning and audit	97
1.8	9.1	6.2	better inter-team relations	Better inter-team relations - but no example	98
1.8	9.5	5.4	More information given in reports	Again no example - probes need to be ready for this sort of thing, rather than questions	99
1.8	9.5	5.4	More accurate information given in reports	Enhancement of existing information and communication methods rather than development of them	100
1.8	9.7	-	Uncovered unexpected	Direct cultural change and redefinition of values resulting from introduction of guideline based audit. New information about colleagues ability to create information as well as about their performance leads to revaluing them in the new situation where more rigorous local information needs to be created to inform better actions	101
	9.7	-	strengths and weaknesses in individuals		
4.2, 1.8	9.9	6.2	more consensus on aims	Fundamental requirement for effective team working is supported by use of	102

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
				guidelines. Is this consensus on specific clinical or general strategic aims? Is it consensus between professions or within professions?	
1.8	9.9	6.2	more help in documentation - to make it “sound clinically astute”	Nurses are worried about writing things down because this may appear to reveal lack of knowledge.	103
1.8	9.13	-	Personal Learning - audit methods - question phrasing - best use of forms	Information creation skills required. Not much other information was brought forth by this question. Methods of identifying learning needs may be needed too, but this is a separate research question.	104
11	9.15	-	Team Learning - to look at practice	A cultural change - towards looking systematically at practice, gathering data, creating information, and learning from that, rather than arguing theoretically.	105
10.7	9.17	6.3(a)	more support to service improvement	The organisation seen as not fully supporting professional attempts to improve the service.	106
1.9	9.18	6.3(a)	Managers now more open	Sound data should allow greater openness	107
10	1.3	7.4(a)	Interest stimulated by GP co-op	GPs are acute hospitals’ customers and want to ensure they are getting a quality service for their patients and as they are also providers of services to patients they are willing to collaborate with other providers to satisfy their own customers, the patients. The more control the patient has over the health professional through an individualised economic relation, the more human the relationship can be.	108
1	1.4	-	Involvement in SIGN open meeting good	Possibly clinical leaders from all health delivery and commissioning organisations could usefully go to SIGN open meetings relevant to their area of leadership, and then lead implementation by acting as local experts and holding discussion and question/answer sessions for all staff needing involvement and consultation .	109
8, 1.4	1.4	-	Worry about practicalities of implementation	Resource constraints, support from the organisation needed	110
10	1.5	-	A distillation of the evidence/information process		111
8	2.1	-	evolving process of implementation - longer than expected	Learn as you go along - action research approach - learning how to learn as well. Lack of certainty about success of guidelines. Not a useful question	112
1	6.2	3.2	Directorate circulation (DVT)	One way transmission model - obviously did not work	113

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
1	6.4	-	Protocol development used circulation for comment - not necessarily a recommended method	Problems here with circulation - the practicalities of deciding how to create information as a group.	114
4.2	7.3	4.3	Trust-wide audit, finished, not analysed.	A long time coming - practicalities of information creation need streamlining again	115
8	9.4	6.2	Effort of audit	Practicalities/resources	116
1.8	1.3	-	Unaware of others	This question was deleted as a number of interviewees did not know how others used guidelines	117
1, 4.2	7.3	4.3	audit aims: to find out if practice as erratic as it seemed	This was a simple aim but there was no explicit concept of follow-on action.	118
10	7.3	4.3	Audit trigger - external funds	An external incentive was needed to trigger the generation of local information - funding.	119
8	7.5, 7.9	6.2	Data coding difficulties	The information created was limited because a pilot of the information creation and usage system was needed	120
8, 4.2	7.7	-	Audit of over treatment needed too	An extra unexpected information need revealed by the system - on over treatment	121
1	7.11	-	clinician desire to improve hospital practice		122
8	8.1	-	It was a mistake to try to do the audit all in one - find out what was happening, and compare with standards and categorise risks	Learning occurred about the development of a local information system	123
4.2, 4.7	9.1	6.2	Put more thought into treatment	Guidelines did not just encourage compliance but also thought	124
1	9.3	-	More discussion - but nurses still less aware/updated than medical staff of whats on paper	Guidelines encouraged discussion. But the question was too leading and deleted. In this research about views and opinions, a central difficulty is how to bring out required information without leading respondents	125
1	9.5	-	No written record of why on treatment	This information came out in response to this question but was not in fact an answer to the question	126
4.2, 4.9	9.8, 9.10, 9.12	6.2(a) 6.2 -	No change to ways of working, except to comply. Still keep staff + self updated	Why did no action result from the thought and discussion? No consensus? What is the trigger for consensus and action? External: funds, evidence, review? Survival of professional credibility?	127
10	9.15	-	decided Ward guidelines are		128

