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Enhancing Scotland's Childsmile programme through Community Linking to address child oral health inequalities

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Abstract

Dental caries in primary teeth affects over 530 million children globally, and outcomes are significantly associated with social circumstances. Scotland's national child oral health improvement programme Childsmile has in part been responsible for improvements in oral health over the past decade, but inequality based on socioeconomic factors persists. Community Linking/Social Prescribing aims to reduce inequality through addressing the social determinants of health by engaging patients with community services/third-sector support. The Childsmile programme employs Dental Health Support Workers who provide targeted and tailored interventions to families most in need. Part of the role of Dental Health Support Workers is to link families experiencing wider social and economic problems to external community services/resources where tailored support can be offered. This thesis describes research which aims to optimise Childsmile's Community Linking/Social Prescribing pathway for families of young children to improve oral health and tackle the social determinants of health to reduce inequalities.

Methodology: A mixed methods approach was employed, and three studies were conducted. Study one used secondary analysis of population-wide individual-level linked routine administrative data and health data to investigate Community Linking practice within Childsmile. The second study was a Systematic Overview of systematic reviews and guidelines to assess best practices for Community Linking, drawing from literature across Primary Care health services and using the Consolidated Framework for Implementation Research (CFIR) model to guide analysis and reporting. The third study was an online national survey of Dental Health Support Workers to assess the feasibility and acceptability of Community Linking. The first and the second study informed the survey content, and again the CFIR guided survey design. IBM SPSS v26 was used to describe quantitative data, and QRS NVivo v12 was used for qualitative thematic analysis.

Results: Secondary analysis of linked data showed just over a fifth of families were referred to a Dental Health Support Worker for additional support over the study years, reflecting the targeted nature of this Childsmile intervention. Among these families, the percentages who were linked to external community services/resources increased from 1.8% (219/12169) in 2011 to 21.0%

(1227/5833) in 2015, with the main support services being related to nutrition/diet and parent/baby support groups. Families living in the most deprived areas of Scotland and those determined by their Health Visitor to have greater support needs were more likely to be linked to wider community services by Dental Health Support Workers; however, there was significant variation in linking rates. The Systematic Overview key findings highlight several programme delivery aspects associated with best practice, such as basing programmes on high-quality evidence, obtaining resources, and being flexible in approach, developing trust among partners and assessing participants' needs to provide a tailored pathway. An optimum level of training, mentoring, and feedback is required for Community Health Workers. The Community Health Workers' characteristics should be such that they are perceived as leaders in the community and are respected. The services should be accessible and perceived by the participants as beneficial. Inter-sectoral working is also key. Partners should have enough time to develop understanding, communicate, network, and implement and evaluate the Community Linking implementation. The Systematic Overview showed a need for a multilevel pragmatic approach. The Online Survey of Dental Health Support Workers had a response rate of 58% (59/102) from 13/14 geographical health boards. Results demonstrated high awareness of Community Linking: 88% (52/59) of respondents agreed that this is a good way to improve child oral health, and 72% (42/59) had some experience of Community Linking in their current role. Feedback from community services and families was lacking. More than three quarters, 85% (50/59), said they would be able to identify appropriate community organisations for Community Linking. Thematic illustrations of open-ended responses showed: workload and time barriers when working with families; the importance of collaborative working, for example, with social services and education; training of staff to overcome these barriers, such as local area knowledge; the importance of building trust with families; and the importance of actively facilitating and supporting access to services.

Conclusion: Community Linking is a relatively new concept in dental public health. It is implemented within the Childsmile programme via Dental Health Support Workers and is considered a route to help families in need of support and address socio-economic inequalities in oral health. According to our findings, future implementation work in Childsmile is broadly supported by moderate quality evidence and perceptions on acceptability and feasibility. Programme

theory is articulated in Chapter 7, which shows the need to tailor links to need and foster integrated working, with clear communication routes between referrers and community organisations, including those for monitoring and evaluation. Staff are supportive of this as a route to a range of positive health outcomes. Nevertheless, workload/resource barriers need to be considered, and support and training are required in terms of available community resources and building sustainable links.

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Acknowledgement

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Author's Declaration

I declare that, except where explicit reference is made, that this thesis is the result of my own work and has not been submitted, partly or in whole, for any other degree at the University of Glasgow or any other institution.

Part of this research project was presented in the following conferences/meetings/research days.

International Conferences

The International Association of Dental Research conference (Virtual General Session) 22nd – 25th June 2022.

Oral presentation title: A survey on Community Linking for Dental Health Support Workers

National Conferences

School of Medicine, Dentistry and Nursing (SOMDN), Postgraduate Research Day 17th May 2021

Oral presentation title: Community Linking for Child Oral Health: A Systematic Overview of Reviews and Clinical Guidelines

Scottish Oral Health Research Collaboration (SOHRC) conference 1st October 2019 at Dundee Educational Centre

Oral presentation title: A roadmap for enhancing the Childsmile programme through Social Prescribing to address children's oral health inequalities (Three-minute thesis)

Oral presentations on the project in Community Oral Health research meetings

Poster presentation at SOMDN Postgraduate Research Day 2019
Poster presentation title: Social Prescribing in Childsmile to address oral health inequalities of preschool children.

Signature: ……

Printed Name: Aalia Karamat

Definitions/Abbreviations

AOR	Adjusted Odds Ratio
AGREE II	Appraisal of Guidelines for Research & Evaluation II
ALISS	A Local Information System for Scotland
ALLIANCE	Health and Social Care ALLIANCE Scotland
AMSTAR II	A Measurement Tool to Assess systematic Reviews II
CCG	Clinical Commissioning Groups
CERT	Central Evaluation and Research Team
CFIR	Consolidated Framework for Implementation Research
CHI	Community Health Index
CHW	Community Health Worker
CHS (6-8WR)	Child Health Surveillance (6-8 Weeks Review)
CI	Confidence Interval
CL	Community Linking
CLINCh	Community Linking IN Childsmile
CLP	Community Link Practitioner
CS	Childsmile
DALYs	Disability Adjusted Life Years (DALY = YLL (Years of Life Lost) + YLD (Years Lived with Disability)
df	Degree of freedom
DHSW	Dental Health Support Worker
DMFT	Decayed, Missing, Filled Teeth (Permanent dentition)
dmft	decayed, missing, filled teeth (Primary dentition)
$d_3$mft	Dental decay extending to dentine (obvious decay), missing, and filled teeth (Primary dentition)
DG	Dumfries and Galloway
EDDN	Extended Duty Dental Nurses
eDRIS	Electronic Data Research and Innovation Service
GG&C	Greater Glasgow and Clyde
GMP	General Medical Practice
GP	General medical practitioner
HB	Health Board

HIC	Health Informatics Centre
HV	Health Visitor
ICS	Integrated Care System
ISD	Information Services Division
JISC	Joint Information Systems Committee
NDIP	National Dental Inspection Programme
NHS	National Health Service
NICE	National Institute for health and Care Excellence
NRS	National Records of Scotland
OR	Odds Ratio
P1	Primary one children aged 4-5 years (equivalent to reception)
P2	Primary two children aged 5-7 years
PHE	Public Health England
PHS	Public Health Scotland
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-analyses
ppm	Parts per million
Q	Quintile
R	Respondent (DHSW online survey)
RAMESES II	Realist And Meta-narrative Evidence Syntheses: Evolving Standards II
RE-AIM	Reach Effectiveness Adoption Implementation and Maintenance
ROB	Risk of Bias
SIMD	Scottish Index of Multiple Deprivation
SOS	Source of Support
SPSS	Statistical Product and Service Solutions
UK	United Kingdom
WHO	World Health Organisation
χ^2	Chi-Squared tests
YLDs	Years Lived with Disability

Chapter One
Introduction and Background

This thesis takes an Implementation Science approach to develop the programme theory for the Community Linking component of the Dental Health Support Worker's role within Scotland's Childsmile programme. The initial two studies within this thesis describe the Community Linking practices within the Childsmile programme and the best practice and evidence from the wider health literature in the area. The results of these two studies guided the development of a theory-based survey of Dental Health Support Workers, used to collect data on the feasibility and acceptability of delivering an enhanced Community Linking intervention to families in need.

This chapter first describes the global problem of childhood caries and the associated inequalities in poor oral health and then highlights the issues within the Scottish context. It outlines the various public health approaches to improving oral health and reducing inequalities and introduces Childsmile, the national oral health improvement programme for children in Scotland. Community Linking (otherwise known as Social Prescribing) across the health sector is then described to give the project rationale.

1.1 Non-communicable Diseases

Non-communicable chronic conditions are globally on the rise, and managing them is difficult (Ayomoh, 2021). According to the World Health Organization (WHO), dental caries is a widespread non-communicable public health problem (WHO, 2022). Oral health conditions like dental caries share common risk factors with other non-communicable conditions such as obesity and diabetes (WHO, 2022). Therefore, its management must also be like other chronic health problems (FDI, 2022, Twetman, 2018). It consumes almost 5-10% of the healthcare budget in industrialised countries and is the primary reason for child hospitalisation (WHO, 2017).

Dental caries is caused by localised tissue damage to tooth-hard structures caused by acids produced by bacterial fermentation of carbohydrates in the diet (Fejerskov and Kidd, 2009, Marsh et al., 2009). Though the disease process of demineralisation (removal of mineralised tissue) becomes visible on dental hard

tissue (enamel), the actual process starts from the bacterial biofilm that surrounds and covers the surface of the tooth (Selwitz et al., 2007). When sugars or other fermentable carbohydrates are consumed on a regular basis, the outer layer of the tooth, called enamel, demineralises. Organic acids lower the pH of dental plaque, increasing the solubility of calcium hydroxyapatite in the enamel (Bilbilova, 2020).

A biofilm microbiology shift during the carious process is influenced by multiple complex factors such as the flow and composition of saliva, fluoride exposure, dietary sugar consumption and teeth cleaning routine (Selwitz et al., 2007). The appearance of a cavity in the mouth is a continuum of an underlying mechanism taking place for months (Featherstone, 2008).

Early childhood caries is a commonly used term for primary teeth caries (Selwitz et al., 2007). Deciduous (baby) teeth have thin enamel with fewer minerals (Low et al., 2008) and are more prone to dental caries.

1.1.1 Global Burden of Caries in Children

Oral illnesses, including dental caries, cause an enormous global economic burden. Combined oral conditions account for 15 million DALYs (Disability Adjusted Life years) (DALY = YLL (Years of Life Lost) + YLD (Years Lived with Disability) per year for all individuals worldwide. This means, on average, per 100,000 people, 224 years of health are lost (Marcenes et al., 2013). Untreated caries is the most prevalent condition of permanent teeth (Marcenes et al., 2013, Kassebaum et al., 2015). In primary teeth, it is the 12th most prevalent non-communicable disease (WHO, 2017) and affects 530 million children globally (James et al., 2018). In 2019 dental caries in deciduous teeth ranked as a leading disease among children aged 1-14, with 500 million prevalent cases (Wen et al., 2022). In a study in 2010, the approximate cost for oral diseases was estimated to be US $442 billion (Listl et al., 2015). Individuals with dental caries in their primary teeth are more likely to have caries in their permanent teeth (Greenwell et al., 1990). The risk accumulates throughout a person's life (Peres et al., 2005, Peres et al., 2019).

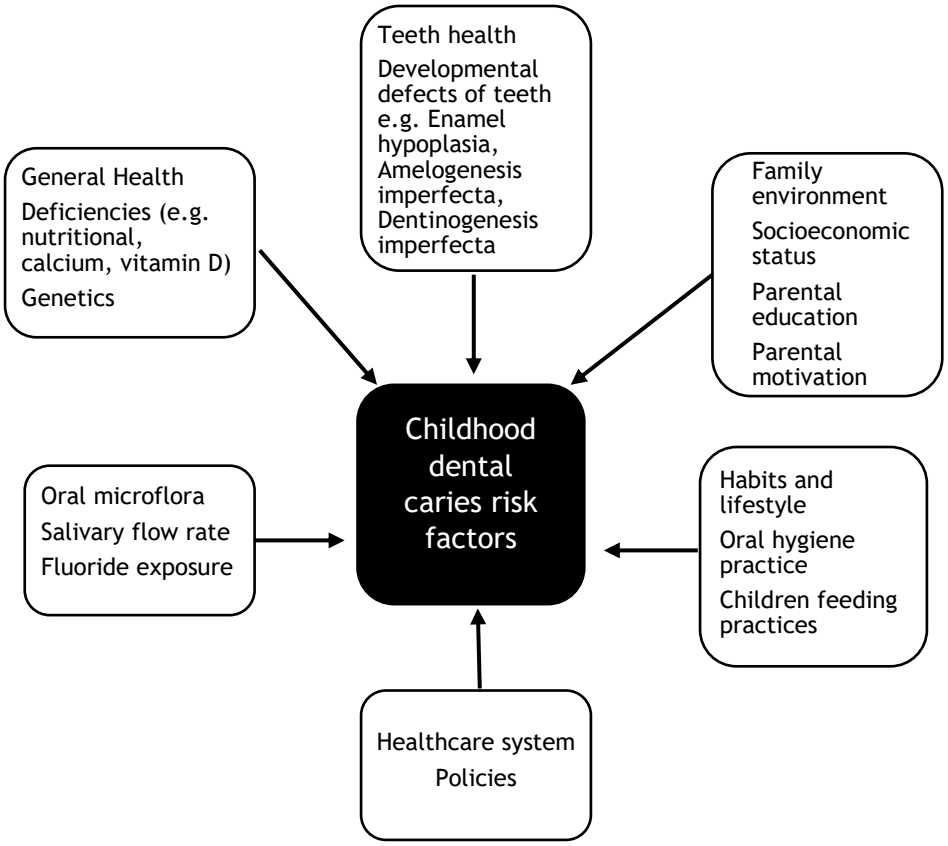
Besides economic loss, there are also individual impacts due to pain, discomfort and time lost from school or work (Casamassimo et al., 2009). A North Carolinian (USA) study compared school days missed for routine dental care versus dental

pain or infection. They used Child Health Assessment and Monitoring Program data to establish the relationship between school attendance and performance with children's oral health status; the sample size was n = 2120, and children were aged 5-11 years. Children with poor oral health were almost four times more likely to be absent from school, with odds ratio = 3.89; 95% confidence interval = 1.96, 7.75 (Jackson et al., 2011) and academically underperform (Jackson et al., 2011, Ruff et al., 2019). There may also be problems with eating and sleeping and a reduced ability to participate in the learning process (Petersen et al., 2005). Dental caries can cause nutritional deficiencies and may hamper child growth due to disruptive chewing and eating (Sheiham, 2006). It negatively impacts a child's quality of life (Nora et al., 2018, Clementino et al., 2015). Dental caries limits oral function and increase children's emotional stress (Alsumait et al., 2015). If timely intervention via prevention or treatment is not performed, they would require hospital admission for either teeth removal or fillings under general anaesthesia, causing a financial burden on the healthcare system (Colak et al., 2013).

Dental extractions of carious teeth for 5-9-year-old children are regarded as the most common cause of children's general anaesthesia in England (RCSE, 2015). There were 102,663 hospital admissions in 2015-2018 for children under ten years to have teeth extractions (NHS Digital, 2019). The National Health Service (NHS) approximate cost for children's hospital admissions (aged 0-19 years) for extraction due to dental caries under general anaesthesia was £33 million in the financial year 2019-2020 (GOV.UK, 2021). A cost analysis study in Scotland on the national toothbrushing programme in 2015 estimated the main tooth extraction cost under general anaesthesia to be £653.25 per child, and sensitivity analysis showed a range of £393.22 to £1,393.89 (Anopa et al., 2015). Another report by the Personal Social Services Research Unit (PSSRU), University of Kent, UK, estimated the hospital stay cost for every child undergoing teeth extraction under general anaesthesia to be £1,146 (PSSRU, 2012). General anaesthesia is a burdensome procedure for children and parents, both emotionally and financially (Baghdadi et al., 2021), and it also carries a mortality risk (Knapp et al., 2017). In England, in 2016-2017, a decayed tooth of a child was removed every ten minutes (Public Health England, 2018a).

1.1.2 Risk Factors for Childhood Dental Caries

Common acid-resistant bacteria producing caries are *Streptococcus mutans*, *Streptococcus sorbinus*, *Lactobacillus*, and *Actinomyces* species (Aas et al., 2008). Numerous risk factors contribute to dental caries. Several biological and non-biological contributing factors like diet, behaviour, genetics, lifestyle, and socioeconomic circumstances of an individual play an essential role in producing dental caries (Rosier et al., 2018, Pitts et al., 2017, Ghazal et al., 2015). Figure 1-1 is on childhood dental caries risk actors.



Adapted from (Anil and Anand, 2017)

Figure 1-1: Childhood dental caries risk factors

It describes multiple factors leading to dental caries in children. Dietary risk factors are frequent sugar consumption (Moynihan and Kelly, 2014) and carbohydrate intake (Palacios et al., 2016). Dental caries can also develop due to an inability to remove plaque with a toothbrush and insufficient fluoride exposure to teeth. (WHO, 2020). Furthermore, several societal and contextual factors also influence dental caries production. There are multiple socioeconomic risk factors associated with tooth decay experience (André

Kramer et al., 2018). Children born to socially disadvantaged parents are more likely to experience higher rates of caries (Colak et al., 2013). The environment influences our diet and eating habits, including corporate organisation's promotional activities for selling and making unhealthy food readily available (Kickbusch et al., 2016). According to Kickbusch, the identified processes through which corporations can exert influence are marketing, lobbying, sustainable business practices and extensive distribution networks (Kickbusch et al., 2016). Dental caries and other non-communicable chronic diseases also share common risk factors like unhealthy diet, use of tobacco, and obesity, as defined by Sheiham and Watt, and its consideration is important for tooth decay management (Sheiham and Watt, 2000).

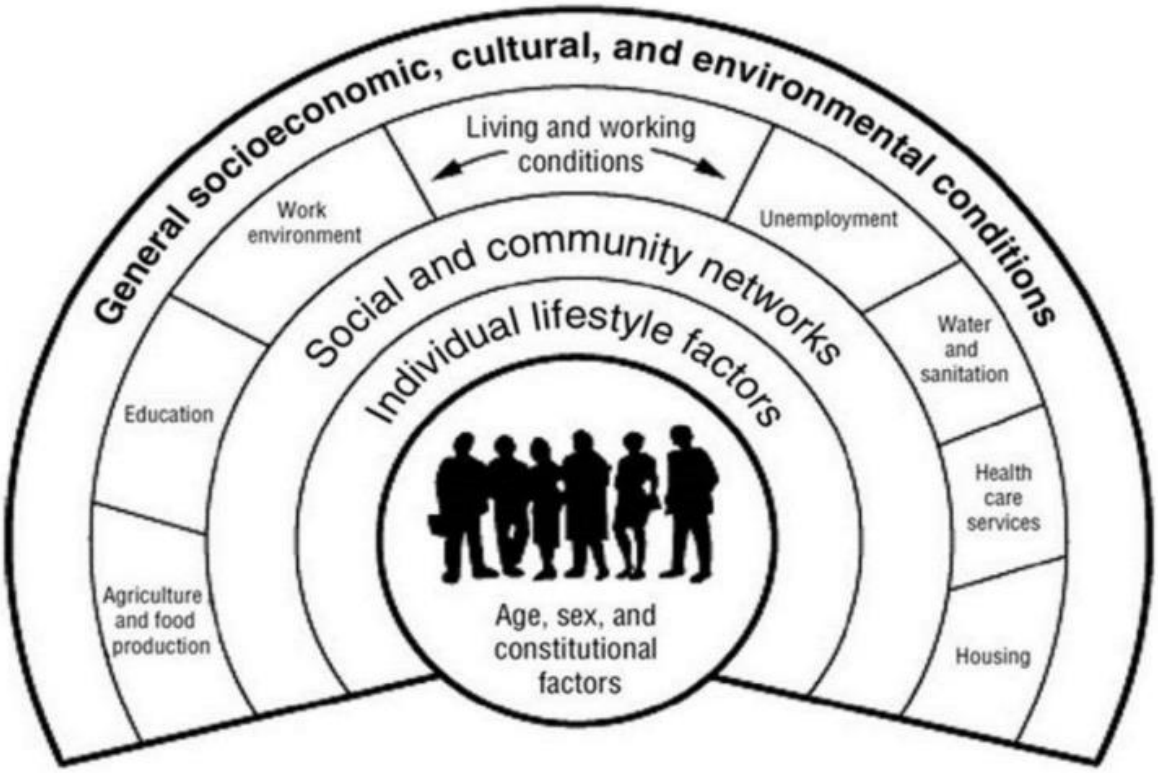
1.1.3 Child Caries Experience in Scotland

Annually in Scotland, the National Dental Inspection Programme, approved and supported by the Scottish Dental Epidemiology Co-ordinating Committee, is conducted in the first and final years of primary (elementary) school, and all children who attend local authority schools in these school years are targeted for inspection. There are two levels of inspections: a basic inspection for all Primary one (age 4-6 years) and Primary Seven (almost 11 years) children, and a detailed inspection from a representative sample of Primary One or Seven children taking place in alternative years. The basic inspection involves checking the mouth simply with a ball-ended probe and mirror under a light. The inspectors undertake training followed by calibration sessions on inspection procedures, teeth surface coding, and the British Association for the Study of Community Dentistry (BASCD) diagnostic criterion. The aim is to inform parents/carers about children's dental health status and make anonymised data available for health improvement initiative planning (Public Health Scotland, 2020c). A significant amount of dental health improvement has been observed over time in both five and eleven-year-old children in Scotland, from 2003-2020, based on National Dental Inspection Programme (NDIP). Among five-year-old in 2020, 73.5% were observed with no caries experience compared to 45% in 2003 when the programme was started. The average number of decayed, missing or filled teeth (dmft) in primary teeth also declined from 2003 to 2020 (from 2.75 to 1.04) (Public Health Scotland, 2020c). Among 11-year-old children in 2005, 53% had no obvious decay experience compared to 80% in 2019 and a fall in

average decayed, missing or filled teeth (DMFT) was observed from 1.29-0.42 (NDIP, 2019).

1.1.4 Inequalities in Oral Health

Inequality is defined as an unfair societal situation whereby some people have more opportunities than others (Cambridge Dictionary, 2022). Health inequality refers to individuals' differential experiences of health status and outcomes (Kawachi et al., 2002). According to the National Institute for Health and Care Excellence (NICE) glossary, health inequality is a disproportionate state of health and healthcare access among various groups, such as those with varying socioeconomic backgrounds, ethnicity or living in different geographical areas (NICE Glossary, 2022). Health inequity is an unfair difference in health care service provision between two individuals (WHO Newsroom, 2018). The causes of inequities in health are due to systematic variability in healthcare resource distribution among various population groups due to their social circumstances. Health inequalities are known to have a risk gradient across the population according to socio-economic status (Sanders, 2007). This social gradient is observed in relation to oral health (Watt, 2012); those from higher socioeconomic groups have better health than those from lower socioeconomic groups (Sabbah et al., 2007). Social conditions in which people are born, grow, live, and work influence health. The World Health Organization Commission on social determinants of health now recognises various drivers of inequalities. The leading causes are social, environmental, political, and economic (Marmot et al., 2020) and these adversely influence physical, mental, and dental outcomes (Poulton et al., 2002, Public Health England, 2018b). Marmot's review (2010), "Fair Society, Healthy Live", states that the primary approach to tackle health inequalities is to create an environment where people are empowered and take control of their lives across social determinants of health (Marmot et al., 2010, Marmot et al., 2020).



Source: Dahlgren and Whitehead (1991)

(Whitehead and Dahlgren, 1991)

Figure 1-2: The Dahlgren and Whitehead Model of various layers of health determinants

Figure 1-2 describes the various layers of social determinants of health; it shows the economic, cultural, environmental, and social factors influencing health quality. The model's focal point is individual characteristics (age, gender, hereditary factors, and ethnicity). The next influencing factor is lifestyle factors, which include individual behaviours. The community and social circles are the networks in which people socialise and influence the family. The second last circle is the working and living conditions, and the final circle is the socioeconomic environment in general (Public Health England, 2017b).

Among children in Scotland, inequalities in tooth decay experience still exist when categorised according to area-based deprivation (Public Health Scotland, 2020c). The Scottish Index of Multiple Deprivation (SIMD) measures Scotland's area-based deprivation. This measure of deprivation using the child's/family's postcode. Postcodes are grouped into Data zones (Small areas) and then categorised according to seven domains: income, employment, education, health, access to services, crime, and housing, to identify people living with low income and fewer opportunities (Gov. Scot, 2020). For epidemiological purposes,

the Data Zones are ranked, and cut-offs are used to categorize into equal group sizes (usually fifths). Despite the improved levels of caries described above (section 1.1.3), inequalities in tooth decay experience among five-year-old children persist. In 2014, 53% had no obvious caries experience in the most deprived fifth, compared to 83% in the least deprived fifth. In 2020, 58.1% of the most deprived fifth had no obvious caries experience compared to 86.9% of the least deprived fifth (Public Health Scotland, 2020c). A slight improvement in inequality measures among 11-year-old children in their final year of primary/elementary school has been observed, but the social gradient remains. Among the most deprived fifth in 2014, 60% had no obvious caries experience, compared to 81.5% in the least deprived fifth. In 2019 among the most deprived fifth, 69.5% had no obvious caries experience compared to 88.1% of the least deprived fifth (NDIP, 2019).

Younger children rely on family resources. Thus, parent/carer socioeconomic circumstances affect children, especially toddlers and babies, who depend on their parents to maintain their oral and general health. A cross-sectional study (n=3,022) on children and adults aged 5-23 years in four cities of the Netherlands was conducted where the healthcare system covers dental treatment costs for children up to the age of 18 years to assess the differences in caries experience according to their socioeconomic status. It was observed that the caries-free percentage was low among children from low socioeconomic groups compared to children from high socioeconomic groups. Among five-year-old children, for those with dmft >0, the mean caries experience was 3.6 in low socioeconomic status compared to those of high socioeconomic status, where the mean caries experience was 2.3 (Verlinden et al., 2019).

The most important parental behaviours that prevent childhood oral diseases are supervised parental toothbrushing with fluoride-containing toothpaste, restricting children's sugar intake, and attending regular dental appointments (Public Health England, 2017a). In family health care, parent's oral health beliefs, attitudes, knowledge and parenting skills are critical (Amin and Harrison, 2009). Parent's problem-solving skills are also considered an essential indicator of a child's oral health (Duijster et al., 2015). Childhood caries is attributed to parent's/carer's reduced sense of family relevance and responsibility (Bonanato et al., 2009, Qiu et al., 2013), their stress (Tang et al.,

2005, Menon et al., 2013) and parental self-efficacy (Reisine and Litt, 1993). A systematic analysis of the global burden of oral diseases reported a high risk of caries among preschool children of parents with low family income (Marcenes et al., 2013). A systematic review of eighteen studies investigating parental factors for early childhood caries in developing countries also showed that children living in low socioeconomic circumstances have higher childhood caries (Rai and Tiwari, 2018). There are broad, long-term detrimental effects on children's welfare, for those living in families facing adverse circumstances, and they may not be aware of the available support (NSPCC, 2018). These parents need help to give their children a good start to life.

1.2 Oral Health Improvement Approaches

John McKinlay was a medical socialist who recognised the 'river metaphor' approach (McKinlay and Marceau, 2000, Mckinlay, 2019), which is now commonly used in Public Health when discussing health improvement strategies. The WHO in 2008 commission on Social Determinants of Health (WHO Report, 2008), reported that health improvement approaches and health inequality reduction involve the implementation of policies (upstream), community assets mapping and community sector involvement (midstream), and individual level (downstream) approaches. Watt and Sheiham adapted this model for oral health (Watt and Sheiham, 2012).

Socioeconomic status is a broad term that refers to a system of social stratification based on access to various economic and social resources (Moya and Fiske, 2017). Families in disadvantaged situations face numerous challenges. They feel stressed and isolated due to a lack of material and psychological resources and multiple family issues (Rayner et al., 2003). Further challenges like reduced access to jobs, limited opportunities and approaches to private or public services, and increased exposure to life-threatening circumstances such as homelessness and street violence put children in deprived areas at an indirect risk of poor health (McLoyd, 1998). Material poverty appears to affect specific child outcomes depending on when it occurs. In 1997 Brooks and Duncan, in the USA, conducted a review to investigate poverty and child outcomes. The reviewers found that family income influences child and adolescent well-being and has a variable impact. Children and adolescents who are poor during their preschool and early elementary school years are less likely to complete high

school than those who become poor later in life. Children who live in poverty or below the poverty line for many years suffer more (Brooks-Gunn and Duncan, 1997). A child's early years are significant for their health and development. Sir Harry Burns, former Chief Medical Officer of Scotland, raised issues of health inequalities and actions needed to work across social determinants of health. His 2011 report emphasised the importance of improving the quality of care in the early years and for families. The improvements should be made over the course of a person's life; this approach focuses on early life experiences, risks and protective factors that affect health later in life, such as drug misuse or smoking. The main social policy for the early years, Getting It Right for Every Child (GIRFEC), marks a shift of investment to early intervention and prevention in Scotland. The early-year task force was established to coordinate policy across the government and the public sector to prioritise spending by the whole public sector for children and their family support (The Scottish Government, 2013).

1.2.1 Upstream Approach

The upstream approach is the policy approach through regulations or incentives for a larger population (Brownson et al., 2010). WHO policies for dental caries prevention are in line with shared principles of common risk prevention and addressing shared health determinants. This includes implementing policies for reducing the intake of free sugars, discouraging sugar-loaded food through taxing beverages and other foods with high sugar contents and displaying clear labels of the sugar contents. WHO also advocate: food and beverages marketing/advertisement regulation; removal of complimentary high sugar-sweet beverages from public places such as hospitals, schools, kindergartens, universities, and workplaces; and the promotion of the use of fluoridated toothpaste to reduce caries development and progression (WHO, 2017).

1.2.2 Mid-stream Approach

Population-level interventions, such as community-based interventions, are the midstream approaches (Orleans, 2000). For example, this might include addressing individual social needs/factors like housing and food access. The Childsmile community component (see section 1.4) is an example of a midstream approach. Living and working conditions and neighbourhood, social capital, and psychosocial factors are all targeted by community-based midstream

approaches. Interventions at the community level improve community resilience, health-related behaviours, and self-esteem (Macpherson et al., 2019a).

1.2.3 Downstream Approach

Downstream approaches include one-on-one interventions, for example, oral health education and clinical prevention in the form of fluoride varnish application, diet advice, or toothbrushing administration provided by the dentist or dental teams. The traditional curative oral health care system is critically appraised concerning social inequality in that it does not allow a focus on the causal factors that underpin poorer outcomes, especially the social ones (Watt et al., 2019).

1.3 Health Inequality Management Approaches

A well-balanced set of government policies can help address these inequitable health disparities (WHO Newsroom, 2018) in terms of poor health, reduced life quality and premature death (Baker et al., 2017). Marmot and colleagues recommended establishing a national strategy on social determinants of health to reduce health inequalities, ascertaining that there is 'proportionate universal' resource allocation and policy implementation (Marmot et al., 2020). The intervention should be made early so that health inequalities are obviated. Experienced workforce development is required to address social determinants of health in various ways. The public should be involved in the process. A comprehensive system should be developed that reinforces, promotes and monitors accountability for health inequalities (Marmot et al., 2020).

1.3.1 Proportionate Universalism

The proportionate universalism strategy strikes a balance between targeted and general approaches. The goal is to improve everyone's health while focusing on those with the most needs and poorer health outcomes (Public Health England, 2014). This approach thus targets the social gradient in which health outcomes are often linked to socioeconomic status, deprivation, or other factors, such as education levels (Public Health England, 2014). The Marmot review 2010, "Fair Society, Healthy Lives", first proposed proportionate universalism whereby resource allocation should be proportionate to the needs as a means to reduce the health social gradient (Marmot et al., 2010).

1.3.2 Integrated Care System (ICS)

The integrated care system approach stresses collaboration between health providers, local partners, and National Health Service (NHS) commissioners in geographical or local authority areas to collectively design health and social care services following people's needs. The main focus is coordinating and integrating hospital and community-based care services, physical and mental health services, and health and social care services (Charles, 2021). Wilderink and colleagues recognised elements of integrated care that can help reduce inequalities (Wilderink et al., 2020). The key features are that various locally involved organisations should collaborate and support each other at strategic and operational levels. There should also be inter-organisational communication, networking and collaboration with private organisations and the general public. This approach should be continuously monitored and evaluated to promote learning and improvement (Wilderink et al., 2020).

1.3.3 Community Health Services

Local community and voluntary organisations provide support to families within the health sector. According to the World Health Organization, community-centred approaches empower marginalised communities and reduce health inequalities through social inclusion, easy access to various social and other services and resources, and community capacity and resources (WHO, 2018). Skills, knowledge and information within the communities can be harnessed to improve health and well-being (Buck et al., 2021). It has thus become common for commissioning and service design approaches to be centred on building and mobilising capacity from within the community and engaging this resource in health and care system pathways.

Oral health improvement approaches for children traditionally focussed on clinical prevention and delivering oral health improvement messages to parents and children. However, the evidence showed that such an approach only increases inequalities and limits impact (Yevlahova and Satur, 2009). Furthermore, oral health inequalities may not be reduced if the intervention is implemented equally across all socioeconomic classes. For instance, educational programme approaches, if anything, may have widened the inequality gap if an affluent group benefited from it (Macintyre, 2007). It is recognised that mostly those in the least need of assistance are more likely to access dental resources,

and an ‘inverse care law’ prevails in dental care (Jones, 2001). The inverse care law suggests that medical care availability is inversely related to the population needs they serve (Hart, 1971). Understanding the circumstances under which deprived socioeconomic communities endure difficult situations is critical to creating a nurturing environment for oral health promotion (Macpherson et al., 2019a).

It is essential to consider social determinants of health in future strategies to reduce inequalities and manage oral health (Watt, 2012). Population-based public health initiatives involving different sectors and disciplines working together may address this issue (Watt, 2012). Working with multiple sectors and engaging community services to manage social determinants and inequalities in oral health may benefit the primary dental care setting (Bedos et al., 2018). For example, to link targeted families in need of support to community support services.

1.4 The Childsmile Programme

Faced with high dental caries experience in children in Scotland, the Scottish Executive, as part of a national health improvement initiative, put an action plan forward in 2005 to improve oral health in Scotland and provide better accessibility for patients to the National Health Services (NHS) (Scottish Executive Edinburgh, 2005). The Childsmile programme was initiated as part of the action plan and commenced in 2006, then funded by the Scottish Executive. Childsmile is a comprehensive national multidisciplinary oral health improvement programme for children that was designed to improve oral health and reduce inequality in access to dental services and oral health (Macpherson et al., 2015). The programme was established on scientific evidence, professional guidelines, clinician experiences, and various policies, including standardised implementation parameters such as a theory-based approach (logic model) with embedded monitoring and evaluation (Deas et al., 2013). It has adopted a proportionate universal approach to improving oral health and reducing inequalities through various universal and targeted interventions and has an embedded theory-based evaluation.

The Childsmile programme is involved in developing national policies and strategies on diet and nutrition (Macpherson et al., 2019b). For example, participation through membership in a collaborative working group established

healthy eating policies in nurseries/schools (The Scottish Government, 2008). It also endorses common risk factor theory for non-communicable diseases and encourages integrating oral health into national sugar control and obesity policies and legislation (The Scottish Government, 2017). Childsmile has influenced changes in policies and regulations that have resulted in the General Dental Council broadening the scope of dental nurse training in the UK. This has led to trained dental nurses applying fluoride varnish in a dental setting as part of the Childsmile community-based dental public health programme (Macpherson et al., 2019b). The Scottish dental primary care payment system has also been modified to encourage a prevention-oriented approach (The Scottish Government, 2011). A national policy on toothbrushing under supervision and a programme on applying fluoride varnish application (FVA) in educational settings have been developed and implemented (The Scottish Government, 2011).

1.4.1 Childsmile Components

The main components of the Childsmile programme are interventions in dental practices, nurseries/schools, and the community. Childsmile takes a proportionate universalism approach, with some interventions universal and others targeted.

1.4.1.1 Childsmile Universal Dental Packs Programme

Under this component, every child has the opportunity to receive a toothpaste tube containing 1450 ppm (parts per million) of fluoride and a toothbrush (dental packs) at least six times from birth to the age of five, either through a Health Visitor, a Dental Health Support Worker or early years educational institutions (Macpherson et al., 2019b).

1.4.1.2 Childsmile Nursery and School Supervised Toothbrushing

Standardised supervised toothbrushing in the nursery is universally offered to all children who attend nursery educational establishments in their early years. This applies to all 3-5-year-olds and some 2-year-olds every day they attend nursery.

In some health boards, supervised toothbrushing continues into primary (elementary) schools and is mainly targeted to children living in those areas of Scotland considered most deprived.

1.4.1.3 Childsmile Nursery and Schools Fluoride Varnish Programme

This program component is targeted and involves fluoride varnish application twice a year to children by dental nurses in the nursery educational establishment from 3-5 years of age. Targeted children are identified through nurseries/schools located in the highest deprivation areas. This comprises almost 20% of children targeted by each health board. Extended Duty Dental Nurses (EDDNs) have been trained in fluoride varnish application techniques by National Health Services Education for Scotland (Macpherson et al., 2019b).

1.4.1.4 Dental Primary Care

Under this universal component, the dental team provides preventative diet and toothbrushing advice in addition to clinical management/prevention for all children from two years of age who attend dental practice and twice-yearly fluoride application from three years of age (Childsmile, 2022b).

1.4.1.5 Childsmile Practice Community Intervention

In Scotland, a newborn baby is seen by a Health Visitor at 6-8 weeks through a universal health visiting pathway. The Health Visitor sees all children from birth to 5 years, along with their parents/carers. Health Visitor conduct an assessment and occasionally provide oral health advice and dental care kits to parents/carers. If a Health Visitor identifies the need for further oral health support, they will introduce the family to the Childsmile programme and make a referral to a Dental Health Support Worker (DHSW).

After receiving a referral from a Health Visitor, the Dental Health Support Worker contacts the family. The contact is made through telephone calls, home visits, or clinic appointments. The main activity of the Dental Health Support Worker is providing tailored advice on oral health, demonstrating toothbrushing, providing diet advice, and assisting the family with dental practice registration and facilitating appointments (Childsmile, 2022a).

Importantly, they also operate as community link workers. The family can be linked to community initiatives/services and resources such as parenting support, food banks, and other similar organisations if needed. This thesis will focus on the community-linking aspect of the Dental Health Support Worker's role within the Childsmile programme.

1.4.2 Childsmile Evaluation

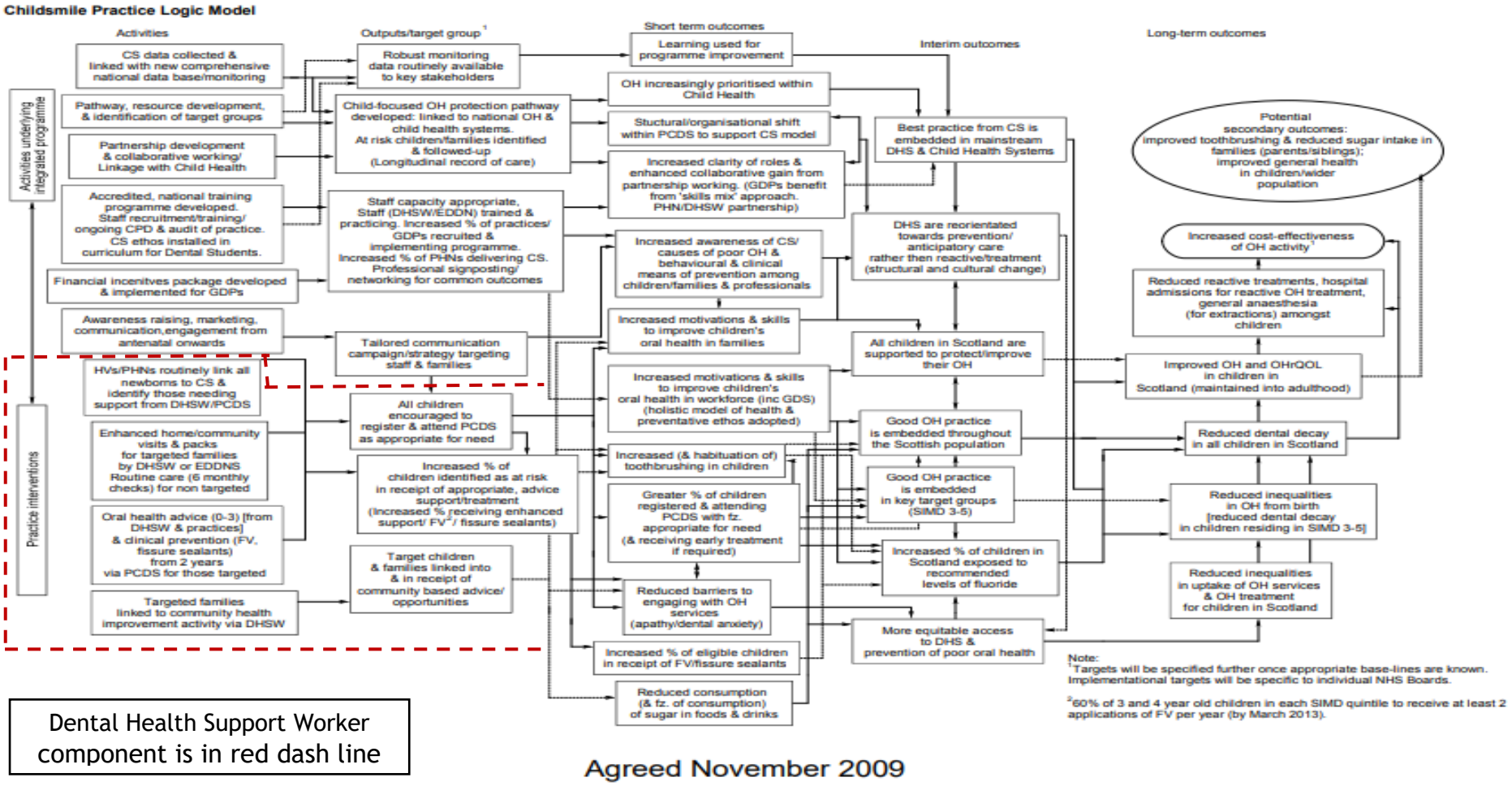
Complex public health interventions involve various agencies and settings, making it difficult to monitor and evaluate. The evaluation may not always follow gold standards, such as randomised controlled trials, because that may not be feasible or appropriate; therefore, a sequential application of various evaluation methods in multiple combinations can be applied (Minary et al., 2019).

The Scottish Government's Health Department supported and initially funded the Childsmile embedded evaluation. The evaluation is monitored by a Central Evaluation and Research Team (CERT) based at the University of Glasgow Dental School (Community Oral Health section). The evaluation process incorporates routine monitoring data from multiple agencies and the establishment of supportive IT systems (NHS Scotland Childsmile, 2021). It includes a formative assessment to improve the programme during implementation, and a summative assessment, to determine the programme's overall impact. The evaluation determines how Childsmile affects oral health and general health and its ability to reduce health-related inequalities.

The evaluation of the programme was carried out using an integrated theory-based model, guided by all stakeholders' views on how the programme should work and resulted in an outcome-focused evaluation model (Childsmile, 2022c). The process entailed evaluating outcomes and assessing the intervention's impact and the involved process of intervention implementation at various levels. The three primary domains for evaluation were Service Delivery (Quality), Service Impact, and Health and Behavioural Outcomes (Childsmile, 2022c). Recommendations after research and evaluation are fed back into the programme for optimal implementation and for the programme to evolve (Hodgins, 2017).

1.4.2.1 Childsmile Logic Model

The Childsmile evaluation is theory-based and follows a logic model whose development involves multiple stakeholders. The logic model drives the program's development, delivery, process and outcome evaluations.



Dental Health Support Worker component is in red dash line

Childsmile, 2010 document

Figure 1-3: Childsmile logic model

1.4.2.2 Outcome Evaluation

The Childsmile outcome evaluation employs multiple study designs, including randomised controlled trials, natural and ecological experiments, population-level cohort studies and economic evaluation to determine the reach and effectiveness of the programme. The linkage of routinely collected health and education data and Childsmile intervention data is used for these studies (Kidd, 2019). For example, in a population-wide study of n=99,071 five-year-old children in Scotland, a correlation between the national nursery supervised toothbrushing programme rollout and a reduction in dental caries experience among five-year-old children was explored through multiple dental epidemiology surveys and dental data sources. It was found that with increased uptake of the national nursery toothbrushing programme, there was a decline in dental decay among 5-year-old children. With more programme take-up by the health boards, there is an overall reduction in mean $d_3$mft (obvious dental decay extending to dentine, missing, and filled teeth in primary dentition), a decrease of 1.71 in the most deprived and 0.43 in the least deprived children (Macpherson et al., 2013).

Kidd and colleagues conducted a Scotland-wide study to evaluate the national oral health improvement programme through data linkage. The aim of the study was to explore the Childsmile programme's reach and impact on caries experience in children born in 2011/12 (n=50379 children). A longitudinal cohort was formed, and individual child-level data was used to link four different Childsmile intervention datasets to the National dental inspection survey data from July 2014 to June 2015. All Primary one (approximately 5-year-old) local authority school children of the academic year 2014 to 2015 who underwent the National Dental Inspection Programme were included. The study found that the universal interventions within the Childsmile programme reached a high proportion of the population; nursery-supervised toothbrushing (89.1%) and dental practice visits (70.5%). Whereas targeted interventions favoured most deprived areas according to the Scottish Index of Multiple Deprivation (SIMD), DHSW contacts for SIMD 1 (most deprived) was 29.5% compared to SIMD 5 (least deprived), 7.7%, and nursery fluoride varnish applications in SIMD 1 were 75.2% compared to SIMD 5, 23.2%. Children who participated in nursery supervised toothbrushing for three years or more had lower odds of caries experience, adjusted Odds Ratio (aOR=0.60; 95%CI 0.55 to 0.66). Children attending the regular dental practice for greater than or equal to six visits (aOR=0.55; 95%CI

0.50 to 0.61) had lower odds of dental caries experience than those who never attended. The study concluded that universal interventions such as nursery supervised toothbrushing and regular attendance at dental practices are strongly associated with reduced caries experience. In addition, nursery toothbrushing is more effective for children from high-deprivation areas (Kidd et al., 2020).