CODE	Orig. qu. No.	New qu. No	Description of item coded	Comment on item(s) coded, relationship with code and implications for research	No.
			needed. Have nursing policy manual		
1	9.18	6.3	More nursing involvement has happened over the past couple of years	More nursing involvement in strategic planning has resulted from guideline introduction. A broader question covered these issues in the revised interview schedule to avoid bias.	129
	Note:		Personal politics not covered questions overlapping		

Table A4.3 Old and new questions relationship to pilot coding frame

A4.4 Summary of revisions to the old interview schedule with reasons

The following table summarises changes to the interview schedule.

Subject	Purpose	Change
Not part of research question		
Extent of previous involvement	To compare experience of the two hospital samples	Deleted since previous involvement was not part of the research question
Dissemination	To find out how the guideline was disseminated , and the acceptability of this.	Question on typicality deleted - interviewees unlikely to know, and not essential to research question
Attitudes to guidelines	To assess how worthwhile guideline implementation is thought	Deleted since covered by general issues
Audit	To describe the extent, nature and perceived success of the audit of the guideline	This section was shortened to exclude attitudes about audit and audit support given. Reason: these were not a direct part of the research question.
Too leading		
Implementation	To discover what was done by the interviewee to ensure compliance or other use of the guideline	Question about local protocol deleted - too leading. Otherwise, question whether interviewee was in an implementation group was added.
Audit results	To find out what change happened as a result of the guideline, and roughly estimate the impact of the change on patients and on the organisation.	Deleted, and replaced with short section on implementation rather than audit results, asking for descriptions of changes to practice and communication of the findings of any audit. Impact of audit on patients could not be estimated by interviewing participants.
Team Learning	To ask specifically about new working methods within and between clinical teams and between clinical teams and senior management	Shortened by removing questions about sharing of results and communication - too leading. Instead asked now about learning about other teams, and any new ways of working. A question suggested by a senior manager was added on how the organisation can facilitate learning from guideline implementation.
Ordering		

Subject	Purpose	Change
General issues and attitudes about clinical guidelines	To uncover differences in how different groups would ideally use guidelines	More focused on Nurses' and Clinicians' views. Reordered to come more sympathetically at the end of the interview.

Table A4.4.1 Changes made to the pilot interview schedule

There was a short personal details survey. This was changed as in table A4.4.2.

Subject	Purpose	Change
Covered elsewhere		
The interviewee's job	to enable comparison of different roles and seniority levels	Job title, length of service, department, time in the position, age and gender were covered in the Goh and Richards learning organisation survey. A question on the function of the role was retained.
Time in the role	to indicate socialisation into role	deleted as covered in the Goh and Richards questionnaire
Retained		
Team membership	to clarify working arrangements	retained
Membership of implementation groups	to assess personal investment in guidelines success	retained and additional information asked for
Number of SIGN guidelines implemented	To enable a quantitative comparison between groups on this	Retained
Audit and change resulting from SIGN guideline implementation	To enable a quantitative comparison between groups on this	Retained
Aspects of hospital culture	to cross validate answers to learning company questionnaire	Deleted as the learning company questionnaire was not used.

Table A4.4.2 Changes to personal details survey

A4.5 List of old interview questions, changes and reasons for change

The following table gives reasons for the revision or deletion of each question in the initial interview schedule.

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
1General issues on guidelines			
1 What purposes do you think clinical guidelines are used for by others?	A	7.1, 7.2	Old question thought strange by respondents
2 What do you see as constraints on the effectiveness of guidelines?	R	7.3	
3 How does your use of guidelines relate to the uses others put them to?	A	7.4, 7.5	Old question thought strange by respondents
4 Can you discuss briefly how you feel about guidelines?	D		question too unfocused
5 What are your general opinions on guidelines -	D		question too unfocused
prompts: importance, effectiveness, wider purpose, practical issues	D		part of question 1.5
6 What does implementation of a guideline mean to you?	R	7.7	
7 What does a quality improvement project in a hospital mean to you?	R	7.8	
2 Extent of previous involvement			
1 Based on your experience of them, how successful do you feel guidelines are in improving healthcare?	D		Not relevant to RQ
Probe: Why? _	D		Not relevant to RQ
2 Have you been involved in	A	1.1	New question gives an adequate idea of previous

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
implementation of any other SIGN guidelines before the DVT/Diabetes one?			involvement level
3 Can you estimate the number?	A	1.1	New question gives an adequate idea of previous involvement level
4 How many guidelines have you been involved with in the last 6 months?_____	A	1.1	New question gives an adequate idea of previous involvement level
3 Attitudes to guidelines			
1 How worthwhile is to implement guidelines in your view? (Do you think it is worth the effort?)	D		Not relevant to RQ
Probe: Why?			Not relevant to RQ
4 Change and guidelines			
1 What can encourage you to implement any changes caused by guidelines?	D		Self-report of reasons for motivation is of little value in establishing causal factors
2 What can prevent you from implementing changes related to guidelines?	D		Self-report of reasons for motivation is of little value in establishing causal factors
The following questions relate to the SIGN DVT or one of the SIGN Diabetes guidelines only **5 Dissemination**			

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
1 Which guideline applied to your practice?	D		Respondent now given no choice of which guideline to respond on - this is determined by the sampling
Which did <u>you</u> apply to your practice?	D		
2 What was done to disseminate the guideline?	A	2.1	Question now separated into two parts about dissemination to self and by self
Prompts: Uni-professional meeting, multi-professional meeting, newsletter, team meetings, mailshot, electronic mail, other.	A		
3 Was the dissemination process typical?	D		Respondents showed lack of knowledge on this
Prompt : (If it differed) in what way?	D		
4 Would you do anything differently about dissemination next time?	R	2.2	
Prompt : (If yes), what would it be and why?	R	2.2	
6 Implementation (GIG members, audit facilitators, service managers, clinicians)			
1 Did you actively implement the guideline - did you do things to make sure you or others complied with its recommendations?	A	3.2	wording simplified
2 If yes, what did you do?	R	3.2	

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
3 If no, could you discuss why you did not actively implement it?	A	3.2	wording simplified
4 If a local version/protocol was developed, could you discuss how satisfactory it was from your point of view?	A	3.3	local version not always developed - new question is broader
5 Was anything else done to implement the guideline?	R	3.3	
7 Audit			
1 Was your practice audited in relation to the guideline?	A	4.1	less threatening to ask about practice in general rather than the respondents practice. New question 5.1(A) covers the issue of individual practice
2. Could you discuss briefly how you felt about this?	D		
3 What were the aims of the audit?	R	4.3	
4 How successful was the audit?	D		this should be apparent from the changes reported
5 Probe: Why?	D		Ambiguous - what caused the success or what characteristics did you consider to be those of success - neither is useful for the RQ
6 How worthwhile did you think the audit? (Did you think it was worth the effort?)	D		Not relevant to RQ
7 Probe Why?	D		Not relevant to RQ

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
8 Did anyone provide input for the audit without being part of it (eg were not in the audit, but provided advice or help?	D		Not relevant to RQ
9 If so, what did you find useful and/or not useful about the help?	D		Not relevant to RQ
10 Were you in the group conducting the audit?	R	4.4	
11 What were the good and bad things about being in the group or not being in it?	R	4.8	
12 What use did you make of the audit results?	D		Covered in sections 5 and 6
8 Audit results (GIG members, audit facilitators, service managers, clinicians) Section 5 which replaces this section is now entitled “implementation results” to cover a situation where the guideline is said to be implemented but no audit has been done			
1 What came out of the baseline audit for you?	D		Question both too general and confined to audit. Covered by asking about change and learning
2. and the audit after implementation?	D		as above