The nursery supervised toothbrushing component of the Childsmile programme across fourteen health boards in Scotland underwent economic evaluation in 2015 (Anopa et al., 2015). The annual cost of implementing Childsmile universal nursery toothbrushing and the yearly avoidance of dental treatment cost was investigated over the same time. The study's findings showed that nursery supervised toothbrushing in the programme's eighth year had savings of approximately three million pounds. The highest saving was observed for more deprived children. The cost-effectiveness of toothbrushing over routine treatment for dental caries showed that the programme cost per year was approximately £1.8 million. It was estimated that over time the saving was more than two and a half times the implementation cost of the programme (Anopa et al., 2015).

A study on the effectiveness of Dental Health Support Workers within Scotland's Childsmile programme in linking families to primary dental care was conducted through a quasi-experimental approach between 2010-2013. It showed that 33% of children assessed by Health Visitors were referred to Dental Health Support Workers. Out of the total referred children, 44% received intervention from Dental Health Support Workers. The attendance rate to primary dental care among those who received the intervention was 88%, in contrast to 82% who did not receive an intervention by a DHSW despite referral. The study concluded that Dental Health Support Workers based in the community effectively connected targeted families earlier for prevention to dental practices with those visited by Dental Health Support Workers seen six months earlier (Hodgins et al., 2018).

1.4.2.3 Process Evaluation

Besides summative outcome and cost evaluations, complex interventions like Childsmile need process evaluations to understand why an intervention works, when, for whom, and in what circumstances (Moore et al., 2015). This is central to Childsmile's theory-based approach. The main aim is to interpret the

programme's impact and explore what factors are affecting the ability to deliver what is intended. Multiple studies assess Childsmile's reach and programme delivery using routine monitoring data (Macpherson et al., 2019b) and data collected from stakeholders to understand facilitators and barriers to optimising roles, including that of the community link worker DHSWs (Young et al., 2021) (Mairi Young, 2017).

1.4.3 Childsmile Programme Limitations

There are some limitations to the Childsmile programme. While supervised toothbrushing is intended to be offered to all children attending nurseries, this may not happen if for example children attend part time and miss the allocated toothbrushing slot. Fluoride varnish application in General Practice is lower than intended (Childsmile-National Headline Data, 2023), and is also reported to be an expensive alternative to water fluoridation (Centres for Disease Control and prevention, 2019). Fluoride varnish is only applied to children's teeth in targeted nurseries; there may be children at risk in other areas who will not receive this. Further, application is subject to parental consent.

1.5 Community Linking

Community Linking is a non-medical intervention whereby health service staff support individuals by linking them to community services or organisations based on their needs (Buck and Ewbank, 2020). This is also referred to as Social Prescribing, and the terms are used almost interchangeably in the literature (see Chapter 5).

The idea of Social Prescribing is that it provides an alternative to drug or medical prescription. For example, to reduce the progression of chronic disease, a change of lifestyles, such as increased physical activity (Arsenijevic and Groot, 2017) or healthy cooking and eating (An et al., 2017), may be 'prescribed'. This involves a 'pathway' that takes patients out of traditional health services and into contact with charitable, voluntary or other community services. This is mainly initiated from Primary Care medical services at the moment but can also be utilised by other departments, such as secondary care professionals (medical specialists), to address holistic health and well-being (Public Health Scotland, 2018).

Community Linking tends to be employed for socially deprived populations, including those with complex physical and mental health issues. The rationale is that individuals with complex financial, social, and emotional difficulties are best addressed outside the medical sphere (Skivington et al., 2018, Husk et al., 2019).

Social problems account for almost 20% of patients visits to General Medical Practitioners (Polley M, 2016). Evidence suggests that Social Prescribing can improve an individual's self-efficacy and well-being (Morton et al., 2015). Social Prescribing is thus encouraged in UK Medical practices (Brandling and House, 2009) but there is still a need to explore the evidence-base for engaging communities and achieving health objectives (South et al., 2017). Burns and colleagues' systematic review of twenty-four studies on "interventions to link families with preschool children from healthcare services to community-based support" highlighted the importance of linking. Their population of interest were families or parents/carers with preschool children (under five years). The included studies were predominantly cross-sectional. The settings included routine child clinics, universal health visiting programmes, and clinics for children with specific needs such as developmental delay. The systematic review identified four main component parts of Social Prescribing/Community Linking that are of interest here: screening (using available psychosocial screening tools); signposting (providing information and indicating where to go); referral (sharing information with other departments or agencies for further management); and facilitation (one designated person takes the responsibility of actively facilitating). As the intervention becomes more complex, tailored, and individualised, the strength of the evidence weakens, and there are more methodological flaws. While the evidence for the effectiveness of Community Linking was described as limited, the review findings back up assistance by community support workers in connecting individual families to resources, especially if community support workers actively facilitate this activity. The findings also support a shift in linking practice in the United Kingdom from passive signposting to the development of a link worker or community support worker within healthcare and social settings to support more facilitation (Burns et al., 2021).

Tierney and colleagues conducted a realist review on "supporting Social Prescribing in primary care by linking people to local assets". The findings were drawn from 118 documents spanning 1992 to 2019, from various projects from Scotland, Wales, the south midlands and north of England, and Northern Ireland. The included studies were qualitative and quantitative study designs, but methodology rigour was not always strong. From their realist review, the reviewers developed a programme theory or logic, namely that: a) link workers, as an essential element of Social Prescribing, can help people develop social capital by increasing connectedness, learning new skills, and participating in activities that make life appear more fulfilling; b) link workers who are skilled, dedicated, and knowledgeable are valuable because they can assist patients in developing social capital; c) creating more extensive social networks keeps people from feeling isolated and exposes them to new outlooks and experiences, giving meaning to their lives; d) individuals with the knowledge and confidence can manage their health and feel in control (Tierney et al., 2020).

1.5.1 Social Prescribing/ Community Linking Models

The practice of Social Prescribing schemes varies across the UK. The differences depend on demographic/geographical reach areas, source of funding, level of funding, commissioning models, and elements such as identifying service users, referral pathways, and level of input that is expected to be provided by the social prescriber of the area (Dayson, 2017).

Two basic and fundamental distinctions can be made:

- Active linking (the facilitation of individuals or families to contact services and be supported to maintain contact) versus passive 'signposting' (basic provision of information)
- Direct linking (from a healthcare worker such as a General Practitioner to a community service) versus indirect linking (from healthcare to a link worker who then engages with the community services)

Chapter 5 will show a broad consensus that active facilitation is preferable. Kimberlee outlines a spectrum in this regard from signposting through to what they call 'light', 'medium' and 'holistic' levels (Kimberlee, 2015). At one end of the scale, signposting traditionally involves the provision of information – often a leaflet containing the contact information of a service or community resource.

The holistic end involves partnership working between health and community services such as clear networks for support; formal referral and facilitation of appointments, multiple appointments/contacts if needed; encouraging patients to take an active role in their care management etc. (see Chapter 5). Holistic models of linking involve the community service being viewed as a strategic part of the health and social care commissioning plan, utilised flexibly with alterations made as needed within a given framework (Dayson, 2017).

Morris and colleagues (Morris et al., 2022) outline Community Enhanced Social Prescribing (CESP) and stress the importance of integrating this in health and social care structures to improve patient outcomes and value for money and of building enabling environments that encourage people to help themselves. They also include a theory-of-change logic model (see derived logic for Childsmile in Chapter 7) describing, for example, how link workers should draw from a 'map' of local assets (see barriers/facilitators described in Chapter 6).

In terms of indirect linking, the National Health Services in England include Social Prescribing as a central part of their Personalised Care Strategy and has incorporated clear targets for recruiting link workers (NHS UK, 2019). Husk et al. distinguish clearly between direct referral and the use of a link worker and conclude broadly that 'well-trained and knowledgeable link workers are beneficial for accessing, developing knowledge of activities and assisting transitions between services' (Husk et al., 2019). However, they also conclude that there is a lack of well-developed methodologically sound evidence for the effectiveness of particular approaches.

1.5.2 Community Linking Programmes in Scotland

Despite this evidential gap, it is worth briefly outlining some of the Scottish Community Linking/Social Prescribing programmes.

1.5.2.1 Sources of Support (SOS) Social Prescribing Service

Dundee Sources of Support (SOS) focuses on improving the mental health and well-being of individuals due to their socioeconomic related issues. Patients who present to their General Medical Practitioners for low mood are referred to one of three social prescriber link workers employed in a Healthy Living Initiative and catering to four General Medical practices. The meeting between the Link worker and the patient can occur either in General Practice or a community

venue. Participants can talk to link workers confidentially, and non-medical community-based support is provided. The consultations are structured for 45 to 50 minutes. After this, the link worker discusses the issue and finds appropriate support that suits the patient's needs (Sheila McMahon, 2012).

1.5.2.2 Community Connector Programme

The Community Connector Programme is a Glasgow City Council initiative which aims to connect older people over 60 years and their carers to facilities and local voluntary sector services to support them to live well. The referral can be made by health and social care partners but also by carers, friends or family members. A Community Liaison officer provides support to three Community Connector ('link') Practitioners. The team is linked to the local housing association and provides health and well-being support through advocacy services, signposting, and referrals (GCVS, 2021).

1.5.2.3 Community Compass

The Community Compass was established in 2013 to support adults aged 16 years and over living in deprived areas of Edinburgh. Carr Gomm is a Social Care and Community development charity in Scotland that took the initiative to help individuals with issues that could not be managed medically. Referrals are from general practice, with link workers based at local libraries (meetings can be at either location). Patients are linked to local resources to assist with self-management. The target population may be living with isolation, debt, employment, relationship, housing or transport issues. Links are to various activities/groups like counselling services, educational course providers, or to volunteering roles. The staff provide person-centred, tailored support, including identifying and referring individuals to appropriate activities and accompanying them to their first appointment or thereafter until they feel confident (Carr Gomm, 2018, Helena Richards, 2018)

1.5.2.4 Health and Well-being Practitioner Service

As part of a National Health Services initiative in National Health Services Lothian, six full-time equivalent Well-being Practitioners based in the community provide targeted psychological support and coordinate care plans from mental health services. Nine General Practitioner practices in Edinburgh and Midlothian contribute and make referrals for individuals above 18 years of age with long-standing medical problems (Alisa Cook, 2018).

1.5.2.5 Edinburgh Community Link Workers

The Edinburgh Voluntary Organisation Council is part of the Edinburgh Third Sector Interface, together with Volunteer Edinburgh and Edinburgh Social Enterprise (all of these constitute the Third Sector Interfaces Scotland Network). Twenty-four community link workers work for the Edinburgh Community Link Worker Network, which covers 45 General Practices (EVOC, 2022). The main components are groups of General Practitioners serving as contact points and link workers providing the necessary skills based on the needs of the General Practitioners group. There are no referral criteria, but the emphasis is on vulnerable individuals. According to the 2019-20 report, the main focus was on areas of high deprivation in Edinburgh. The referrals were made for activity-based assistance, housing and benefits support (Ian Brooke, 2020).

1.5.2.6 Links Worker Programme (The Scottish Deep End Project)

The 'Deep End' group is a network of General Practitioner practices serving 100 of the most deprived areas of Scotland (Watt, 2011). The deprived areas were ranked according to the Scottish Index of Multiple Deprivation (University of Glasgow, 2018) and were based on the proportion of patients in the 15% most deprived Scottish data zones (ALLIANCE, 2015a). Patient consultations in deprived areas are at a premium for General Practitioners due to time constraints, higher patient needs, and multiple comorbidities.

This gave rise to the need for referral to other services or professionals (The Scottish Deep End Project, 2016). The programme initially focussed on linking, Social Prescribing and physical activity. The Health and Social Care ALLIANCE Scotland and the Government set up a clear programme framework for financial availability, programme management and evaluation. Funding was initially approved for two years. The Chief Executive of Health and Social Care ALLIANCE Scotland and the General Practitioner's representatives negotiated the programme implementation plan and deployment of the funds.

Initially, seven Community Links practitioners were employed and joined General Practices in Glasgow in 2014. They had one month of induction; the aim was to prepare Community Link Practitioners to enter a general practice environment and train them to develop knowledge of community resources and network activity.

The core values of the Links worker programme were in line with the Self-Determination Theory (Autonomy, Competence, Relatedness). These values reflected the main ethos of the programme and were embedded in the programme's execution (ALLIANCE, 2015c).

Patients needing support for non-medical problems were identified from General Practitioner practices by the Community Link Practitioner. They helped them individually to identify issues influencing their health and well-being. Community Link Practitioners developed contacts with local communities, formed a network, and facilitated individual persons according to their social needs.

Community Links practitioners are line managed by the Community Links manager, the Learning and Evaluation Officer and the Programme Director. These are, in turn, line managed by the Programme Director. The management group look after the operational activities of the programme. The programme's executive group, through the management group, conducts three weekly meetings for feedback and supervision. Every three years, a joint meeting of stakeholders (Programme management team, Lead General Practitioners and practice managers) takes place to review the programme's progress (ALLIANCE, 2015b). For programme development and implementation, the programme management team intends to partner with General Practitioners practice staff and involve them in achieving change. Special considerations were given to consent, confidentiality and Community Link Practitioners' involvement with the data collection and dissemination of information (governance issues).

A General Practitioner or a Practice nurse can make a Community Link Practitioner referral. The common issues that Deep End General Practitioner practices came across were social isolation, boredom, bereavement, mental health, anxiety, depression, stress, alcohol addiction, housing/homelessness, employment, benefits, financial support/debt, exercise, weight management/diet and family relationship (ALLIANCE, 2016).

1.6 Project Rationale

In the context of oral health improvement, despite improvements overall, inequalities in caries experience in children in Scotland have not reduced significantly and need further attention. The Dental Health Support Worker 'link' programme within Childsmile is targeted to families most in need who are

referred with the aim to provide additional and intensive support for implementing home toothbrushing, promoting a good diet and facilitating registration at dental practice when appropriate.

Where needed, Dental Health Support Workers can also link families to the third sector and other community resources that provide support for wider socio-economic issues such as finances, living conditions, employment, food insecurity, and family relationships.

There is some evidence that Community Linking can tackle inequalities by addressing the social determinants of health. Further review is needed (see Chapter 5), but there is some scope to explore possibilities of enhancing support through the Dental Health Support Worker programme.

The aim of this project was thus to explore the development of an optimal, evidence-based Community Linking/Social Prescribing pathway for families of young children within the Childsmile programme to improve oral health and tackle the social determinants of health to reduce inequalities.

The next chapter describes the research questions and studies carried out. Each has its own aims and specific objectives that were met in order to meet these aims.

Chapter Two

Aims, Objectives and Thesis Structure

This chapter outlines the overarching aim and overview of each study of the project. This has been approached through three dedicated research studies, each with specific aims and objectives, which set out to answer several important research questions.

The **overarching aim** of this project is to develop an optimal Community Linking/Social Prescribing pathway for families of young children to improve oral health and tackle the social determinants of health to reduce inequalities. To achieve this, the following **research questions** will be addressed:

1. What is the DHSWs Community Linking practice within the Childsmile programme?
2. What are the current evidence and best practice regarding Community Linking in the wider literature?
3. What are the barriers and facilitators to implementing an enhanced Community Linking pathway within the Childsmile programme?
4. How feasible and acceptable is an enhanced Community Linking pathway within the Childsmile programme?

The studies are:

- A secondary analysis of the pre-pandemic practice of DHSWs utilising population-wide child-level data on Community Linking (Chapter 4).
- A systematic overview “review of reviews and guidelines” of the evidence-based and best practices in Community Linking across healthcare (Chapter 5).
- An online survey of DHSWs views on current linking practice and the acceptability and feasibility of enhancing Community Linking within their part of the Childsmile programme (Chapter 6).

A general methodology is outlined in Chapter 3 before the dedicated study chapters and synthesis.

2.1 Study One (Chapter 4)

Aims

- To explore pre-pandemic Community Linking practices of Dental Health Support Workers within the Childsmile programme.

To meet this aim, the objectives were to learn how DHSWs refer children's families to various services and their methods of doing so. There were a number of other objectives that had to be met, including:

1. Define the study cohort.
2. Define DHSWs referral and contact.
3. Undertake data management and cleaning.
4. Carry out the requisite analyses to answer the study research questions.

Study one was a secondary analysis of the Community Linking practices of DHSWs within the Childsmile (CS) programme using child-based individual level, monitoring data on Community Linking through the Health Informatics Centre (HIC) in the National Safe Haven. A Safe Haven is a secure location where trained personnel operate under agreed operational standards and principles. The health data can be processed, linked with other data, and made available for research. There are stringent governance procedures in place to ensure data confidentiality and disclosure. The researchers work with the data under Public Health Scotland's control through one of its departments called eDRIS (Electronic Data Research and Innovation Service) (NHS Research Scotland, 2021) (The University of Edinburgh, 2021, Aisha Agbaje et al., 2020). We selected the Child Health Surveillance (CHS) 6-8 weeks Review dataset as a baseline-controlled group.

2.2 Study Two (Chapter 5)

Aims

- To explore current best practices in Community Linking across healthcare through a 'systematic overview' methodology.

To meet this aim, there were a number of objectives that had to be met, including:

1. Identify relevant scientific databases and sources of 'grey' literature to search.
2. Review previous literature and develop an appropriate search strategy (this is outlined in Appendix 7), amended for different databases.
3. Conduct a search and contact authors where appropriate.
4. Develop clear inclusion and exclusion criteria and screen searched papers (title and abstract, full text).
5. Resolve any conflicts in reviewer opinions through discussion.
6. Appraise the quality of reviews and guidelines using validated tools.
7. Extract data from high-quality sources and summarise using the conceptual model for implementation (see Chapters 3 and 5).
8. Summarise data in narrative form to answer key research questions and feed into the final synthesis and programme theory in chapter 7.

Community Linking is not commonly practised in dentistry or through oral health services, and to optimise and enhance this component, we need to understand how other settings take Community Linking up. A systematic overview is a relatively new approach. It is applied when there are already systematic reviews on the related topic to collect, evaluate, and synthesise the findings of related systematic reviews methodically (Hunt et al., 2018). The overviews evolved due to an increasing need to filter information overload to inform healthcare decision-making and improve access to targeted data (Smith et al., 2011).

We conducted a systematic overview of reviews and guidelines to explore Community-Linking intervention implementation. The objectives were 1) to summarise best practices in the Community Linking intervention from other settings, such as general medical practices, to community support services. 2) Identify facilitators and barriers in successful service provision for both service

users and service providers. 3) To identify the effectiveness of intervention of individuals' health and well-being outcomes utilising these services.

In view of the research question, a search strategy was formulated, and an initial search strategy was piloted and later finalised (Appendix 6).

A systematic online search of databases (Medline/ CINAHL/ Embase/ASSIA) was performed using our search strategy on Community Linking/Social Prescribing to identify relevant systematic, realist and scoping reviews and guidelines. A wide range of government and professional websites were searched, and bibliographies of reviews and guidelines were hand searched.

We used four specific checklists to assess the quality and risk of bias for systematic/non-systematic reviews and guidelines. A validated AMSTAR II checklist was used to evaluate the quality of Systematic reviews (Shea et al., 2017), Rameses II for Realist review (Wong G, 2017), Cooper et al. checklist for Scoping review (Cooper et al., 2019) and AGREE II for critically appraising guidelines (Brouwers MC, 2017).

The findings were reported using the theory-based CFIR model for implementation, which has five domains. The CFIR is a conceptual model created to help researchers conduct a systematic analysis of multi-staged implementation to ascertain the factors that may influence the effectiveness and implementation of the intervention (Damschroder et al., 2009). It is a widely used framework that includes a list of constructs, possible facilitators and barriers to implementation (Damschroder et al., 2009, Nilsen, 2015).

2.3 Study Three (Chapter 6)

Study one was undertaken to learn about Dental Health Support Workers current Community Linking methods and how they refer children's families to various services. Study two involved a systematic overview of systematic reviews and guidelines to explore community-linking best practices in other settings, such as general medical practices. In addition, to identify facilitators and barriers to successful service delivery and determine the potential effectiveness of this intervention, study three was a population-based online survey for DHSW to explore the acceptability and feasibility of enhancing Community Linking within the Childsmile programme to optimise its pathway.

Aim

- To explore current practice and staff views on enhancing Community Linking service in the Childsmile programme.

To meet this aim, there were a number of objectives that had to be met, including:

1. Obtain ethical approval to conduct an online survey.
2. Contact relevant staff in the Childsmile organisation and build a dataset of DHSWs contacts (with data security and governance approval).
3. Design the mixed methods (open-ended and scale questions) questionnaire (Appendix 12).
4. Gain approval on content from programme managers and feedback from an advisory group of users (DHSWs).
5. Obtain a software licence to administer the survey.
6. Recruit and consent DHSWs to take part.
7. Send out survey links and reminders where appropriate.
8. Export to statistical software for descriptive analysis and visual presentation of results of fixed-scale questions.
9. Export to qualitative analysis software for the development of themes emerging from open-ended questions.

The previous research by Hodgins and colleagues on DHSWs was on tailoring family needs and providing support that matched the family's requirements (Hodgins, 2017). Their findings suggested that child dental attendance improved

after the Dental Health Support Worker intervention. The outcome of efforts to improve oral health can also be observed by the National Dental Inspection Programme Scotland oral health report 2020, demonstrating a reduction in caries experience in primary one children across Scotland from 73.5% of Primary one children with no caries experience in 2020 compared to 45% in 2003. However, there is a need to address and reduce the inequality gap. To achieve this, Dental Health Support Workers understanding of the Social Prescribing/Community Linking process and the extent of their practice was necessary. It was also essential to consider their point of view if a change in their working methods is required. The acceptability and feasibility of such a change are needed for them to be at ease and willing to take ownership of enhancing community-linking intervention implementation. Their direct involvement in the DHSW's service and training restructuring could produce positive outcomes.

An online survey was designed containing closed and open-ended questions. The various sections of the survey were theoretically mapped according to the CFIR model. We used signposting typology from study one and the overview findings to inform survey questions. The results were analysed descriptively for Likert scales and illustrative models for open-ended responses. Word cloud was used to visualise overcoming barriers to enhanced Community Linking. The details of the survey design and methods are in Chapter six.

The answers to the research questions in studies 1-3 (Chapters 4-6) are fed into a final synthesis in Chapter 7, which takes the form of a logic model articulating programme theory for Community Linking in Childsmile. This is part of the discussion of results leading to a final short recommendations and conclusions chapter (Chapter 8). The following chapter now describes the overarching methodology followed by the three studies.

Chapter Three
Overarching Methodology

The chapter describes the overarching methodology that guides the studies that follow. The work involved a mixed-method project with three studies; specific methods and procedures for each study are provided in Chapters 4-6.

3.1 Childsmile Process Evaluation

Childsmile has an embedded, theory-based research and evaluation element which helps provide strategic direction (led by the University of Glasgow in partnership with National Health Services Scotland and the Scottish Government).

The programme is conceptualised as a complex intervention with various levels of programme delivery and evaluation from individuals to society (Skivington et al., 2021). Programme theory (a framework for how Childsmile is supposed to work) is articulated in logic models which guide evaluation, research and improvement (Macpherson et al., 2010) and sets priorities for the summative evaluation of outcomes (Macpherson et al., 2015). The logic model guides a longitudinal process evaluation with three key aims; to assess whether the programme is being delivered as intended; to check assumptions underpinning the programme (e.g. in terms of policy changes or new evidence emerging), and to set out key programme components or activities. Due to several interacting components, Community Linking is a complex intervention. Early fidelity monitoring of implementation is helpful to identify the challenges an implementation will encounter and to make changes to keep the programme on track. The best way to accomplish this is to connect the data to the programme logic model which allows evaluators to identify problem areas (Holliday, 2014).

The logic or Programme Theory of Childsmile iterates over time, and knowledge gained during this thesis has helped develop a specific logic for the pathway by which Community Linking or Social Prescribing can be implemented in the programme to support families' health and well-being and reduce inequalities (see Chapter 7).

3.2 Implementation Science

The process evaluation employs Implementation Science, which is the term that has come to be used for the uptake of evidence-based practices and/or improvement interventions and the identification of factors that affect this. The central point is that there are known barriers and facilitators to implementation at multiple levels, e.g. individual, organisational and cultural (Bauer and Kirchner, 2020). The aim is to develop and execute implementation strategies to overcome these barriers and improve facilitators so that evidence-based clinical or organisational developments are more widely adopted (Bauer and Kirchner, 2020).

Optimising recommendations from research is known to require a systematic approach to planning, implementation and evaluation, which Implementation Science provides (Wensing et al., 2020).

It has been reported that implementation research that lacks a theoretical or determinant framework impedes the scientific goal of generalising the process and building on the evidence (Kirk et al., 2016). Having a theoretical framework helps guide data collection, analysis, and interpretation.

The lack of a guiding model in implementation would make it difficult to determine why an implementation succeeded or failed or to identify the factors that contributed to its success (Nilsen, 2020). The gaps in implementation strategies could also be identified through implementation models and frameworks that help prioritise action areas (Villalobos Dintrans et al., 2019).

Nilsen broadly divided theories/models for implementation into five categories (Nilsen, 2020).

1. Process models specify the steps in translating the research into practice. Some of the examples are the CIHR (Canadian Institutes of Health Research, 2014), Model of Knowledge Translation (Canadian Institutes of Health Research, 2016), the Stetler Model (Stetler, 2010), the ACE (Academic Centre for Evidence-based Practice), Star Model of Knowledge Transformation (Stevens, 2012), the Knowledge to-Action Model by Graham and colleagues (Graham and Tetroe, 2010), the Iowa Model (Titler et al., 1994, Titler et al., 2001), the Ottawa Model (Logan and Graham, 1998, Rycroft-Malone and Bucknall, 2010), a model by Grol and Wensing (Grol and Wensing, 2004), a model by Pronovost and colleagues

(Pronovost et al., 2008), and the Quality Implementation Framework (Meyers et al., 2012).

2. Classic theories are the theories that developed external to the implementation science. These theories are passive and explain the mechanism of change without including an implementation action plan. For example, the Theory of Diffusion (Rogers et al., 2014), social cognitive theories, cognitive processes and decision-making theories, social networks theories, social capital theories, communities of practice, professional theories, and organisational theories.

3. Implementation theories are the theories that are either adapted or developed by the researchers working on implementations to better understand and explain a few aspects of the implementation phenomenon. Examples are Absorptive Capacity (Zahra and George, 2002), Organisational Readiness (Weiner, 2009), Normalization Process Theory (May and Finch, 2009), (Capability Opportunity Motivation and Behaviour) COM-B (Michie et al., 2014).

4. Evaluation frameworks; These frameworks provide a structure for an implementation process. Examples are RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) (Glasgow et al., 1999), the framework by Proctor and colleagues (Proctor et al., 2011) and PRECEDE-PROCEED (Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation-Policy, Regulatory, and Organisational Constructs in Educational and Environmental Development) (Green, 2005, Nilsen, 2020).

5. Determinant frameworks specify the types or domains of determinants that can influence implementation outcomes. Each determinant can have several barriers and facilitators at different organisational levels. Examples are (Promoting Action on Research Implementation in Health Services) PARIHS framework (Estabrooks et al., 2009, McCormack et al., 2009), Active Implementation Frameworks (Bailey, 2012), Understanding-User-Context Framework (Jacobson et al., 2003), Conceptual Model (Greenhalgh et al., 2004), the framework by Grol et al. (Grol and Wensing, 2004), the framework by Lorna Cochrane and colleagues (Cochrane et al., 2007), the framework by Nutley et al. (Nutley et al., 2007), CFIR (Damschroder et al., 2009), framework by Gurses and colleagues (Gurses et al., 2010), the framework by Ferlie and Shortell (Ferlie and Shortell, 2001), Theoretical Domains Framework (Michie et al., 2014).

It was decided that a determinant framework would work best for this research as Childsmile Community Linking has already been implemented to a certain extent, but there was evidence from the programme that its delivery was variable, and there were barriers at different levels.

Nilsen's Determinant frameworks suggest a systems approach to implementation intervention by recognising a relationship between and among various levels of different determinants (Nilsen, 2020). The determinant frameworks were developed in two ways. One was synthesising results from empirical studies of barriers and enablers for successful implementation. Examples of such frameworks were Cochrane et al.(Cochrane et al., 2007); and Greenhalgh et al (Greenhalgh et al., 2004). And others, for example, the frameworks by Gurses et al. (Gurses et al., 2010) and the CFIR (Consolidated Framework for Implementation Research) (Damschroder et al., 2009), used existing different disciplines determinants frameworks and their pertinent theories (Nilsen, 2020).

3.3 The Consolidated Framework for Implementation Research

Damschroder and colleagues reviewed published reports of empirical studies and implementation theories to identify variables associated factors for effective development of implementation for the Consolidated Framework for Implementation Research (CFIR) framework. After considering various definitions and construct terminology, they compiled an overarching framework with thirty-nine constructs and five domains on factors that can likely affect intervention implementation (Damschroder et al., 2009). The CFIR framework can also assess the implementation's initial phases and inform stakeholders about the intervention's progress (Damschroder et al., 2009).

The CFIR is a conceptual framework that serves as a pragmatic information resource of standardised implementation-related constructs that can be used across various implementation research domains (Damschroder et al., 2009). It is also used for data collection, such as an interview guide, or to underpin a survey, analyse, code, interpret data, or report implementation research findings (Damschroder et al., 2009). The CFIR framework has been used at the pre-implementation stage to inform programme implementation strategies (Taylor et al., 2020). During COVID-19, Taylor and colleagues did a rapid pre-implementation evaluation of the navigator's programme for family engagement

to evaluate stakeholders (critical care physicians, nurses, medical students and researchers) perceived barriers and facilitators. The evaluation was conducted in two stages in a teaching hospital (specialist unit) in North Carolina. A survey with open-ended questions guided by Consolidated Framework for Implementation Research constructs was used (n=14) in the first stage, and feedback from the pilot in the second. The research findings showed that the stakeholders used multilevel implementation strategies, the facilitators/barriers and the next step for successful implementation to engage families. The strategies were feedback, ongoing training, flexibility in approach, constant workflow designing, encouraging workforce leadership and engaging community resource (Taylor et al., 2020). Elisabeth Björk Brämberg and colleagues investigated Swedish national policy (return to work) implementation using a web survey for stakeholders (eighteen county council process leaders [n=30], clinicians [n=580], patient employers + occupational health services + employment office [13]) understanding of its use (Björk Brämberg et al., 2020). The Consolidated Framework for Implementation Research model was used to systematically evaluate implementation perceived use, focusing on the facilitators and barriers (Björk Brämberg et al., 2020). The CFIR describes why implementation has worked or failed at various stages and recognises essential modifiable factors that can encourage or undermine adoption (King et al., 2020). It gives insight into the facilitators and barriers of evidence-based intervention characteristics, the outer and inner setting, characteristics of the individuals, and the process involved for implementing and intervention (Damschroder et al., 2009).

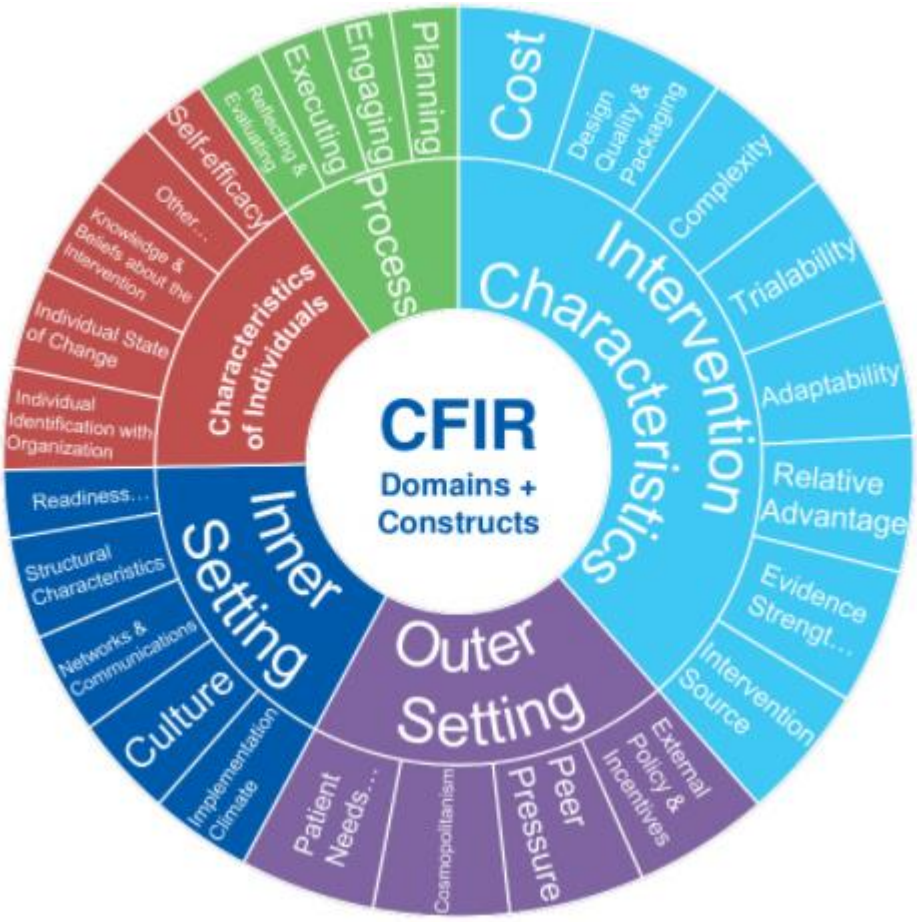
Since the 2009 publication of the CFIR framework, it has been cited by over 1000 peer-reviewed articles as of 2019 as indexed in PubMed, and over 3000 articles cited the CFIR listed in google scholar, demonstrating its utilisation in implementation science (Damschroder et al., 2020).

The CFIR framework was used in our project because it examines broader organisational and societal factors related to implementation. We are in the exploratory phase, focusing on contextual factors (facilitators and barriers) and Community Linking processes within the Childsmile programme. The Theoretical Domains Framework (TDF), on the other hand, focuses on behaviour change after identifying specific professional behaviours that are desired (Atkins et al., 2017).

It may be that in future, if Community Linking is employed more systematically that behavioural approaches can help standardise practice.

Figure 3-1 is on the domains and constructs of the CFIR framework. It shows:

1. Intervention characteristics: There are eight constructs to this domain. It relates to the aspects of the intervention that can influence the success of implementation.
2. Outer setting: There are three constructs to this domain – It relates to the external influences that can impact intervention implementation.
3. Inner settings: There are five constructs to this domain. The fourth and fifth ones are further divided. It relates to the characteristics of the organisation that is implementing the intervention.
4. Characteristics of the individuals involved: There are five constructs to this domain. It relates to the individual's beliefs, knowledge, and self-efficacy.
5. Process: There are four constructs to this domain. The second construct is further divided. It relates to the implementation process that includes planning, execution, and evaluation.



(Isomi Miake-Lye et al., 2017)

Figure 3-1: The Consolidated Framework for Implementation Research domains and constructs

The CFIR framework has been used both in qualitative and quantitative studies. For example, Young and colleagues in the USA designed their qualitative study on mobile apps of entrusted professional activities using the CFIR framework to identify barriers and facilitators to engagement (Young et al., 2020). Crowley and colleagues from the University of Maryland (USA) designed a survey for staff pre and post-implementation based on the CFIR model and evaluated electronic health record implementation (Crowley et al., 2019). Nevedal and colleagues from the USA compared rapid versus traditional qualitative research methods employing semi-structured interviews using the CFIR framework for collecting data and analysis (Nevedal et al., 2021).

3.4 Overall Thesis Structure

The three integrated studies follow the general model for the process evaluation of complex interventions: are we doing as currently intended? (Fidelity to the programme logic); can we do better? (Examining the assumptions of the

evidence-base for the intervention); and what are the barriers/ facilitators to improvement (see Figure 3.2).

The three studies are described in the chapters that follow. Chapter 5 is a systematic overview of Community Linking evidence, and Chapter 6 examines barriers and facilitators from the perspective of staff delivering the intervention. But the first step was to examine the current linking within the programme Chapter 4 (Pavis and Morris, 2015).

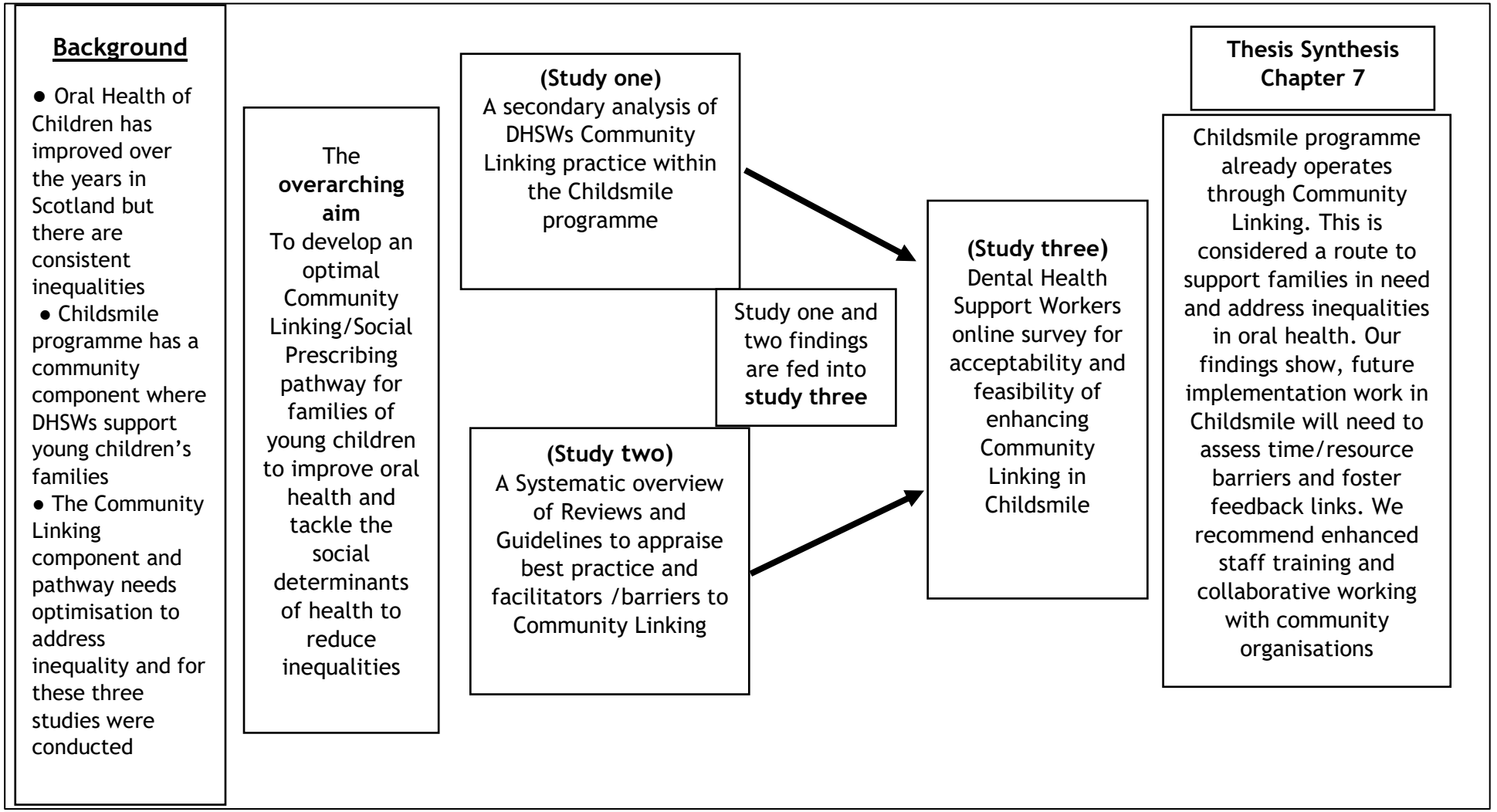


Figure 3-2: Project flow diagram showing the background situation, the three studies conducted and the thesis synthesis

Figure 3-2 shows the links between the studies. The CFIR model was used to extract data from high-quality evidence sources and guidelines and to design the themes for exploring barriers via the staff survey. Data from study 1 and study 2 were fed into the survey to questions about current practices and potential improvements and obstacles, respectively.

The specific research questions with methods and procedures for each study are now described, with results and short discussions. Broad methods are mixed and are:

- A secondary analysis of routine data: the research and evaluation programme benefits from access to national data 'the National Safe Haven', which is a secure, supported environment for routine data access and linkage (Pavis and Morris, 2015), which Public Health Scotland coordinates (see Chapter 4).
- A systematic overview following standards for data searching, appraisal and extraction.
- A staff survey with a mixture of fixed-response and open-ended questions.

Study results then feed into the development of a logic model for an enhanced pathway for Community Linking in Childsmile in Chapter 7.

3.5 Ethical Considerations

Study one involved a secondary analysis of routinely collected administrative data held within Public Health Scotland. Ethical approval for the overarching Childsmile programme evaluation) was given by the University of Glasgow College of Medicine, Veterinary and Life Sciences ethics committee (project No. FM 04908 (Appendix 1). Information governance approvals were given by National Health Service Scotland's Public Benefit and Privacy Panel for Health and Social Care (PBPP, 2022) (Appendix 2).

Study two is the systematic overview to collect evidence for best practice; no ethical approval was required.

Study three involves acceptability and feasibility testing through confidential online surveys of the entire workforce of DHSWs of Scotland. The University of Glasgow's ethical approval was taken.
The **MVLS College Ethics Committee Project:** Community Linking in Childsmile (CLINCH) study 200200027 (Appendix 3).

Health informatics data remain in the National Safe Haven. After analysing the data, tabulated data is released following a disclosure protocol. Once the survey was closed, all personal identifiers were replaced with an anonymised unique ID. All the survey data were stored on a secure university shared drive (accessible only by researchers) on a password-protected computer, following our data security protocol (Community Oral Health) which is in full compliance with the General Data Protection Regulation (GDPR 2018).

Chapter Four

A Secondary Analysis of DHSWs' Community Linking Practice within the Childsmile Programme (Study One)

4.1 Introduction

This chapter aims to explore the role of the Dental Health Support Workers within Childsmile with respect to the home-based support they provide to families. This role is described in detail in section 1.4. We will first explore the general support provided to families by Dental Health Support Workers and then focus on community-linking activities. Please note this analysis was undertaken pre-pandemic. During the pandemic, all Childsmile home visits were halted, and a majority of Dental Health Support Workers were redeployed within the National Health Service to work on the pandemic response.

Specifically, the research questions (RQ) are:

1. What are the rates of referral to the DHSW programme, and have these changed over time?
2. What are the characteristics of the families referred to and contacted by the DHSWs, and have these changed over time?
3. What is the frequency of contact and types of intervention (including Community Linking) delivered by DHSWs?
    a. Have these changed over time?
4. What types of community services/resources have families been linked to?
5. What factors are associated with families who are linked to community services /resources by DHSWs?

4.2 Methods

4.2.1 Study Design and Participants

This is a longitudinal cohort study in children from birth to 3 years of age born between January 1st 2011 and June 30th 2015, who had undergone a child health surveillance assessment by a Health Visitor in Scotland within their first year. As the DHSW intervention is primarily to support families in the early years up to the stage the child starts nursery school; these children were followed up for

three years, so the last data point was collected on June 30th 2018. The main cohort was partitioned into 4.5 sub-cohorts to reflect the five calendar years: The first cohort was children born from January 1st 2011 - to December 31st 2011. The second was children born on January 1st 2012 – December 31st, 2012. The 3rd was children born from January 1st 2013 – December 31st 2013. The fourth was children born between January 1st – December 31st 2014. And the fifth was children born within a half-year period from January 1st 2015, till June 30th June 2015.

4.2.2 Datasets

4.2.2.1 The Child Health Systems Programme Pre-School 6-8 Week Review (CHS 6-8 WR)

This dataset was initiated in 1991 as a universal child health surveillance system for Health Visitors (Public Health Scotland NDC, 2020). By 2001, it had been implemented in most Scotland health boards, though some did not join until after. A Health Visitor (HV) or a General Practitioner (GP) usually performs the CHS 6-8 Weeks review on all children between six and eight weeks from birth in Scotland.