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
3. If there was a change to your practice as a result of the guideline, can you describe the most important change, and how it was implemented?	A	5.2	two questions in one. “how it was implemented” not part of RQ and deleted
4 What encouraged you to make the change?	D		Self-report of reasons for motivation is of little value in establishing causal factors
5 Can you estimate roughly how many of your patients are affected by the change	D		Not part of RQ to establish the size of the effect
6 Can you estimate roughly what proportion of your caseload this would form	D		Not part of RQ to establish the size of the effect
7 Age range of the patients affected	D		Not part of RQ to establish the size of the effect
8 What was the significance of this change for patients? Prompts: Life or death, increased survival time, increased quality of life, lowered morbidity)	D		Not part of RQ to establish the size of the effect
9 Can you describe any other findings from the audit?	A	5.3	phrasing made relevant to guideline implementation rather than just audit
10 Were the findings of the audit communicated to anyone outside the clinical team?	R	5.4	
11 If yes to whom?	D		Replaced with “Why”, which will bring out who and the reason

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
			for doing so too
12 With what purpose?	D		
13 Did the audit results lead any change involving anyone outside the clinical team?	A	6.2	The new question will cover changes in the team, whether they involve people from outside it or not
14 If yes what were the changes?	A	6.2	the prompt covers this
9 Team Learning			
1 What effect do you think the guideline has had on the way of working in your clinical/management/audit team?	A	6.2	“new ways of working” covers all effects
2 Can you comment on the way audit results are shared by the team?	D		Not specific enough
3 Do you communicate more with other members of your team as a result of the guideline?	D		Self-report is of little validity in identifying real behaviour (Feder G)
4 Prompts Within the team?	D		“
5 Between the team and other levels of the organisation?	D		“
6 Between the team and other teams?	D		“
7 Did you learn anything about the practice of other members of your team from auditing the guideline?	A	6.1	New question about implementing rather than auditing
8 Have you found that improved dialogue	A	6.2	The word dialogue was leading and replaced with guidelines

OLD QUESTION	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
led to any new ways of working?			as a more neutral term in this context
9 If so, what was the change?	A	6.2	covered
10 Has the guideline changed the way you work with the rest of your team?	A	6.2	covered by the broader question
11 If so how?	D		Its the role of the analysis to answer this
12 Do feel that you need to learn anything more about any aspect of your practice or your organisation, to be a more effective (professional)?	D		Came across as rather patronising. Covered in 6.1
13 If yes what is it you need to learn?	D		as above
Has the guideline helped you to recognise this?	D		Self-report of reasons for motivation is of little value in establishing causal factors
14 Does your team need to learn anything to be a more effective team?	D		Replies to this were either about specific clinical skills or too broad to mean much. Covered from a different perspective in q6.3
15 If yes, what is it?			
Has the guideline helped you to recognise this?	D		Self-report of reasons for motivation is of little value in establishing causal factors
16 Does your organisation need to change in any way to provide a more effective health service to the local population?	A	6.3	the amended question focuses specifically on support to learning and implementation in this context
17 If so how?	D		The “how” is incorporated in the new question
Has the guideline helped you to recognise this?	D		Self-report of reasons for motivation is of little value in establishing causal factors
18 Have there been any changes in the			Did not lead to much useful additional information in the pilot

	Retained = R Deleted = D Amended = A	If retained/ amended, no. of question in revised version of questionnaire	DELETION/AMENDMENT MADE AND REASON WHY
OLD QUESTION			
way clinicians and managers work together resulting from the guideline?	D		and responses tended to reiterate those to previous questions about using guidelines to get more resources