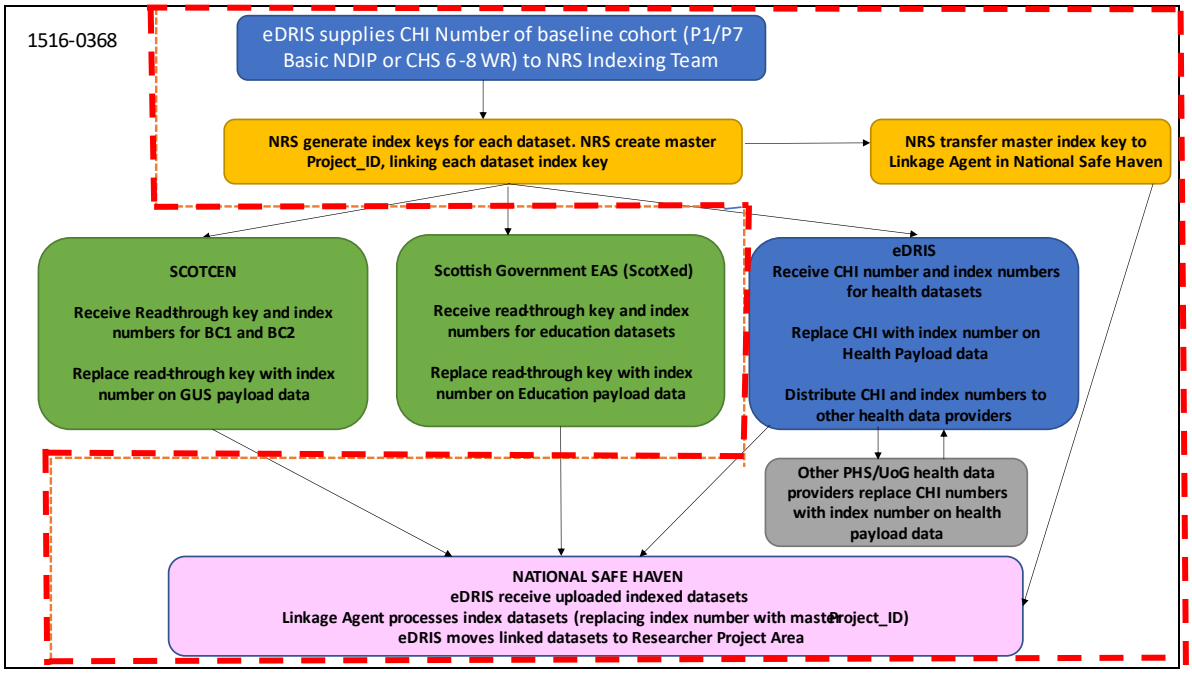
The Dental Health Support Workers work closely with Health Visitors, who make relevant referrals, based on individual family need. At this assessment, the Health Visitor may feel that the family would benefit from additional support with the child's oral health and will refer them to a Dental Health Support Worker embedded within the Childsmile programme. This referral information is flagged up within the Child Health Surveillance dataset. The DHSW will make contact with the family, link them with a dental practice for routine appointments where appropriate, provide additional oral health home-based support (e.g. toothbrushing/dietary advice) and refer the family to wider community services if appropriate (Community Linking) (Childsmile manual, 2016). The Child Health Surveillance dataset (6-8 weeks) was the obvious baseline dataset to use as it captures more than 95% of the children born in Scotland. This was then linked with the Childsmile datasets regarding Dental Health Support Worker activity which allowed the creation of a natural control group: i.e., those who were not referred to a DHSW.

4.2.2.2 Childsmile Intervention Databases

The Childsmile intervention databases held in Public Health Scotland (known as the Health Informatics Centre datasets) (Public Health Scotland, 2020a) consist of individual family-level data on the timing and nature of contacts with DHSWs and the interventions (dietary advice, toothbrushing support, provision of dental packs, Community Linking, DHSW facilitation of a dental appointment) they deliver to families in their homes. These data are collected by the Health Informatics Centre (HIC), University of Dundee and are primarily used to support DHSW activity in the community. Once a child/family has been referred to a DHSW (primarily by a Health Visitor) for additional oral health support, the DHSW attempts to contact that family, usually by telephone, in the first instance. If needed, arrangements are then made with contacted families for the DHSW to meet with the family, usually at their home, and additional support is then provided in the form of dietary advice, toothbrushing support, provision of dental packs, facilitation to register with a dentist and if required, linking with external community services/activities (Community Linking). All this information is recorded on the HIC system (a web-based system) by the DHSWs each time they attempt to contact/make contact with a family. These data are collated quarterly and transferred to Public Health Scotland for linkage with other health/ administrative datasets.

4.2.3 Linkage of Datasets

The electronic Data Research and Innovation Service (eDRIS) linked the data between the Child Health Surveillance dataset (4.2.2.1) and the HIC dataset (4.2.2.2). eDRIS serves as a central point of contact for researchers seeking access to linked datasets via a National Safe Haven and supports the National Safe Haven by providing a platform for data access, management, and analysis. This project was part of the overall evaluation of the Childsmile programme. The overall evaluation had a number of different components to it, and the linkage process for this is illustrated in Figure 4-1. The process within the dashed red lines applies to the linkage process for the current study. All of this is carried out by third-party analysts within eDRIS. The linked datasets are then made available to researchers within a designated area of the National Safe Haven, accessed via a virtual private network (VPN) within the University of Glasgow.



(Childsmile.org.uk, 2021, Kidd, 2019)

Figure 4-1: Flow diagram of Data Linkage process

4.2.4 Data Cleaning and Management

This study included a significant amount of data cleaning and management. Duplicate records were checked and deleted as appropriate. All dates were checked for validity, and all coding of variables was checked.

The age of the child when the DHSW delivered an intervention was calculated from the date of birth (from the CHS 6-8 WR) and the age at referral/intervention from the HIC dataset.

Date of birth and sex were cross-checked across datasets to ensure valid linkage of the two datasets (CHS 6-8 WR and HIC).

Once the baseline cohort was created from the Child Health Surveillance dataset, records from the Health Informatics Centre dataset were linked using the study specific unique identifier.

Figure 4-2 is a flow diagram that shows various steps involved in the data linkage.

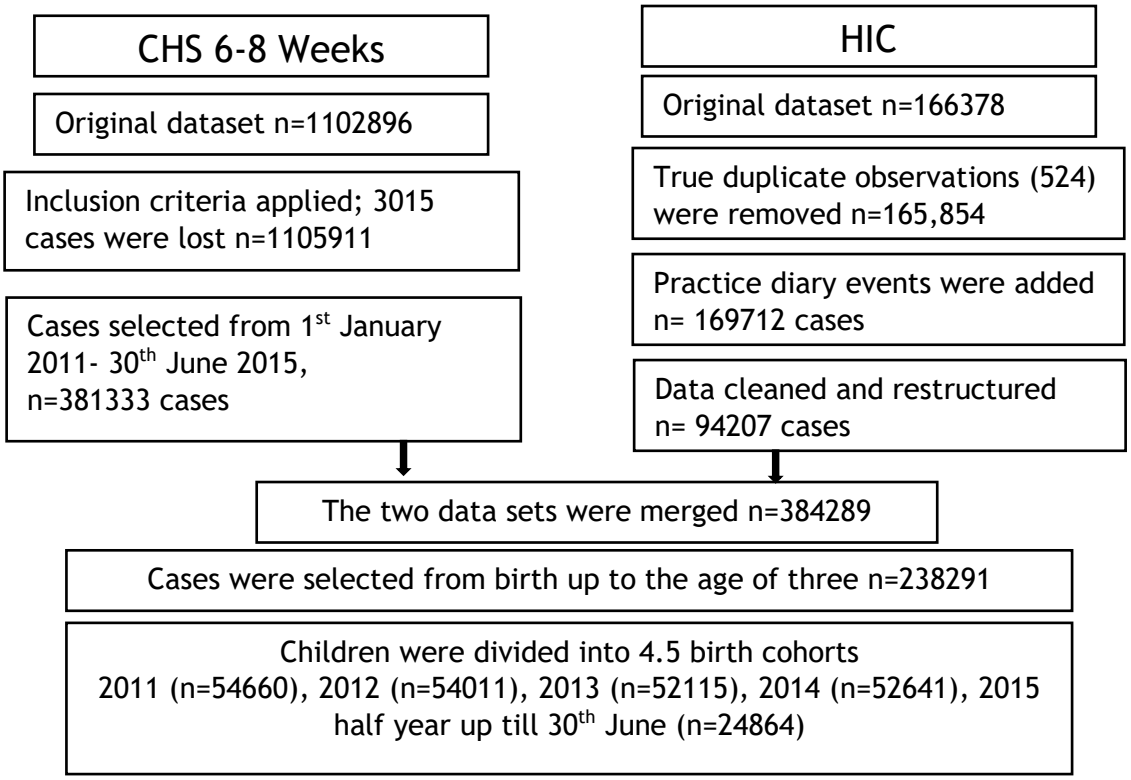


Figure 4-2: Flow diagram of data management

The community services/resources where the families were linked were categorised under nine headings: Nutrition/diet, local parents/baby groups, parenting skills, financial support, smoking cessation, language support, statutory services, and others. Appendix 4 provides detailed information on how the community services were categorised and what types of services were offered.

4.2.5 Information Governance Approvals

The study required approval from the National Health Service (NHS) Scotland Public Benefit and Privacy panel for Health and Social care, because it involved using pseudonymised data obtained from National Health Service patients (Reference: 1516-0368 Mahmoud, (Appendix 2) (PBPP, 2022). The National Health Service Scotland Public Benefit and Privacy Panel (PBPP) is a health and social care patient advocacy panel that evaluates the ethical implications of applications for non-direct care to access National Health Service health data in Scotland for the benefit of the patient (PBPP, 2022). There was no direct contact with National Health Service patients for this study (Appendix 1).

4.2.6 Ethics Approval

An existing University of Glasgow College of MVLS ethics approval for the overarching Childsmile programme evaluations covers this study (project No. FM 04908). Childsmile evaluation was considered an "NHS service development"; National Health Service ethical approval was not needed (Appendix 1).

4.2.7 Approved Researcher Status

The National Safe Haven hosted by Public Health Scotland securely stores the linked data. The researchers must first meet the requirements to become approved researchers before accessing the data. This includes Information Governance training to familiarise researchers with data protection policies and procedures and freedom of information policies and sanctions in the event of a breach of data confidentiality or security. The researcher's organisation must be approved. The study approvals must be in place, and the researcher's name must be entered into the data-sharing application. (Public Health Scotland, 2020a)

All involved in this study took MRC (Medical Research Council) Regulatory Support Centre: Research Data and Confidentiality e-learning and completed ten research, GDPR and confidentiality modules linked to data protection and information governance. It is mandatory that the training in Information Governance be recent and updated every three years. Training re-attendance is required if the training certificate expires during the project time.

Access to the data held within the National Safe Haven was provided through a remote desktop via a University of Glasgow virtual private network (VPN).

4.2.8 Statistical Analyses

IBM SPSS software V 24 was used for data analysis in the National Safe Haven.

All variables were summarised appropriately and were presented partitioned by cohort year. Continuous variables were summarised using mean/median, standard deviation/Q1/Q3 and minimum and maximum values, depending on whether the data were considered symmetrical or not. Categorical data were presented as percentage with numbers in brackets. Chi-squared tests or Fisher's Exact tests were used to test associations between categorical variables. Binary logistic regression models were used to identify factors associated with families being linked to community resources by DHSWs. Unadjusted and adjusted odds

ratios and 95% Confidence intervals were calculated. All models were adjusted for sex, age, SIMD fifth.

Sex was defined as the gender assigned to the child at birth. Age refers to the period beginning with birth. The cohort years were the years according to which children were grouped based on their birth year. The Scottish Index of Multiple Deprivation (SIMD) 2012 (Data Government UK, 2021) is an official tool of the Scottish Government to identify areas of deprivation concentration. It is a relative measure of deprivation across various zones of Scotland based on multiple criteria such as income, employment, education, health, crime, housing and living condition. The deprivation ranks are grouped into fifths. Each group contain 20% of the population. SIMD1 consists of children born in the 20% most deprived areas, and SIMD5 consists of children born in the 20% least deprived areas. The Health Plan indicator (HPI) is assessed by the Health Visitor at the 6-8 weeks assessment and is an indicator of the level of support a family need from external services-based on the judgement of the Health Visitor. The scores range from “Core” to “Additional” to “Intensive”. Core support includes Health Visitor contacting the family for basic child screening and surveillance to assess breastfeeding practice, child growth and development through discussion with parents as child obtains each milestone. Including assessment of height, weight, muscle tone, hearing, vision, and social interactions. Additional support is structured support for first-time mothers experiencing difficulties with breastfeeding and mental health. Intensive support is structured interagency support for looked after children, child on child protection register or disabled children or if there are significant parental stresses (NHS Scotland, 2010).

4.2.9 Disclosure of Results

A request form and checklist help develop a request for outputs and prepare for disclosure control. Once submitted, two eDRIS staff members check the requested outputs and, if satisfied, release the results of the data analysis to be shared.

4.3 Results

We first present the characteristics of the five birth cohorts overall and then compare the characteristics of families referred to the DHSW with those not referred in the general population. Next, we describe the frequency and types of intervention delivered by the DHSWs (including Community Linking activities). Finally, we explore the types of community services/resources that families are being linked with and which factors are associated with families being linked to community services.

4.3.1 Characteristics of the Cohort

The full cohort for this study consisted of 238,291 children born between January 1st 2011, and June 30th 2015, who had a Child Health Assessment (6-8 weeks) in Scotland before the age of one year and were followed up to the age of three years. Children were divided into birth cohorts according to calendar year. Children born in 2011 (n=54,660), 2012 (n=54,011), 2013 (n=52,115), 2014 (n=52,641), and 2015 (n=24,864) were followed up for three years. For births in 2015, there were only six months of the final birth cohort due to the cohort end date of June 30th, 2018 (i.e., the last date of data availability). These comprised the population of children born in Scotland during this period.

Table 4-1 presents the characteristics of the cohort, including sex, age at Child Health Surveillance 6-8 Weeks Review (CHS 6-8 WR) assessment, area-based deprivation distribution (SIMD), health boards and Health Plan Indicator (which indicates the level of support a Health Visitor decides a family requires).

Table 4-1: Characteristics of the overall cohort by the birth years

Birth Cohort	2011 %(n)	2012 %(n)	2013 %(n)	2014 %(n)	2015 %(n)	Total %(n)
	22.9 (54660)	22.7 (54011)	21.9 (52115)	22.1 (52641)	10.4 (24864)	100 (238291)
Age at Child Health Surveillance assessment in weeks median (Q1, Q3)	7 (6, 8)	7(6, 8)	7(6,8)	7(6,8)	7(6,8)	7(6,8)
Sex						
Males	51.3(28033)	51.2 (27638)	51.4 (26773)	51.1 (26904)	51.6 (12826)	51.3 (122174)
Females	48.7 (26627)	48.8 (26373)	48.6 (25342)	48.9 (25737)	48.4 (12038)	48.7 (116117)
Area-based deprivation fifth (SIMD 2012)						
Q1-Most deprived	24.9 (13547)	25.2 (13566)	25.0 (13210)	24.6 (12903)	24.8 (6153)	24.9 (59152)
Q2	20.6 (11198)	21.0 (11292)	21.0 (10918)	21.0 (10992)	20.9 (5187)	20.9 (49587)
Q3	19.2 (10441)	19.4 (10438)	19.4 (10095)	19.2 (10077)	19.1 (4721)	19.3 (45772)
Q4	18.4 (10008)	17.9 (9653)	18.2 (9437)	18.5 (9709)	18.6 (4597)	18.3 (43404)
Q5-Least deprived	16.9 (9197)	16.6 (8922)	16.4 (8498)	16.7 (8781)	16.6 (4106)	16.6 (39479)
Missing	(294)	(140)	(184)	(179)	(100)	(897)
Health Boards 2014						
Ayrshire & Arran	6.7(3661)	6.5 (3512)	6.6 (3427)	6.4 (3353)	6.5 (1613)	6.5 (15566)
Borders	1.8 (994)	1.8(993)	1.9(984)	1.8 (962)	1.8 (438)	1.8 (4371)
Dumfries & Galloway	2.5 (1369)	2.5 (1355)	2.4 (1257)	2.3 (1231)	2.4 (601)	2.4 (5813)
Fife	7.4 (4015)	7.1 (3819)	7.0 (3658)	6.8 (3599)	7.0 (1743)	7.1 (16834)
Forth Valley	5.5 (3002)	5.6 (3048)	5.5 (2874)	5.6 (2966)	5.4 (1351)	5.5 (13209)
Grampian	10.3 (5644)	11.0 (5963)	10.7 (5570)	10.9 (5725)	11.2 (2775)	10.8 (25677)
Greater Glasgow & Clyde	22.0 (12030)	22.5 (12119)	22.2 (11555)	22.2 (11668)	21.4 (5312)	22.1 (52684)
Highland	5.0 (2726)	5.1 (2739)	5.0 (2600)	5.1 (2671)	4.9 (1226)	5.0 (11962)
Lanarkshire	12.4 (6773)	11.7 (6327)	12.1 (6323)	12.2 (6423)	12.7 (3166)	12.2 (29012)
Lothian	17.5 (9550)	17.6 (9473)	17.8 (9274)	17.7 (9294)	17.7 (4410)	17.6 (42001)
Orkney	0.3 (166)	0.3 (174)	0.3 (173)	0.3 (168)	0.4 (98)	0.3 (779)
Shetland	0.4 (243)	0.5 (273)	0.5 (245)	0.5 (258)	0.4 (104)	0.5 (1123)
Tayside	7.7 (4204)	7.4 (3978)	7.5 (3892)	7.7 (4079)	7.7 (1905)	7.6 (18058)
Western Isles	0.4 (221)	0.4 (223)	0.5 (241)	0.4 (207)	0.4 (107)	0.4 (999)
Missing	(62)	(47)	(42)	(37)	(15)	(203)
Level of support required by family (HPI)						
Core	39.7 (20521)	45.1 (22751)	58.9 (28326)	67.0 (32428)	70.8 (16489)	54.3 (120515)
Additional	57.1 (29530)	52.4 (26466)	39.5 (19012)	31.9 (15465)	28.5 (6635)	43.7 (97108)
Intensive	3.2(1674)	2.5(1246)	1.6 (764)	1.1 (530)	0.7(158)	2.0 (4372)
Missing	(2935)	(3548)	(4013)	(4218)	(1582)	(16296)

Note: Scottish Index of Multiple Deprivation (SIMD), Quintile (Q), Health Plan Indicator (HPI).

The median age of the children at their first Child Health assessment was seven weeks, with 25% (Q1, quintile one) of the children having their assessment by 6 weeks and 25% (Q3, quintile three) after the age of 8 weeks. There were 51.3% (122174/238291) male children, and 48.7% (116117/238291) females overall. The sex split and median age remained the same over birth cohort years (Table 4-1).

Table 4-1 also illustrates the distribution of the children living in the most and the least deprived areas using area-based deprivation measure (SIMD). The first fifth (Q1) represents the 20% most deprived areas and accounts for 24.9% (59152/238291) of our total cohort (4.5 years). Again, this distribution did not change substantially over time and was in line with published population estimates (National Records of Scotland, 2015).

The distribution of children across 14 health boards is shown in Table 4-1. National Health Service Greater Glasgow and Clyde is the largest health board in Scotland and represents 22.1% (52684) of our overall cohort. The smallest is Orkney, representing 0.3% (779) of our overall cohort. This distribution remained the same across the birth cohorts over the years and was in line with the published population estimate (National Records of Scotland, 2022).

At the Child Health Surveillance 6-8 weeks review by a Health Visitor, the child's health assessment was made to evaluate and determine whether the child/family requires core, additional, or intensive support, based on the child's/family's level of need, called the Health Plan Indicator (HPI). In 2011, 39.7% (20521) of children/families were considered to require core support; by 2015, the requirement for core support rose to 70.8% (16489) of families. Additional support in 2011 was required by 57.1% (29530) of children, and by 2015 the additional support required reduced to 28.5% (6635). Intensive support was required by 3.2% (1674) of children in 2011, which was reduced to 0.7% (158) by 2015.

4.3.2 Rates of Referral to Dental Health Support Workers (RQ1)

Referral to a DHSW from a Health Visitor should be targeted to those families in need of additional oral health support. Overall, 22.6% (53820/238291) of children were referred to a DHSW (primarily by a Health Visitor) and were successfully contacted by a DHSW. Those referred but not successfully contacted were 1.5% (3611/238291). Out of the total, 75.9% (180860/238291) of children in

the entire cohort were not referred for DHSW support (Table 4-2). These referral rates did not appear to change much over the 5 birth cohort years.

Table 4-2: Referral status across the five birth cohorts

Cohort birth year	2011 % (n)	2012 % (n)	2013 % (n)	2014 % (n)	2015 % (n)	Total % (n)
Referral status						
Not referred	76.6 (41881)	76.1(41077)	76.7(39975)	74.7(39337)	74.8(18590)	75.9 (180860)
Referred not contacted	1.1 (610)	1.2 (669)	1.8 (956)	1.8(935)	1.8 (441)	1.5 (3611)
Referred and successfully contacted	22.3 (12169)	22.7(12265)	21.5(11184)	23.5(12369)	23.5(5833)	22.6 (53820)
Total (n)	(54660)	(54011)	(52115)	(52641)	(24864)	(238291)

Table 4-3: Characteristics of the families not referred/ referred not contacted and referred and contacted by a DHSW

Referral Status		**Not referred** %(n)	**Referred not contacted** % (n)	**Referred and contacted** %(n)	Total %(n)	X^2 value	df	P value
Overall total count		75.9 (180860)	1.5 (3611)	22.6 (53820)	100 (238291)			
Variables								
Sex	Males	51.3 (92708)	52.9 (1912)	51.2 (27554)	51.3 (122174)	4.2	2	0.122
	Females	48.7 (88152)	47.1 (1699)	48.8 (26266)	48.7 (116117)			
HPI	Core	53.3 (90909)	49.8 (1800)	58.2 (27806)	54.3 (120515)	1263.39	4	<0.0001
	Additional	45.2 (77168)	45.9 (1592)	38.4 (18348)	43.7 (97108)			
	Intensive	1.5 (2641)	2.3 (79)	3.5 (1652)	2.0 (4372)			
	Missing (n)	(10142)	(140)	(6014)	(16296)			
SIMD	Q1-most deprived	20.6 (37191)	30.7 (1102)	38.9 (20859)	24.9 (59152)	10180.04	12	<0.0001
	Q2	20.5 (37004)	24.4 (878)	21.8 (11705)	20.9 (49587)			
	Q3	19.9 (35797)	17.6 (634)	17.4 (9341)	19.3 (45772)			
	Q4	20.1 (36163)	15.4 (552)	12.5 (6689)	18.3 (43404)			
	Q5- least deprived	18.9 (33983)	11.9 (429)	9.4 (5067)	16.6 (39479)			
	Missing (n)	(722)	(16)	(159)	(897)			
HB	Ayrshire & Arran	80.3 (12502)	2.2 (349)	17.4 (2715)	100 (15566)	59969.629	22	<0.0001
	Borders	78.1 (3412)	2.9 (127)	19.0 (832)	100 (4371)			
	D&G	87.2 (5070)	2.6 (153)	10.1 (590)	100 (5813)			
	Fife	91.3 (15363)	0.9 (156)	7.8 (1315)	100 (16834)			
	Forth Valley	90.7 (11980)	0.9 (114)	8.4 (1115)	100 (13209)			
	Grampian	95.8 (24604)	0.9 (233)	3.3 (840)	100 (25677)			
	GGC	50.1 (26410)	0.7 (381)	49.1 (25893)	100 (52684)			
	Highland	64.8 (7751)	2.5 (304)	32.7 (3907)	100 (11962)			
	Lanarkshire	46.6 (13531)	3.0 (879)	50.3 (14602)	100 (29012)			
	Lothian	94.6 (39729)	1.9 (809)	3.5 (1463)	100 (42001)			
	Tayside	96.9 (17493)	0.5 (97)	2.6 (468)	100 (18058)			
	Islands	98.6 (2861)	0.2 (7)	1.1 (33)	100 (2901)			
	Missing	(154)	(2)	(47)	(203)			

Note: Health Plan Indicator (HPI), Scottish Index of Multiple Deprivation (SIMD), Health Board (HB), Quintile (Q), Dumfries and Galloway (D&G), Greater Glasgow and Clyde (GG&C).