Table A4.5 Revisions to the old interview schedule with reasons

A5 Results

A5.1 Previous experience of responders

Group	Hospital 1 Mean no. of previous orgs	Hospital 2 Mean no. of previous orgs	N
Senior clinical responders	2.93	2.96	87
Junior responders	2.86	2.51	98
All survey responders	2.9	2.8	194

Table A5.1.1 Number of previous organisations for clinical responders in each hospital

Group	Number of functions Hosp 1		Number of functions Hosp 2		T	2 tailed Sig
	Mean	N	Mean	N		
Junior staff	1.59	59	1.24	38	1.22	<0.23
Senior staff	1.38	40	1.0	46	1.54	<0.130
All staff	1.5	101	1.1	89	2.24	<0.028

Table A5.1.2 number of organisational functional areas worked in (by hospital)

A5.2 Mean scale score and age

The table gives mean scale score in each age range (graph in the main text).

Age range		Learning Capacity	Formalisation	Job satisfaction	Hospital culture
20-30	Mean	3.7	4.5	4.5	2.9
	N	41	41	41	39
31-40	Mean	4.0	4.6	4.8	3.2
	N	93	93	93	93
41-50	Mean	4.2	4.5	5.0	3.3
	N	45	45	45	44
51-60	Mean	3.9	3.9	5.0	3.4
	N	17	17	17	16
Total	Mean	4.0	4.5	4.8	3.2
	N	196	196	196	192

Table A5.2.1 Scale means for age ranges

Profession	Age range		Learning Capacity	Formalisation	Job satisfaction	Hospital culture
Doctor	20-30	Mean	3.8	3.3	5.0	3.3
		N	7	7	7	6
	31-40	Mean	4.3	3.8	5.8	3.7
		N	11	11	11	11
	41-50	Mean	3.8	3.8	5.4	3.7
		N	9	9	9	8
	51-60	Mean	3.6	3.5	5.1	3.6
		N	11	11	11	10
	Total	Mean	4.0	3.7	5.4	3.6
		N	38	38	38	35
Nurse	20-30	Mean	3.7	4.8	4.4	2.8
		N	31	31	31	30
	31-40	Mean	3.9	4.5	4.6	3.0
		N	59	59	59	59
	41-50	Mean	4.3	4.7	4.9	3.1
		N	32	32	32	32
	51-60	Mean	4.5	4.5	4.7	3.1
		N	6	6	6	6
	Total	Mean	4.0	4.6	4.6	3.0
		N	128	128	128	127
Midwife	20-30	Mean	3.6	5.2	4.3	3.3
		N	2	2	2	2
	31-40	Mean	4.1	5.0	4.7	3.3
		N	23	23	23	23
	41-50	Mean	4.0	5.0	4.6	3.3
		N	4	4	4	4
	Total	Mean	4.1	5.0	4.7	3.3
		N	29	29	29	29

Table A5.2.2 Scale means for age ranges split by profession.

Table A5.2.3 (below) gives a similar breakdown for sub-scale score

Profession flag	Age range		Clarity of Purpose and mission	Leadership commitment and empowerment	Experimentation	Transfer of Knowledge	Teamwork and group problem solving
Doctor	20-30	Mean	2.79	3.80	3.66	4.32	4.57
		N	7.00	7.00	7.00	7.00	7.00
	31-40	Mean	4.55	3.89	4.10	4.50	4.55
		N	11.00	11.00	11.00	10.00	11.00
	41-50	Mean	3.95	3.73	3.58	3.45	4.22
		N	9.00	9.00	9.00	9.00	9.00
	51-60	Mean	3.19	3.91	3.11	3.72	4.30
		N	11.00	11.00	11.00	11.00	11.00
	Total	Mean	3.69	3.84	3.61	3.98	4.40
		N	38.00	38.00	38.00	37.00	38.00
Nurse	20-30	Mean	4.32	3.22	3.48	3.83	3.84
		N	31.00	31.00	31.00	31.00	31.00
	31-40	Mean	4.47	3.65	3.71	3.73	4.01
		N	59.00	59.00	59.00	59.00	59.00
	41-50	Mean	4.47	4.21	4.26	4.30	4.58
		N	32.00	32.00	32.00	31.00	31.00
	51-60	Mean	4.83	4.20	4.23	4.29	5.17
		N	6.00	6.00	6.00	6.00	6.00

	Total	Mean	4.45	3.71	3.82	3.92	4.16
		N	128.00	128.00	128.00	127.00	127.00
Midwife	20-30	Mean	4.63	3.70	2.60	3.13	4.50
		N	2.00	2.00	2.00	2.00	2.00
	31-40	Mean	4.49	3.92	4.00	4.04	4.29
		N	23.00	23.00	23.00	23.00	23.00
	41-50	Mean	4.38	3.80	3.50	4.19	4.59
		N	4.00	4.00	4.00	4.00	4.00
	Total	Mean	4.48	3.89	3.84	4.00	4.34
		N	29.00	29.00	29.00	29.00	29.00
Clinical Audit Facilitator	20-30	Mean	4.25	5.60	5.80	6.25	4.33
		N	1.00	1.00	1.00	1.00	1.00
	Total	Mean	4.25	5.60	5.80	6.25	4.33
		N	1.00	1.00	1.00	1.00	1.00
Total	20-30	Mean	4.07	3.40	3.53	3.94	4.01
		N	41.00	41.00	41.00	41.00	41.00
	31-40	Mean	4.48	3.75	3.83	3.89	4.14
		N	93.00	93.00	93.00	92.00	93.00
	41-50	Mean	4.36	4.08	4.06	4.12	4.51
		N	45.00	45.00	45.00	44.00	44.00
	51-60	Mean	3.77	4.01	3.51	3.92	4.61
		N	17.00	17.00	17.00	17.00	17.00
	Total	Mean	4.31	3.77	3.79	3.96	4.24
		N	196.00	196.00	196.00	194.00	195.00

Table A5.2.3 Sub-scale means for age ranges split by profession.

Directorate	**Date of first implementation**
General Medicine	5/2/97
Care of the Elderly	10/3/97 revised 12/97
General Surgery	19/2/97 revised 10/99
ENT	2/6/97
Intensive Care	1/12/96
Gynaecology	1995 RCG Guidelines (same as SIGN)
Obstetrics (until summer 98)	1995
Orthopaedics	No set guideline. Consultant statements of current practice used, not formalised.

Table A5.2.4 Hospital 2 – directorate implementation dates for SIGN DVT prophylaxis guideline.

Directorate	**Guideline**	**Date of first implementation**
Diabetes Centre	Visual impairment	3/96
Diabetes Centre	Cardiovascular disease	No need to change
Diabetes Centre	Renal disease	No need to change
Gynaecology	Diabetic Pregnancy	No need to change
Diabetes Centre	Diabetic foot disease	On hold

Table A5.2.5 Hospital 2 – directorate implementation dates for SIGN Diabetes guidelines

A5.3 Mean scale item scores

Mean for each scale item by hospital and overall – shown in the main text as a graph.

Report

	HOSPITAL								
	1			2			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
LO1	4.15	108	1.48	3.97	89	1.78	4.07	197	1.62
LO2	3.95	104	1.35	3.95	87	1.52	3.95	191	1.43
LO3	4.24	108	1.45	4.11	89	1.50	4.18	197	1.47
LO4	3.70	106	1.74	4.03	88	1.71	3.85	194	1.73
LO5	4.09	107	1.41	4.27	90	1.39	4.17	197	1.40
LO6	3.75	109	1.61	3.84	90	1.70	3.79	199	1.64
LO7	4.12	109	1.68	4.34	90	1.72	4.22	199	1.70
LO8	4.24	109	1.49	4.19	90	1.76	4.22	199	1.61
LO9	4.29	108	1.50	4.02	90	1.48	4.17	198	1.49
LO10	2.81	107	1.51	2.66	90	1.51	2.74	197	1.51
LO11	3.80	109	1.55	3.48	90	1.57	3.65	199	1.57
LO12	4.14	109	1.38	3.80	90	1.59	3.98	199	1.49
LO13	3.44	108	1.58	3.21	90	1.67	3.33	198	1.62
LO14	4.23	109	1.57	3.91	90	1.65	4.09	199	1.61
LO15	3.58	109	1.55	3.54	89	1.58	3.56	198	1.56
LO16	3.78	108	1.45	3.86	90	1.55	3.81	198	1.49
LO17	4.04	109	1.45	4.14	90	1.72	4.09	199	1.57
LO18	4.21	108	1.65	3.89	88	1.59	4.07	196	1.63
LO19	4.82	108	1.47	4.33	90	1.82	4.60	198	1.65
LO20	4.83	109	1.47	4.47	89	1.54	4.67	198	1.51
LO21	4.62	108	1.38	4.34	89	1.48	4.49	197	1.43