4.3.3 Characteristics of Families Referred to and Contacted by a DHSW (RQ2)

Table 4-3 compares the characteristics of families referred to and contacted by a DHSW to those families not referred (Please note: a small number of families were referred to a DHSW but were not contacted- these are included here for completeness).

Overall, there was a higher percentage of families who were considered by their Health Visitor to require intensive support (based on the HPI) who had been referred and contacted by a DHSW (3.5% (1652)) compared to those families not referred (1.5% (2641)). Among those families who were referred to and contacted by a DHSW, almost 40% lived in the most deprived areas of Scotland, compared to 21% in those families who were not referred.

There was significant variation in referral rates across health boards, with NHS Lanarkshire (50.3%), NHS Greater Glasgow and Clyde (49.1%) and NHS Highland (32.7%) referring a much higher percentage of families for DHSW support than any other of the health boards across Scotland (NHS Grampian, Lothian, Tayside and the Islands had very low levels of referrals to DHSWs (all <=5%)).

4.3.4 Characteristics of Families Referred to and Contacted by a DHSW over the Cohort Years

Within the group of families referred to and contacted by a DHSW, we assessed whether the characteristics of this group had changed appreciably over time.

Table 4-4 presents characteristics of families referred to and contacted by a DHSW over the cohort years (n=53820).

Over the five birth cohorts, there was no change in the sex distribution of those referred and successfully contacted by a DHSW. The percentage of families referred to and contacted by a DHSW requiring only core support by the Health Visitor increased (from 50.7% in 2011 to 69.2% in 2015), with additional and intensive support combined reducing from 49.4% in 2011 to 30.8% in 2015. Families who were referred to and contacted by a DHSW were more likely to live in the 20% most deprived areas than in the least deprived areas. However, in the final cohort year, there was an increased percentage of families from the least

deprived areas who were referred and contacted (8.8% in 2011 compared to 16.6% in 2015).

Three health boards (Greater Glasgow and Clyde, Lothian and Forth Valley) had increased percentages of referred and contacted families between 2011 and 2015, whilst Ayrshire and Arran, Dumfries and Galloway, and Lanarkshire had reduced percentages of referred and contacted families between 2011-2015 (Table 4-3).

Table 4-4: Characteristics of the families referred to and contacted by DHSWs over the birth cohorts (n=53820)

Cohort Year	**2011 % (n)**	**2012 % (n)**	**2013 % (n)**	**2014 % (n)**	**2015 % (n)**	**Total % (n)**
	22.3 (12169)	22.7(12265)	21.5(11184)	23.5(12369	23.5 (5833)	22.6(53820)
Sex						
Males	51.0 (6211)	51.2 (6276)	51.9 (5802)	50.8(6287)	51.1(2978)	51.2 (27554)
Females	49.0 (5958)	48.8 (5989)	48.1 (5382)	49.2 (6082)	48.9 (2855)	48.8 (26266)
Age (weeks)	7 (6, 8)	7 (6, 8)	7 (6, 8)	7 (6, 8)	7 (6, 8)	7 (6, 8)
Health Plan Indicator of all contacted children						
Core	50.7 (5593)	56.1 (6146)	57.8 (5749)	63.1 (6763)	69.2 (3555)	58.2 (27806)
Additional	44.7 (4928)	39.9 (4369)	39.0 (3882)	34.4 (3683)	28.9 (1486)	38.4 (18348)
Intensive	4.7 (516)	4.1 (444)	3.2 (821)	2.6 (275)	1.9 (96)	3.5 (1652)
Missing	(1132)	(1306)	(1232)	(1648)	(696)	(6014)
SMID 2012						
Q1 (most deprived)	40.0(4843)	40.2 (4923)	39.3 (4382)	37.1 (4571)	26.8(2140)	38.9 (20859)
Q2	21.8 (2643)	21.5 (2626)	21.5 (2399)	22.1 (2721)	22.6 (1316)	21.8 (11705)
Q3	17.1 (2071)	17.6 (2154)	17.8 (1985)	17.3 (2139)	17.0 (992)	17.4 (9341)
Q4	12.2 (1476)	12.2 (1492)	12.2 (1356)	18.5 (1604)	13.1 (761)	12.5(6689)
Q5 (least deprived)	8.9 (1080)	8.6 (1047)	9.2 (1028)	10.5 (1298)	16.6 (614)	9.4 (5067)
Missing	(56)	(23)	(34)	(36)	(10)	(159)
Health Boards 2014						
Ayrshire & Arran	8.1 (980)	7.1 (870)	3.7 (418)	2.3 (283)	2.8 (164)	5.0(2715)
Borders	1.5 (185)	1.4 (172)	1.7 (195)	1.5 (186)	1.6 (94)	1.5(832)
Dumfries and Galloway	2.2 (262)	0.9 (107)	1.0 (114)	0.6 (75)	0.5 (32)	1.1 (590)
Fife	2.6 (321)	2.5 (307)	2.5 (280)	2.2 (275)	2.3 (132)	2.4 (1315)
Forth Valley	0.9 (113)	1.4 (174)	2.0 (228)	3.0 (368)	4.0 (232)	2.1 (1115)
Grampian	1.5 (188)	1.9 (228)	1.8 (197)	1.2 (153)	1.3(74)	1.6 (840)
Greater Glasgow & Clyde	44.6 (5423)	47.9 (5875)	48.3 (5393)	50.5 (6241)	50.8 (2961)	48.2 (25893)
Highland	7.2 (874)	7.3(896)	7.9 (882)	7.2 (885)	6.3 (370)	7.3(3907)
Lanarkshire	29.9 (3628)	27.5(3367)	26.4 (2949)	26.4 (3260)	24.0 (1398)	27.2(14602)
Lothian	0.4 (47)	1.2 (150)	3.8 (424)	4.2 (519)	5.5 (323)	2.7 (1463)
Tayside	1.0 (118)	0.8 (104)	0.8 (90)	0.9 (110)	0.8(46)	0.9(468)
Islands	0.1 (14)	0.0(6)	0.1(6)	0.0(4)	0.1(3)	0.1(33)
Missing	(16)	(9)	(8)	(10)	(4)	(47)

4.3.5 Frequency and Type of Interventions Delivered by DHSWs to Referred Families (RQ3)

During their home visit with a family, DHSWs can deliver the following interventions: dietary advice, toothbrushing advice/demonstration; distribution of dental packs(toothbrush/toothpaste); dental practice registration/appointment booking; linking to community services/resources.

This section describes the age at first intervention, the total number of interventions and the intervention type in families referred to and contacted by DHSWs.

Over the five cohort years, the families had received their first DHSW intervention when the study child was on average [median (Q1, Q3)] 4.3 (3.3, 6.3) months (Table 4-5). There was a wide range of ages at first intervention (1 to 36 months), but none of this changed appreciably over the five cohort years. Table 4-6 shows the ages of the first intervention for the different types of intervention delivered. The median age at first Community Linking was younger compared to all other interventions, [median (Q1, Q3)] age of 3.6 (3.1, 4.4) months.

Table 4-5: Ages of children at their first intervention by DHSW across the birth cohorts

Cohort year	2011	2012	2013	2014	2015	Total
Median	4.2	4.2	4.4	4.2	4.3	4.3
Min	1.0	1.0	1.0	1.0	1.0	1.0
Max	35.9	35.8	35.9	36.0	35.9	36.0
Q1,Q3	3.2,6.3	3.2,6.1	3.3,6.8	3.3,5.9	3.3, 6.4	3.3,6.3

Table 4-6: Age at first intervention (in months) of various interventions

	Dietary advice	Toothbrushing advice	Dental Pack distribution	Dental service referral	Community Linking
Median	4.2	4.1	4.1	4.2	3.6
Min	1.0	1.0	1.0	1.0	1.0
Max	35.9	35.9	35.9	36.0	35.8
Q1, Q3	3.3, 6.1	3.3, 5.7	3.2, 5.9	3.2, 6.1	3.1, 4.4

Table 4-7 presents the total number of contacts with a DHSW in those referred to and contacted by a DHSW. Almost 80% (43351) of families had only one contact, 5.3% (2875) had two, and 1.3% (702) had three or more. This trend did not change appreciably over the years, although there was a slight increase in

the percentage of families referred but not contacted between 2011 (10.8%) and 2015 (13.7%).

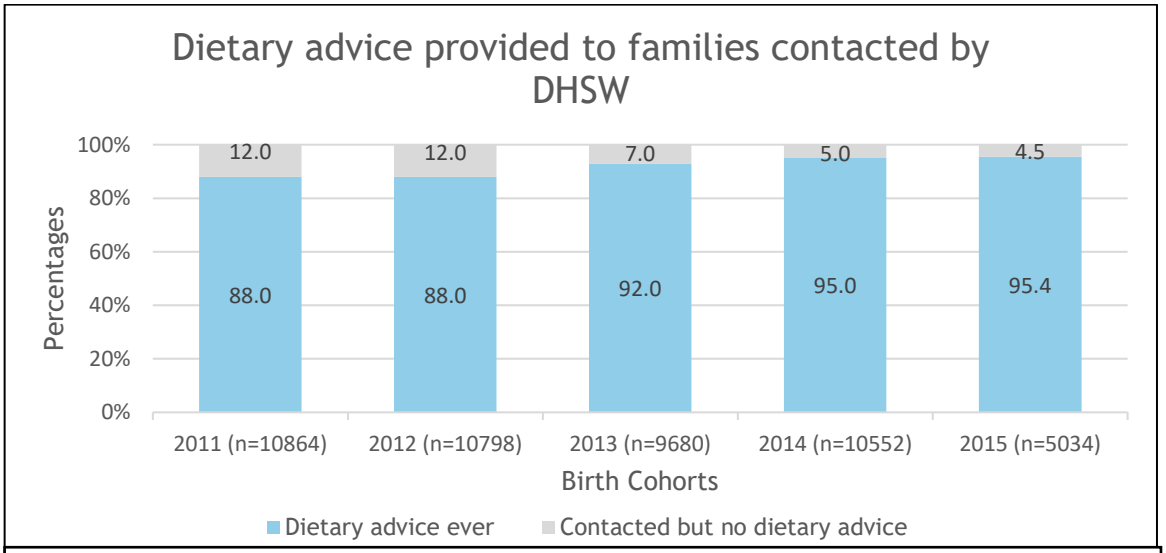
Table 4-7: Frequency of contacts among families referred to and contacted by DHSWs across the birth cohorts

Cohort year	2011 % (n)	2012 % (n)	2013 % (n)	2014 % (n)	2015 % (n)	Total % (n)
Number of contacts						
1	81.6 (9933)	81.0 (9937)	80.4(8996)	79.6 (9846)	79.5 (4639)	80.5(43551)
2	5.9 (717)	5.6 (690)	5.0 (560)	4.7 (582)	5.6 (326)	5.3 (2875)
3+	1.8 (214)	1.4 (171)	1.1 (124)	1.0 (124)	1.2 (69)	1.3 (702)
(Referred not contacted)	10.7(1305)	12.0 (1467)	13.4 (1504)	14.7 (1817)	13.7 (799)	12.8 (6892)
Total Children	22.3(12169)	22.7(12265)	21.5(11184)	23.5(12369)	23.5(5833)	22.6(53820)

4.3.5.1 Types of Intervention Delivered to Families Referred to and Contacted by DHSW

Families who were referred to and successfully contacted by a DHSW could receive dietary advice, toothbrushing advice, and toothbrushing packs, be linked to dental practice and be linked to community services/resources.

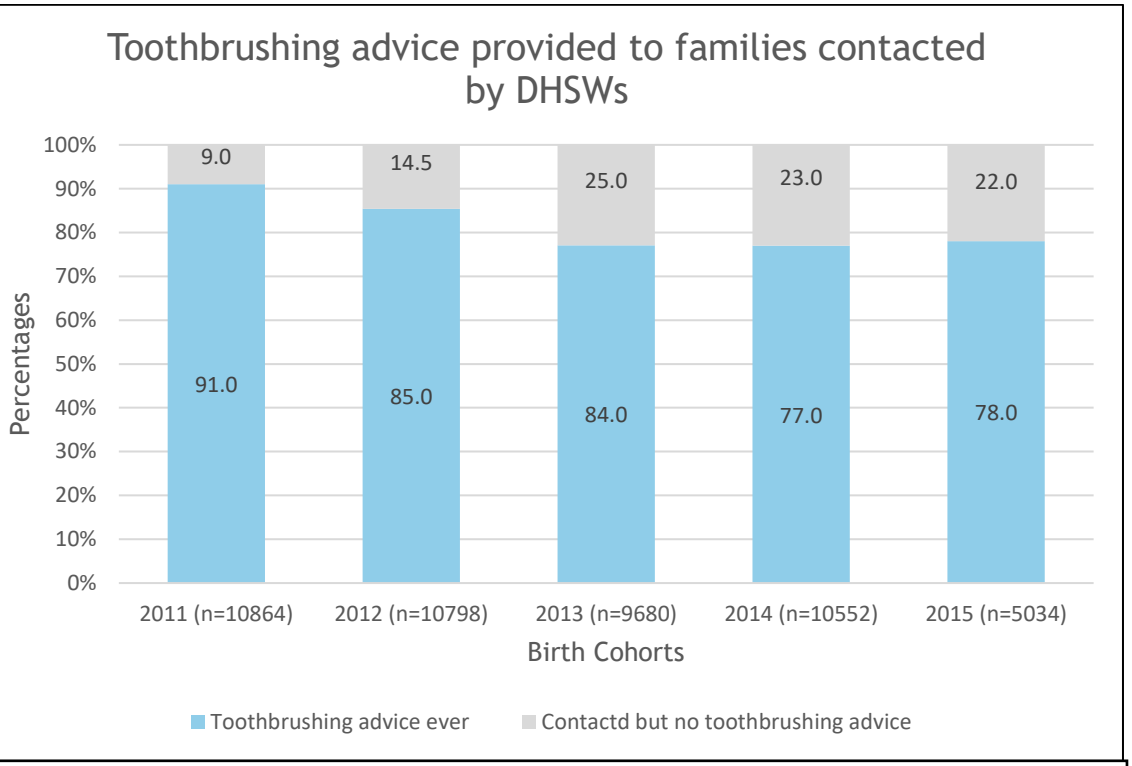
Figure 4-3 presents the percentage of families who were visited by a DHSWs and given dietary advice. It shows that the percentage of children's families receiving dietary advice increased from 88 % (9603/10864) in 2011 to 95.4% (4806/5034) in 2015.



***Note** in each cohort year there were a number of contacts made by DHSWs to families where no interventions were logged. These were removed from the denominator.

Figure 4-3: Frequency of dietary advice provided to all families referred to and contacted by a DHSW across the birth cohorts.

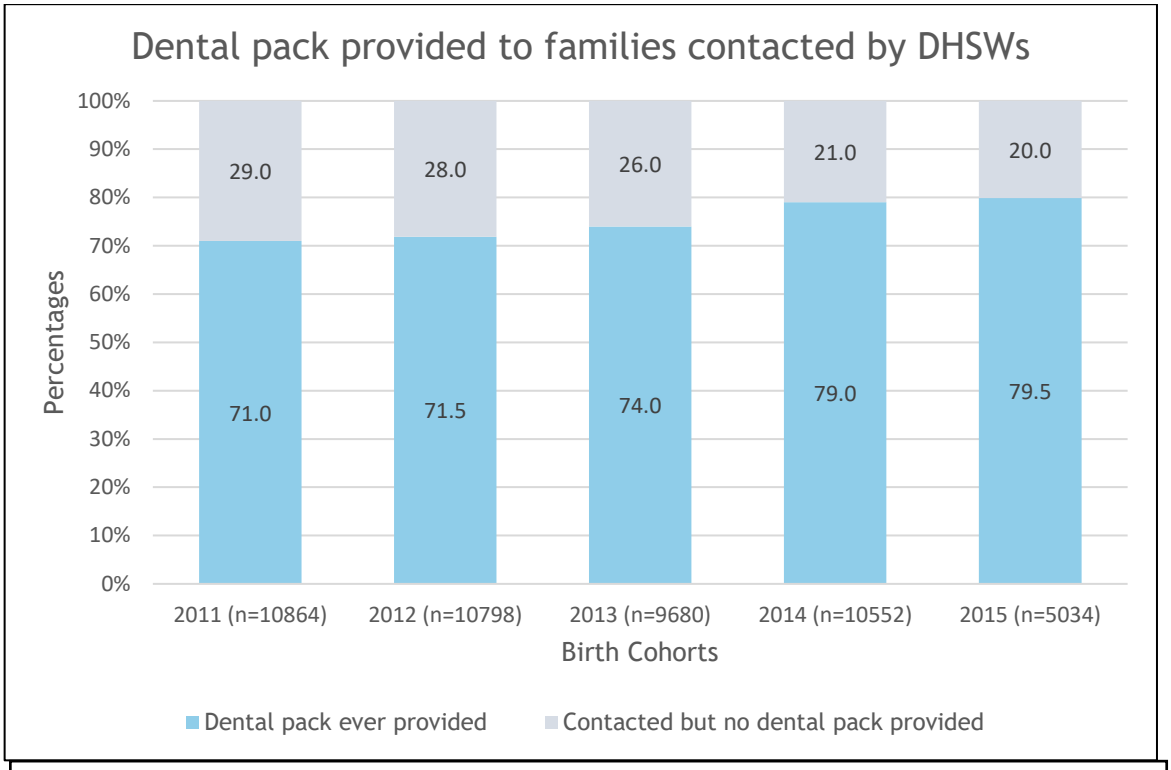
Figure 4-4 presents toothbrushing advice to all referred and contacted families. It shows that in 2011, 91% (9928/10964) of families received toothbrushing advice from a DHSW. This percentage reduced to 78% (3938/5034) by 2015.



***Note** in each cohort year there were a number of contacts made by DHSWs to families where no interventions were logged. These were removed from the denominator.

Figure 4-4: Frequency of toothbrushing advice provided to all families referred to and contacted by a DHSW across the birth cohorts

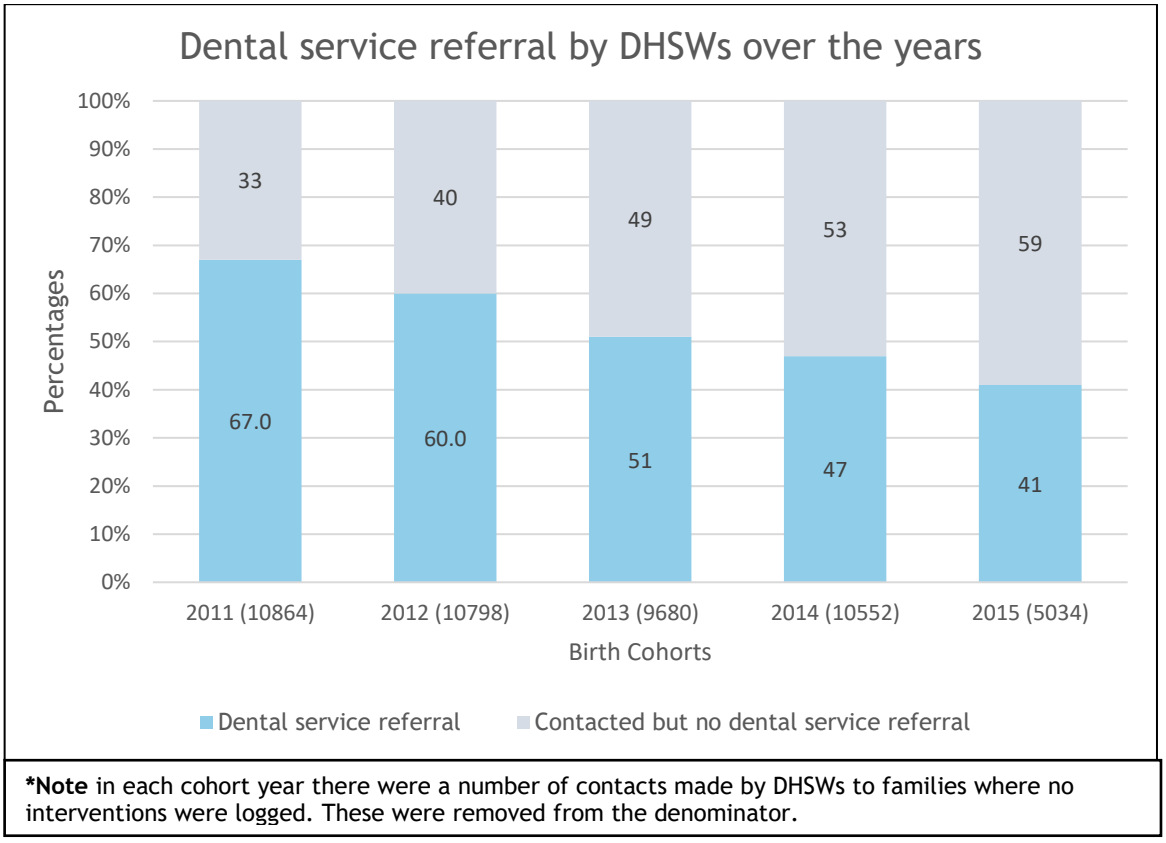
Figure 4-5 presents the proportion of dental packs distributed to all families referred to and contacted by DHSW. The distribution of dental packs increased over time from 71.0% (7676/10864) in 2011 to 79.5% (4003/5034) in 2015.



***Note** in each cohort year there were a number of contacts made by DHSWs to families where no interventions were logged. These were removed from the denominator.

Figure 4-5: Frequency of dental pack provided to all families referred to and contacted by a DHSW across the birth cohorts

Figure 4-6 shows the percentage of families who were referred to a dental service by DHSWs over the years. In 2011, 67% (7307/10864) of families were referred to a dental practice; this was reduced to 41% (2075/5034) by 2015.



***Note** in each cohort year there were a number of contacts made by DHSWs to families where no interventions were logged. These were removed from the denominator.

Figure 4-6: Frequency of Dental services referral to all families referred to and contacted by a DHSW across the birth cohorts.

Figure 4-7 shows the percentage of families who were linked to community services/resources by a DHSW over the years. Compared to 2011 (1.8%, 219/12169), the percentage of families linked to a community service/resource increased by 2015 (21.0%, 1227/5833).

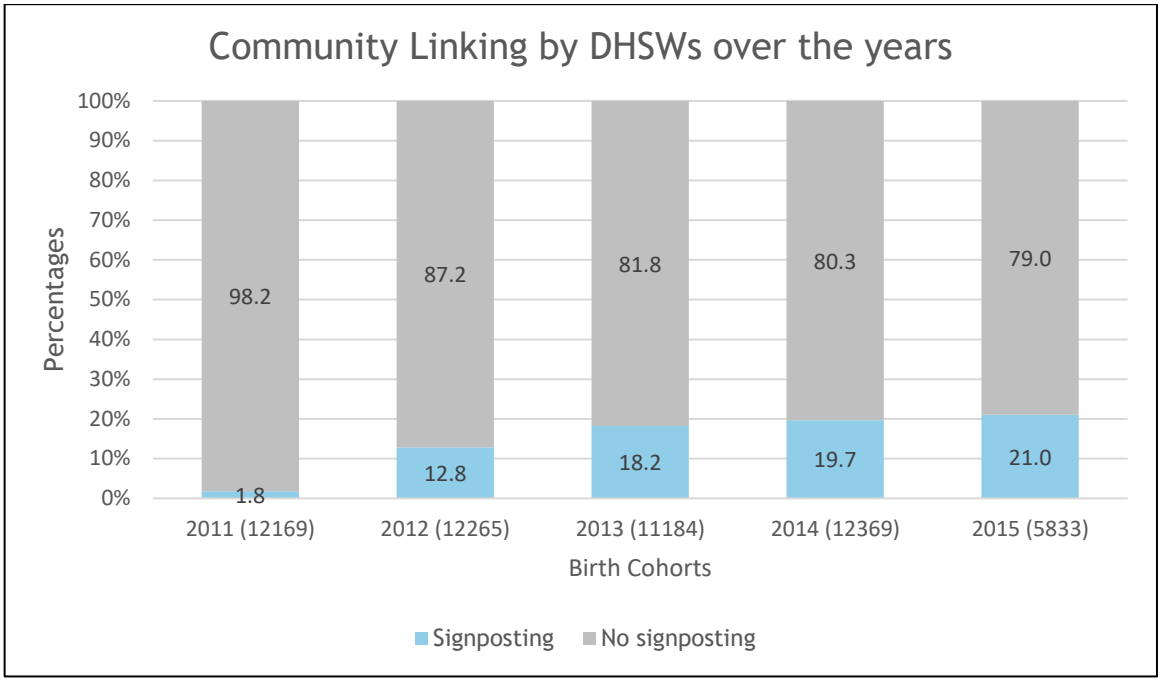


Figure 4-7: Frequency of Community Linking (Signposting) activity to all families referred to and contacted by a DHSW across the birth cohorts

4.3.6 Community Linking Activity by DHSWs

The following section focuses on the Community Linking activity of the DHSWs from 2011 up to 2018. Table 4-8 shows that in the group of families referred to and contacted by a DHSW, 13.9% (7487/53820) were linked to community services overall. This increased from 1.8% for those born in 2011 (219/12169) to 21.0% (1227/5833) in those born in 2015.

Community Linking by DHSWs first occurred when the child's median age was 3.6 (3.1, 4.4) months (Q1, Q2). The minimum and maximum ages were one month and 35.8 months, respectively. Males comprised of 50.4% (3776) of the children, while females were 49.6% (3711).

Table 4-8: Community Linking activity of DHSWs across the birth cohorts.

	2011 % (n)	**2012 % (n)**	**2013 % (n)**	**2014 % (n)**	**2015 % (n)**	**Total % (n)**
	(54660)	**(54011)**	**(52115)**	**(52641)**	**(24864)**	**(238291)**
Not referred	76.6 (43582)	76.1 (41077)	76.7 (39975)	74.7 (39337)	74.8 (18590)	75.9 (180860)
Referred Not contacted by DHSW	1.1 (610)	1.2 (669)	1.8 (956)	1.8 (935)	1.8 (441)	1.5 (3611)
Referred and contacted-no Community Linking	19.3 (10645)	19.8 (10695)	17.5 (9146)	18.9 (9936)	15.2 (4606)	19.4 (46333)
Referred and contacted-yes-Community Linking	0.4 (219)	2.9 (1570)	3.9 (2038)	4.6 (2433)	4.9 (1227)	3.1 (7487)

	2011 % (n)	2012 % (n)	2013 % (n)	2014 % (n)	2015 % (n)	Total % (n)
As % of referred & contacted - ever had Community Linking	1.8 (219)	12.8 (1570)	18.2 (2038)	19.7 (2433)	21.0 (1227)	14.0 (7487)
Ages of children (in months) contacted, and community linked for the first DHSW intervention						
Median	5.0	3.4	3.6	3.8	3.7	3.6
Minimum	1.1	1.0	1.0	1.0	1.1	1.0
Maximum	34.7	34.1	35.8	35.8	34.4	35.8
Q1 (25)	3.7	3.0	3.1	3.1	3.2	3.1
Q3 (75)	13.7	4.1	4.3	4.4	4.3	4.4

Figure 4-8 presents the distribution of families who were linked to community services across birth cohorts according to SIMD fifth. In each cohort year around 50% of families who had been linked to community services/resources lived in the 20% most deprived areas of Scotland.

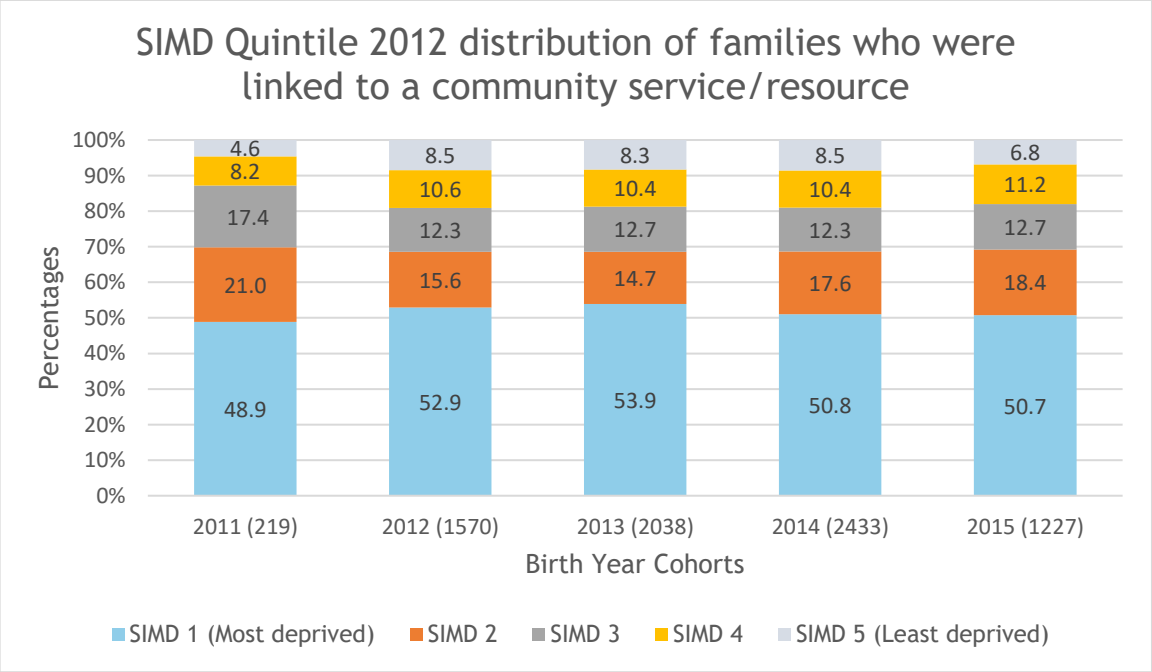


Figure 4-8: Frequency of Community Linking based on SIMD quintile 2012 to all families referred to and contacted by a DHSW across the birth cohorts

Among families who had been linked to a community service/resource, the majority lived in NHS Greater Glasgow and Clyde health board, and this value increased between 2011 and 2015 [60.3% (132/219) in those born in 2011 to 89.6% (1099/1227) in those born in 2015] (Table 4-9). However, reduced Community Linking activity was observed in Ayrshire & Aran, Grampian, Highland, and Lanarkshire health boards over the five cohort years.

Table 4-9: Health board distribution of families linked to community services/resources across the birth cohorts.

	Cohort years					
Health Boards	2011 % (n)	2012 % (n)	2013 % (n)	2014 % (n)	2015 % (n)	Total
Ayrshire & Aran	12.8 (28)	2.3 (36)	2.5 (51)	2.9 (70)	3.3 (40)	3.0 (225)
Grampian	11.4 (25)	2.2 (35)	2.2 (45)	1.8 (43)	1.8 (22)	2.3 (170)
Greater Glasgow & Clyde	60.3 (132)	87.3 (1370)	87.4 (1781)	86.8 (2113)	89.6 (1099)	86.8 (6495)
Highland	7.3 (16)	2.7 (43)	2.4 (48)	3.3 (80)	2.2 (27)	2.9 (214)
Lanarkshire	4.6 (10)	4.2 (66)	4.5 (92)	2.9 (70)	1.6 (20)	3.4 (258)
Health Boards with smaller contributions	Forth Valley Borders Lothian Tayside 3.6 (8)	Borders Fife Forth Valley Lothian Shetland Tayside 1.3 (18)	Borders 0.6 (12) Fife Forth Valley Orkney 0.3 (8)	Borders 0.9 (23) Fife Forth Valley Lothian Tayside Orkney 1.2 (31)	Borders 0.7 (9) Fife Forth Valley Lothian 0.7 (9)	1.5 (118)
System missing (intervention activity not logged)						(7)

4.3.7 Types of Community Services that Families are Linked to (RQ4)

DHSWs linked families to various community services. The majority of families were linked to services associated with nutrition and diet 76.8% (5751), followed by local parents and baby support groups 21.6% (1618), oral health services 8.9% (670), and "others" 3.2% (242) (Table 4-10). "Others" include parenting skills, smoking cessation, financial support, language support and statutory services; however, the numbers were too small to report individually. The pattern of Community Linking varied across the years. In children born in 2011, more families were linked to oral health services (27.4% (60)) compared to 8.2% (200) in 2014 and 15.4% (189) in 2015, respectively. Nutrition/diet service linking increased over the years; it was 33.8% (74) in 2011 compared to 79.4% (1933) in 2014 and 72.0% (883) in 2015 (Table 4-10).

Table 4-10: Services the families are linked to by DHSW across the birth cohorts

Year	2011	2012	2013	2014	2015	Total
	(219)	(1570)	(2038)	(2433)	(1227)	(7487)
Community services/resources						
Oral Health	27.4 (60)	5.7 (89)	6.5 (132)	8.2 (200)	15.4 (189)	8.9 (670)
Nutrition and diet	34.2 (75)	73.7 (1157)	83.6 (1703)	79.4 (1933)	72.0 (883)	76.8 (5751)
Local parent/baby support groups	33.8 (74)	23.4 (368)	19.4 (395)	22.3 (542)	19.5 (239)	21.6 (1618)
Others [1]	7.8 (17)	4.2 (66)	2.4 (48)	2.9 (71)	3.3 (40)	3.2 (242)
Total signposting services	(226)	(1680)	(2278)	(2746)	(1351)	(8281)
	These are the Community Linking activities (services) for individuals who were ever linked to various services. Some individuals were linked to the same service or multiple services more than once. The difference in proportion is 0.4%. That is why the total number of CL activities and the total number of individuals linked do not match.					

1. (Parenting, smoking cessation, financial advice, language support and statutory services)

Figure 4-9 presents the percentage of families linked to one or two or more services. Most families were linked to one service and a small proportion to more than one service. In those born in 2011, 93.2% (204) of families were linked to one service, and by 2015, it was increased to 98.9% (1210). Multiple agencies linking was reduced over the years from 6.8% (15) in 2011 to 1.4% (17) in 2015.

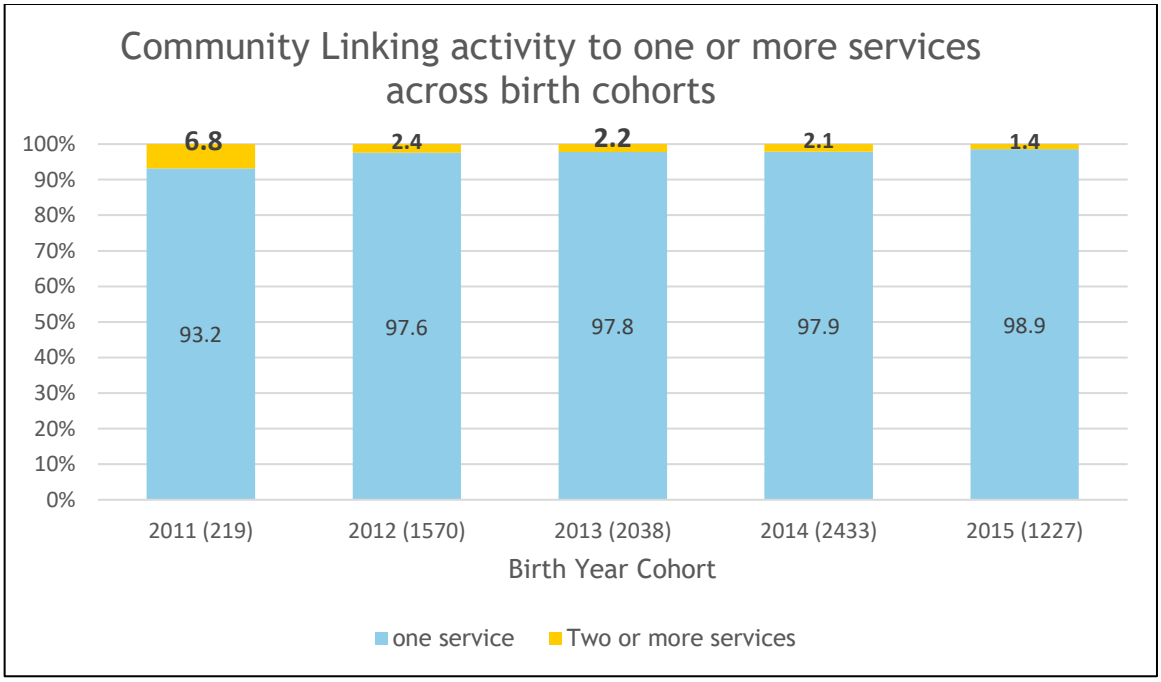


Figure 4-9: Frequency of Community Linking activity to one or more than one service to all families referred to and contacted by a DHSW across the birth cohorts

4.3.8 Factors Associated with Families being Linked to Community Activities/Resources (RQ5)

Appendix 5 presents characteristics of the families referred to and contacted by a DHSW and linked to community services/resources compared to those who were not referred, those who were referred but not contacted and those referred, contacted but with no Community Linking. The characteristics included: the level of support required by the family (based on Health Visitor judgement-health plan indicators), area-based deprivation (SIMD fifth) and health board.

Table 4-11 presents the results from the unadjusted and fully adjusted logistic regression models to identify factors associated with families being linked to community services/resources. The reference category consists of those families referred to and contacted by a DHSW but who were not linked to any community services/resources. We will report on the multivariable model as this identifies those independent factors associated with a Community Linking referral; however, we provide the univariable results also.

Compared to families who required only core support (deemed by Health Visitors at the 6-8 weeks child health surveillance review), those that required additional or intensive support had greater odds of being linked to community services/resources (Additional: aOR=1.28; 95% CI=1.20 to 1.36; Intensive: aOR=1.26; 95% CI= 1.10 to 1.44). Compared to families living in the least deprived areas, families living in the most deprived areas had greater odds of being linked to community services/resources (aOR=1.64; 95% CI=1.47 to 1.83). The odds of a family being linked to community services/resources increased over time from 2011 to 2015.

Table 4-11: Binary logistic regression of factors independently associated with Community Linking in those families referred to and contacted by a DHSW. (Unadjusted and adjusted odds ratios (ORs) and 95% confidence intervals (CI))

		% (n)	Unadjusted ORs (Univariable)	95% CI	P value	Fully adjusted ORs (Multivariable)	95% CI	P value
HPI	Core	10.3 (2865)	1(ref)					
	Additional	14.9 (2740)	1.53	(1.44 to 1.616)	<0.0001	1.28	(1.20 to 1.36)	<0.0001
	Intensive	21.7 (359)	2.42	(2.14 to 2.73)	<0.0001	1.26	(1.10 to 1.14)	0.001
SIMD	Q1-most deprived	18.7 (3893)	1.69	(1.55 to 1.86)	<0.0001	1.64	(1.47 to 1.83)	<0.0001
	Q2	10.6 (1245)	0.88	(0.79 to 0.98)	<0.0001	1.18	(1.04 to 1.33)	0.008
	Q3	10.1 (946)	0.83	(0.74 to 0.93)	0.015	1.12	(0.99 to 1.27)	0.071
	Q4	11.8 (786)	0.98	(0.88 to 1.102)	0.001	1.23	(1.08 to 1.41)	0.001
	Q5-least deprived	11.9 (604)	1 (ref)					
HB	Ayrshire & Arran	8.3(225)	0.27	(0.23 to 0.31)	<0.0001	0.37	(0.31 to 0.42)	<0.0001
	Borders	6.1 (51)	0.19	(0.14 to 0.25)	<0.0001	0.20	(0.15 to 0.27)	<0.0001
	Dumfries and Galloway	0.0 (0)	0.00	NA	NA	0.00	NA	NA
	Fife	2.7 (36)	0.08	(0.06 to 0.11)	<0.0001	0.08	(0.06 to 0.12)	<0.0001
	Forth Valley	1.1(12)	0.03	(0.01 to 0.05)	<0.0001	0.03	(0.28 to 0.06)	<0.0001
	Grampian	20.2 (170)	0.75	(0.63 to 0.89)	0.001	0.83	(0.69 to 1.00)	0.05
	Greater Glasgow and Clyde	25.1 (6495)	1 (Ref)					
	Highland	5.5 (214)	0.17	(0.15 to 0.19)	<0.0001	0.17	(0.15 to 0.20)	<0.0001

		% (n)	Unadjusted ORs (Univariable)	95% CI	P value	Fully adjusted ORs (Multivariable)	95% CI	P value
	Lanarkshire	1.8 (258)	0.05	(0.04 to 0.06)	<0.0001	0.05	(0.04 to 0.06)	<0.0001
	Lothian	0.7 (10)	0.02	(0.01 to 0.59)	<0.0001	0.01	(0.008 to 0.02)	<0.0001
	Tayside	1.3 (6)	0.03	(.02 to .26)	<0.0001	0.03	(0.01 to 0.08)	<0.0001
	Islands	9.1 (3)	0.29	(0.09 to 0.97)	0.04	0.52	(0.15 to 1.80)	0.30
Birth years	2011	1.8 (219)	1 (Ref)					
	2012	12.8 (1570)	8.01	(6.93 to 9.24)	<0.0001	8.23	(7.01 to 9.66)	<0.0001
	2013	18.2 (2038)	12.15	(10.54 to 14.01)	<0.0001	13.46	(11.48 to 15.56)	<0.0001
	2014	19.7 (2433)	13.36	(11.60 to 15.38)	<0.0001	15.00	(12.81 to 17.57)	<0.0001
	2015	21.0 (1227)	14.53	(12.54 to 16.85)	<0.0001	16.6	(14.11 to 19.70)	<0.0001

Note: Adjusted for HPI (Health Plan Indicator), HB (Health Board), SIMD (Scottish Index of Multiple Deprivation) and Birth years

4.4 Discussion

The primary aim of this study was to investigate Dental Health Support Workers (DHSWs) working practices of Community Linking within the Childsmile programme of Scotland. Due to the major disruption to the Childsmile programme caused by the COVID-19 pandemic, where most public health programmes were paused, and staff were deployed to support the pandemic response, data collected pre-pandemic were used. A secondary analysis of the Childsmile intervention datasets of DHSWs' Community Linking activities was performed using population-wide child-level linked administrative and health data.

4.4.1 Main Findings

As a targeted intervention within the Childsmile programme, just over 20% of families in the population were referred to a DHSW for additional home-based support, as might be expected. This figure did not vary much across the cohort years. Those families living in the West of Scotland health boards (Greater Glasgow and Clyde) and from more deprived areas of Scotland were more likely to be referred to a DHSW, as were those considered by their Health Visitor at the 6-8 week child health surveillance review to require intensive support.

The reasons for this are likely to be two-fold. Firstly, this might be explained by the origins of the programme during the pilot (demonstration) phase from 2006 until the full rollout in 2011, where the West of Scotland health boards were focussed on the "home and community support" role of the DHSWs whereas the East health boards focussed on the "nursery and school" aspect of the DHSW role with the delivery of the Fluoride Varnish programme (Deas et al., 2013). Therefore, the home-based support component of the DHSW role may have been better embedded in the West Health boards at an earlier stage than in the East Health boards. Secondly, as the DHSW intervention is a targeted element of the Childsmile programme, it was intended that only those families with the greatest need should receive DHSW support. The finding that referral to DHSWs was highest in the more deprived areas of Scotland suggests the targeting of this component was happening as intended. Finally, it is also worth noting that due to the autonomy that health boards had in implementing components of the Childsmile programme, some health boards may not have targeted the DHSW component to those families most in need- and instead implemented it as a

universal intervention. The DHSW component is quite a resource-intensive and time-consuming role, and therefore, to implement it universally may have created capacity issues across the service leading to lower rates of referral than expected.

The Health Plan Indicator used by the Health Visitor at the 6-8 weeks assessment (as a measure to identify the level of need of a family) was difficult to assess for families referred to the DHSW. Although some guidance was given to Health Visitors as to what each category indicated (Core, Additional, Intensive), interviews with health visitors concluded there was a level of judgement applied, and that criterion were changed over time. This may explain why the overall percentage of families indicated for Core support increased over this time, and this was simply reflected in the sample of "referred" children.

For all cohort years, families were first contacted by a DHSW when their child was around four months old, and the majority of families only received one contact from a DHSW. Most families were given dietary advice during their home visits, which had increased over time, as did the distribution of dental packs. In contrast, toothbrushing instruction and dental practice registration referrals had decreased over time.

We believe the decrease in dental practice registrations over time is an artefact of the reporting system on HIC. A core activity of the DHSW is to register families with a dental practice once they were deemed ready. The HIC data input system has a bespoke section for dental practice registrations to be completed by the DHSW; however, in the early days of implementation, it appears that some DHSWs were not using this section of the data entry system to record dental practice registration but were actually using the "signposting" form to record dental practice registrations. Additional training on the use of the HIC Data entry system should iron these issues out. It is more difficult to explain the decrease in toothbrushing advice over time, however as the support that DHSWs offer to families should be tailored to that family's need, it may be that DHSWs determine there are other more pressing issues to deal with in the family before toothbrushing can be addressed (e.g. financial, parental, social issues), or that the family may not require toothbrushing advice as the toothbrushing is going well, but that other aspects, such as diet, might be focussed on during the visits.

Furthermore, this could be because where older siblings had received this support at a younger age, and it was assumed that the message would automatically be communicated to younger siblings of the same households; therefore, the message was not repeated, and DHSW has focused on other pressing issues. This could also be due to an increased workload within the available time constraints, and the DHSW might have to prioritise their consultations. And toothbrushing advice may have been missed.

Most notably, Community Linking activity had increased significantly over the study duration, probably as a result of this component of the programme "bedding in", and more DHSW teams being trained over time in this part of their role. Health boards in the West of Scotland had a longer "run-in" time for this component of the DHSW role, and therefore it is likely full implementation of this part may be seen first in those "early adopter" health boards.