Table A5.3.1 Means for individual items in the learning capacity questionnaire. All survey respondents, both hospitals.

A5.4 Overall distribution of scores

	OL Capacity		Formalisation		Job satisfaction		Hospital culture	
	Senior	All	Senior	All	Senior	All	Senior	All
N	**90**	199	**90**	198	**90**	198	**88**	195
Mean	**4.08**	3.98	**4.31**	4.49	**5.03**	4.78	**3.34**	3.17
K-S (Z)	**0.72**	0.74	**0.98**	1.09	**0.91**	1.23	**0.82**	0.58
Sig. (2-tailed)	**<0.70**	<0.66	**<0.30**	<0.20	**<0.38**	<0.11	**<0.53**	<0.91

Table A5.4.1 Overall distribution of scores - One-Sample Kolmogorov-Smirnov Test results

A6 Discussion

A6.1 Search details for "low response".

The following table gives the actual references found and databases searched for low response-rates, while the table following that gives details of the topics, population and response rate of studies with low response rates.

Database (all through Athens service, carried out 26-31 July 2000)	Years searched	Number found	Number relevant	References of relevant articles
Ovid Medline	1966-2000	212	8	126;299;326;327;396;397;411;433
Bids Embase	1980-2000	187	6	39;64;129;215;411;425
Bids CINAHL	1982-2000	11	1	309
BIDS ISI (SOC SCI)	1980-2000	28	6	169;309;327;396;402;411
Bids IBSS	1980-2000	0	0	
Web of Science (SCI and SOC SCI)	1981-2000	133	7	169;327;396;397;402;425;431

Table A6.1.1 "Low response rate" – numbers of papers found

Subject of data collection	**Professional group and response rate**
Recording patient activities in a psychiatric unit. [309]	50% Health professionals in psychiatry.
Evaluation of a university counselling course [169].	33% Counselling students.
1016 psychiatric nurses from Stockholm (Sweden) and Birmingham (England) who responded to a postal questionnaire on their psyche-social work environment and feelings of professional fulfilment, mental energy and work-related exhaustion [402].	Low. Psychiatric nurses. No specific rate given.
A postal survey of GPs' communication needs [39]	28% General Practitioners (GPs)
A survey of prescribing practices among psychiatrists [64]	33% Psychiatrists
Survey of 4,000 Midwestern physicians - their attitudes and practices regarding elevated serum cholesterol and their use of referrals for nutrition counselling.[299]	15.8% Physicians
A surgical services learning needs assessment [326]	56% Various types of staff members in a surgical unit
Use of the Nottingham Health Profile to test the validity of census variables to proxy the need for health care [327]	59% General public
National postal study of GPs surveyed about their work with alcohol-misusing patients [396]	44% GPs
Postal survey to gather information from general practitioners regarding aspects of computerisation [397]	54% GPs
Postal survey to explore the attitude of practising physicians toward written medication information for patients. [411]	27.5% .1500 GPs and 500 internal medicine specialists
Postal questionnaire using clinical vignettes to assess general practitioners' use of aspirin in the secondary prevention of vascular events: Knowledge, attitudes, and current practice [425]	54% GPs
Postal questionnaire to assess dentists' perceptions of difficulties encountered in providing dental care for British Asians[433]	41% Dentists

Table A6.1.2 "Low response rate" search results – subjects of papers found

A6.2 Consultants' concerns, Hospital 1.

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