It appears that the families who were being linked to community services/resources came from more deprived backgrounds, perhaps with greater need for support beyond oral health. More than half of those families who were linked to community service or resources lived in areas of high deprivation compared to those who were seen by a DHSW but were not linked to community resources/services. Families considered by the Health Visitor to need additional or intensive support were more likely to be linked to community resources. There was significant variability in Community Linking activity across the health boards. Families were most commonly linked to nutrition/diet community services, where linking rates doubled over the study period. This may reflect the age of the child and the current needs of families with small children. Linking to other services, such as financial support or parenting support, was less common and, again, may reflect the needs of this population or highlight specific issues that DHSWs are less confident engaging with. This analysis was unable to differentiate this.

Referral to DHSWs within the Childsmile programme does appear to be targeted; the families who are being targeted appear to be those most in need. This aligns with the principles of proportionate universalism (Marmot et al., 2010) within the Childsmile programme theory (logic model) and reflects the experience of other Community Linking initiatives that the targeting to the right families can be done.

The precise nature of the delivery of DHSW support to families is unknown from the data, still based on the programme theory, the intervention should be tailored to the family's needs (Mairi Young, 2017, Hodgins, 2017). Since not all 100% of families received dietary advice, dental packs and toothbrushing instruction, this suggests that the visits are being tailored to need to some extent, but it is difficult to know this for sure. The rates of linking families to community services/resources have increased significantly over the study period (in some health boards). This is perhaps a reflection of increased awareness of the need and effectiveness of Community Linking for these families. Indeed, more emphasis on this aspect of the DHSWs role has been made during training sessions (NHS Education for Scotland, 2022). There is a wide range of community services/resources that DHSWs are referring families to. These reflect the wide social needs within this group, who are an even more disadvantaged group than those referred to DHSW but have not been linked to community services. What is uncertain is how effective this Community Linking is, as there is no mechanism as yet to follow up community services to establish whether the family attended and if so, how successful the referral was. From Burns and colleague's systematic review (Burns et al., 2021), it is known that linking is most successful if actively facilitated by the Link worker, and it is unclear from the available data whether this happens routinely or not.

Additionally, as most families only receive one visit from the DHSW, follow-up of families is limited. This may have implications for the success of Community Linking within the Childsmile programme if families are not followed-up to ascertain whether they benefitted from the linking. A systematic review of seventeen studies on Social Prescribing interventions for the effectiveness and active ingredients reported the importance of feedback and monitoring after employing behaviour change techniques (Cooper et al., 2022).

4.5 Strengths and Limitations

The large population-wide sample used for these analyses was broadly representative of the population of Scotland (National Records of Scotland, 2015) and allowed analysis across fourteen health boards. We used secondary analysis of routine health and administrative data, which has the benefits of being already collected, largely cleaned data. We can access these data at a fraction of the costs (and time) of conducting primary data collection (Connelly

et al., 2016). However, the process of securing information governance approvals should not be underestimated. The limitations of using secondary data include the limited range of variables available that can restrict some of the analysis. Information provided by secondary data may not provide all the elements of interest (Pederson et al., 2020). There is also a lag in time between the data being collected, and it is available for analysis. As there was very little activity in the last three years due to the pandemic, the data analysed are the most up-to-date, but in normal times, these analyses cannot capture the most up-to-date data. In addition, more detailed information on the content and delivery of interventions to families is not easily captured by a routine database and therefore limits our understanding of the quality of the interaction between DHSW and family. Similarly, being unable to capture details of the Community Linking activities, such as whether the family were actively facilitated to link with a service, did the family attended the service and if they did, was the experience beneficial to the family? We should note that currently, there are plans by the Health Informatics Centre to collate more detail on the Community Linking activities of the DHSWs, including linking data beyond healthcare facilities to other government organisations that impact health to better evaluate the risk factors and intervention outcome (Health Data Research UK, 2022).

4.5.1 Conclusion

From this study, we can see that pre-pandemic families with the greatest need, as measured by Health Visitor judgement and area-based deprivation, were more likely to be contacted by Childsmile's DHSWs to deliver additional home-based support. Although there is variation across health boards, the percentage of these families being linked to external community resources/services for issues other than oral health had increased over the study period reflecting DHSWs awareness of the wider social determinants of health and their willingness to engage with external services in the community. Understanding the recent and past practices of DHSWs regarding Community Linking will help to refine programme theory, enhance training and support DHSWs in this increasingly important role.

The next chapter synthesises the wider literature on best practices for Community Linking in general health areas.

Chapter Five

Community Linking from Healthcare Providers to Community Resources: A Systematic Overview of Reviews and Guidelines (Study Two)

5.1 Introduction

This chapter outlines the methods and results of a systematic overview conducted to collate, appraise and synthesise key evidence and guidance on Community Linking to inform the Childsmile programme.

5.1.1 Types of Evidential Reviews

A systematic review is defined as an attempt to compile empirical research findings based on predefined criteria to answer a research question. It uses explicit, systematic methods to decrease the risk of bias and provide reliable results from which conclusions can be drawn to make decisions (Higgins et al., 2019). A scoping review is a synthesis of research that attempts to map the literature on a specific subject or area of research that provides an opportunity to identify core concepts, research gaps, sources and types of evidence to inform practice, decision-making on policies and research (Daudt et al., 2013). A realist review is an interpretive literature review driven by a theory. It has prespecified eligibility criteria and synthesises evidence to answer a specific research question. It looks deeply into the context, processes and outcome (Pawson et al., 2005).

An overview, as conducted here, is mainly used when multiple reviews are already present on the topic. It reduces research waste, and information from previous research can build on the new evidence with a broader scope to answer research questions (McKenzie and Brennan, 2017). It strengthens the already present evidence (Hunt et al., 2018). The Cochrane collaborators have suggested using a systematic overview to consolidate the existing literature evidence (Whitlock et al., 2008, Aromataris et al., 2015).

The importance of addressing social determinants of health and the need to refer individuals to community organisations for non-clinical issues is growing in the UK and worldwide. The evidence of the advantages of Social Prescribing is increasing.

Systematic reviews on child oral health and their family support are scarce. To my knowledge, only one good-quality systematic review on children's oral health of “interventions to link families with preschool children from healthcare services to community-based support” has been conducted (Burns et al., 2021). The available literature is primarily on adult health and support through Community Linking. Over the past ten years, multiple reviews have been conducted on Social Prescribing or Community Linking for adults' general health. Recently the UK Government has been investing in Social Prescribing/Community Linking projects to promote health and well-being and reduce General Practitioners' appointments for non-medical problems. Since then, various guidelines were also published. A systematic overview was deemed the right choice to have a higher level of evidence on the effectiveness of best practice and the facilitators and barriers to such an intervention to inform and enhance Community Linking to manage inequalities and improve child oral health within the Childsmile programme. The research question was; What are the current evidence and best Community Linking practices that can inform implementation efforts to improve oral health?

5.2 Methods

5.2.1 Search Strategy

A search strategy was devised on Community Linking / Social Prescribing after discussion with the project supervisors, the University of Glasgow librarian and after consulting previous systematic reviews on the topic. A systematic online Boolean search of databases (Medline/ CINAHL/ Embase /ASSIA) using keywords was performed. The search strategy for OVID (Embase/Medline) is included in Appendix 6; this was amended for other databases. A range of websites, both Government and professional, were also explored. For grey literature, Google Scholar / EThoS / TRiP were searched. Bibliographies of reviews and guidelines were hand searched. The search strategy was piloted initially and refined for the final search. Four authors were contacted because the articles were not accessible. After receiving and reviewing them, three articles were included (ScR2, SR13, ScR7), and one was excluded at the full-text screening stage.

5.2.2 Inclusion Criteria

Systematic and non-systematic reviews, along with the guidelines, were included in the overview. The inclusion criteria were:

- Systematic review / Scoping / Realist review / Literature review / Guidelines / Reports of Government Organisations.
- Social Prescribing/Community Linking (Navigation, signposting) /referral intervention/evaluation, linking patients from health/educational institutions to community-based services, where studies must have some linking to community services.
- Community Linking that involves the referral of a patient from primary care to a 'link worker' who would connect the patient with relevant non-medical interventions in the third sector.
- To address the mild level of mental health and/or social problems, healthy eating, walking/exercise on prescription, art on prescription, housing and health, food insecurities, parental support, loneliness where there is an element of Community Linking or role of links worker support.
- A review may be from any country, and there was no publication year restriction.

5.2.3 Exclusion Criteria

Following were the exclusion criteria for the overview.

- Not a review or guideline (e.g. primary study).
- Review where studies focus on chronic medical conditions, AIDS or cancer support or organ donation programs.
- Psychiatric consultations/ intervention for psychosis/ eating disorder/ split personality.
- Autistic/child hyperactivity syndrome/ disruptive child behaviour / Attention Deficit Hyperactivity (ADH)/ Oppositional Defiant Disorder (ODD).
- Elderly/child abuse/domestic violence/mothers with borderline personality disorders.
- Review of studies on Postpartum depression/ bereavement depression and family support/palliative care support or dementia support, telemedicine, or online patient support.
- Review on elderly carers support/studies on homeless people support / Studies on obesity/ or nutritional deficiencies support / specific fruit on prescription studies.

- Review of statutory social services or on ethical and law considerations for abuse.
- Review of studies where the referral was made from healthcare to healthcare.
- Recommendations only and a protocol. We made one exception of including a systematic review protocol, i.e. Burn et al.,2017 (SR6), because that was the only review focused on Community Linking for child oral health. While we were completing our overview, the Burn et al. systematic review was published, so we included the review article.

5.2.4 Selection of Source Evidence

The systematic overview was managed using Covidence software (Covidence, 2022). Covidence is an online software for systematic review management that allows multiple reviewers to contribute and was used to import citations, screen full text and abstracts, customise and populate the risk of bias table for this overview (Covidence, 2022). The searched records from all the sources were imported to Covidence. Two reviewers (AK, AR) independently screened paper titles and abstracts. Conflicts were resolved by discussion until a consensus was reached. This was followed by full-text screening, again carried out independently by two reviewers, and conflicts were resolved through discussion and mutual agreement.

5.2.5 Data Extraction Process

After identifying, collating and appraising up-to-date evidence and guidance in Community Linking, data were extracted to:

- Summarise the evidence for health outcomes achieved.
- Summarise key aspects of success such as identifying the need, linking to services, sustaining contact, and affecting outcomes.
- Summarise facilitators and barriers to implementation.

Two reviewers (AK, AR) performed the data extraction independently and agreed on the accuracy. The third reviewer (AS) resolved the conflict.

The Consolidated Framework for Implementation Research model (see Chapter 3) guided the description of implementation barriers. Because this is a complex psychosocial intervention, barriers and facilitators to success (the ‘active ingredient’ or mechanisms than make Community Linking work) are often

substantially the same as those for implementation. An example would be skilled staff with a flexible outlook and supportive managers. This is different from a drug or 'conventional prescribing' intervention whereby the mechanisms (drug, dose, route of administration etc.) are more distinct from factors affecting the roll out of the intervention.

Accordingly, barriers and facilitators to success and/or implementation are described below in the subsequent results section according to the Consolidate Framework for Implementation Research model, domains and constructs. Five tables were populated with the extracted evidence.

Appendix 7 summarises the review type, study type, intervention delivery setting, target population, Social Prescribing function, and the types of community assets used.

Table 5-1 summarises the main findings and conclusions of the reviews, including reported evidence for affecting health outcomes and the mechanisms for achieving these (or otherwise).

Appendix 8 includes the quality assessment tools used and the risk of bias in reviews.

Appendix 9 contains information on guidelines issuing organisations and the funding body, the target user, and the aims and objectives.

Appendix 10 contains the quality assessment tool used and the risk of bias in Clinical guidelines.

5.2.6 Evidence Quality Assessment

The quality appraisal and risk of bias assessment for systematic and non-systematic (realist, scoping, literature) reviews were performed using three specific checklists, which were AMSTAR II for systematic review (Shea et al., 2017), RAMESES II for realist review (Wong G, 2017) and the Cooper et al. checklist for scoping review and literature review (Cooper et al., 2019, Pollock et al., 2022). For appraising the guidelines, the AGREE II checklist was used (Brouwers MC, 2017). All three reviewers (AK, AR, AS) appraised the included reviews and guidelines for quality assessment and calibration. Conflicts were resolved after mutual discussion until a consensus was reached. The PRISMA - Preferred Reporting Items for Systematic reviews and Meta-analyses extension

for Scoping Reviews (PRISMA-ScR) checklist guided the overview reporting. This is a 22-item evidence-based checklist (Andrea C. Tricco et al., 2018) for reporting systematic reviews in order to assess the scope of the evidence and synthesize it. This was utilised because the Preferred Reporting Items for Overviews of Reviews (PRIOR) is not yet finalised (Pollock et al., 2019).

5.2.7 Synthesis

The data synthesis was carried out to summarise a) evidence for affecting health outcomes, b) the main aspects of linking, such as assessing patient needs, linking them to services and maintaining contacts which support successful outcomes and c) identifying facilitators and barriers to successful implementation. The findings were reported using the CFIR (Consolidated framework for implementation research) model of implementation (Damschroder et al., 2009). Since the evidence was heterogeneous, the extracted data were narratively synthesised (Campbell et al., 2020).

5.3 Results

In total, 3923 reviews and guidelines on Community Linking were screened for title/abstract and 141 documents for full text. The systematic overview synthesis was conducted on 35 documents (Figure 5-1).

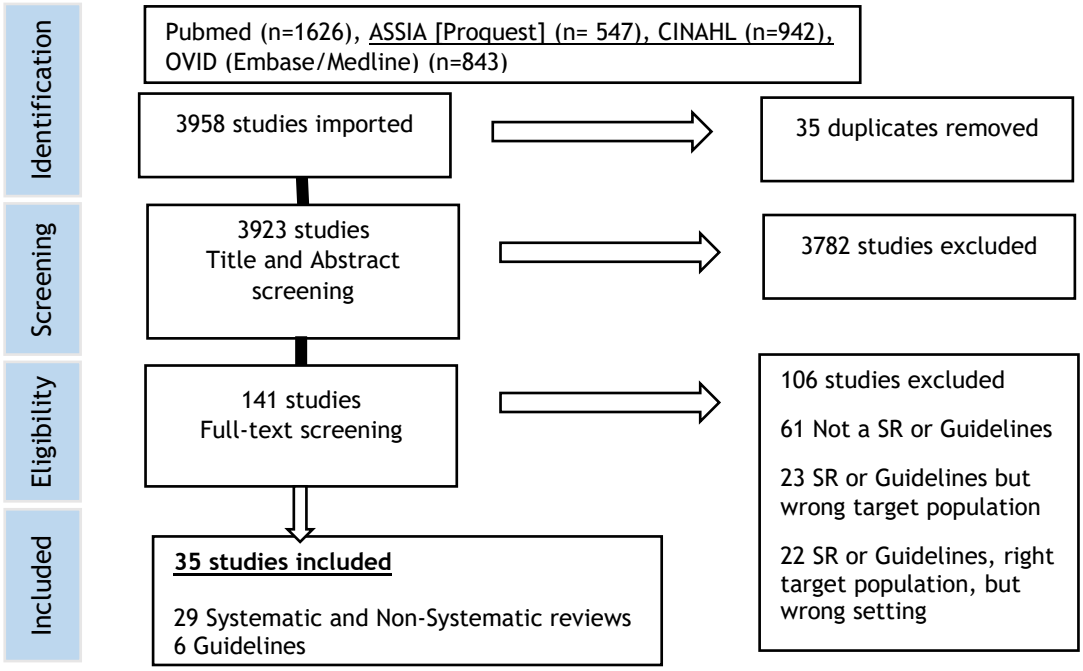


Figure 5-1: Systematic Overview of reviews and guidelines on Community Linking PRISMA flow diagram

5.3.1 Systematic Overview PRISMA Flow Diagram

The PRISMA flow diagram (Figure 5-1) shows an overview of papers collated by the search terms. Our initial search resulted in 3958 documents. There were 1626 results from PubMed, 546 from ASSIA (ProQuest), 942 from CINHAL and 843 results from OVID (Embase/Medline). We screened 3923 documents after removing 35 duplicate records. A total of one hundred and forty-one records were eligible for full-text screening. One hundred and six reviews were excluded following exclusion criteria; see Figure 5-1(PRISMA flow diagram). The final systematic overview included thirty-five reviews and guidelines.

5.3.2 Selection of the Source of Evidence

The final cohort consisted of thirty-five documents in the synthesis. Twenty-nine were systematic and non-systematic reviews (Appendix 7), and 6 were guidelines (Appendix 9).

5.3.3 General Characteristics of the Source of Evidence

Appendix 7 shows the characteristics of included review papers. The studies' methodologies were qualitative (ScR1, RR1, ScR4, SR4, SR5, SR7, RR2, SR9, ScR7, ScR8, SR13), mixed (SR3), and quantitative (ScR6, SR8, SR11, ScR9, RR3, SR14), Quantitative and mixed (LR1), all three together (quantitative, qualitative and mixed methodology) (SR1, SR2, ScR3, ScR5, SR6, LR2, SR10, ScR10, SR12) and one review did not mention the study designs of the included studies (ScR2). The realist reviews (n=3) generated theories and identified the context and outcomes of complex interventions.

In summary:

- The settings were from healthcare settings such as General Practitioner practices to community organisations (ScR1, SR1, SR2, RR1, ScR3, ScR4, SR3, ScR5, SR5, SR6, SR7, ScR6, LR2, SR8, SR10, ScR8, SR11, ScR9, ScR10, SR13, RR3, SR14).
- The target population consists of disadvantaged individuals with long-term physical and mental problems. Individuals with psychosocial issues and socially isolated with a low mood and unmet health/social needs (ScR1, ScR2, SR2, ScR3, ScR4, SR3, SR7, LR2, RR1, ScR8, SR11, ScR9, ScR10), individuals with food insecurity (SR1), underprivileged adults and children (LR1, ScR5, SR4, RR2, SR8, SR10, SR12, SR13, SR14), Primary care patients

needing social support(RR1), Carers and families of children from antenatal to preschool/primary school (SR6, SR9, ScR7, RR3). In two reviews, the target population was not specified (SR5, ScR6).

- The navigation process for referral, signposting, facilitation, and care coordination was through link workers (ScR1, ScR2, RR1, ScR3, SR5, SR6, ScR6, ScR10), health coaches (ScR1, ScR5), health trainers (ScR1, ScR9), lay health workers (SR1), lay volunteer/community workers (ScR5, ScR9, SR13), navigators (SR2, SR3, ScR5, ScR10) and facilitators (SR4, ScR5, ScR8, ScR9, ScR10, SR12). Referrals were also made through community health volunteers/workers (ScR4, ScR5, LR2, RR2, SR8, SR13, RR3, SR14), community health agents (SR13), coordinators (SR5, SR6), voluntary home visitors (SR9, ScR7), referral agents (ScR10), and community mobilisers (SR14).
- Community assets involved in support included employment (ScR1, SR7), housing (ScR1, SR5, SR7), food security (SR6, SR7, RR2, ScR9), legal (ScR1), debt (ScR1, SR5), financial benefits (ScR9), welfare advice (ScR1, SR5) and pensions (scR9), and housing-safety chains (ScR9). In addition, there is family support (SR9, ScR10), food resources (SR1, SR6), time banking (ScR3, ScR10), the museum on prescriptions (ScR10), outreach programmes (ScR4, SR4), sure start (SR6), and domestic violence support (SR6, SR7)
- Health activities in the communities described in the reviews are diet counselling (SR11), healthy eating/educational groups (ScR4, ScR5), community kitchen (SR12), physical exercise/walk (LR1, RR1, ScR3, SR5, SR11, ScR10) and gardening (LR1, ScR9). Besides this, community-based leisure and social activities such as art on prescription (RR1, ScR3, SR5, LR2) were also included.
- Social and emotional support (ScR7) was provided for isolation (ScR1, ScR10), social phobias (SR11), mild depression/anxiety (SR11, SR14), practical skills (RR2), and problem-solving strategies (RR2). Activities such as task completion (ScR7) and goal achievement were used to promote self-efficacy (SR11), self-support (SR5) and self-esteem (SR11). Befriending support was also mentioned in two reviews (SR5, ScR8)
- There was advice on smoking cessation techniques (RR2) and alcohol consumption (SR11). Along with home nursing (RR2), antenatal (prenatal)

care (SR11)/ neonatal advice (SR10), breastfeeding (SR11, SR13), drug use (SR11), immunization (SR8, SR11, SR13), child safety (e.g., seat belt use) (SR11), parenting advice (SR7, ScR7, SR11), and mother and child health and well-being (SR13, RR3, SR14) support. Furthermore, families/participants were assisted with medical appointments and liaising with doctors.

The methodology quality assessment and Risk of Bias (ROB) for included reviews are in Table 2 (Appendix 8), and guidelines are in Table 4 (Appendix 10). Out of 14 systematic reviews, six (SR2, SR3, SR6, SR8, SR9, SR11) had low ROB, and 4 (SR5, SR10, SR13, SR14) had medium. Out of 12 scoping and literature reviews, 5 (ScR1, ScR5, LR2, ScR7, ScR9) had low ROB, and 3 (ScR3, ScR4, ScR10) had medium. Out of 3 realist reviews, 2 (RR1, RR2) had low ROB, and 1 (RR3) had medium. Of 6 guidelines, 2 had low ROB (G4, G6), and 3 (G1, G3, G5) had medium ROB.

Forty-five percent (13/29) of the included reviews were good quality and had low bias risk Table 2 (Appendix 8). Thirty-three percent (2/6) of guidelines were good quality and had low bias risk Table 4 (Appendix 10).

5.3.4 The Outcome of Community Linking Intervention

Table 5-1 describes the main reported outcomes of Social Prescribing/Community Linking.

Pescheny and colleagues, in 2019, found equivocal evidence for improved health and well-being, daily functioning and health-related behaviours (SR2). Kilgarriff et al. in 2015 also reported limited evidence and called for evaluation using standardised outcome measures (ScR8).

While the evidence is mixed, there are reported positive outcomes for patients or participants in terms of anxiety and depression (mental well-being) for those who participated in the linking intervention (SR6), a sense of belonging to the community and being less isolated, increased self-confidence, and reduced anxiety (ScR1, ScR3, ScR9).

There is a greater sense of empowerment, improved physical health and lifestyle, positive mood and increased motivation/self-esteem (ScR3, ScR10), social support, self-efficacy and communication skills. The social support provision positively impacts parent/participant's socioemotional factors, such as

emotional state, sense of control, and coping (ScR7). There was moderate-quality evidence of improved behavioural outcomes and improved use of services they were referred to (ScR5, SR8). Beneficial effect on belief and behaviour outcome regarding healthy eating, substance use and sexual health (SR11). There has also been progress in maternal knowledge and abilities (SR9).

Some gaps in the evidence can be observed. More work is needed to: assess the effect on food insecurity (SR1); examine tailoring to different social and demographic populations (LR1); durations and frequencies of intervention contacts (ScR4); the use of emerging technology (ScR5) such as electronic data integration across care sectors (SR7); and clarity of definitions for referral (LR2).

The health system outcomes included cost savings, reduced staff workload, and the ability to contact difficult-to-reach people (ScR5).
Any of the included reviews did not explore system-level improvements of community organisations or increased organisational demand (work overload).

Table 5-1: Main findings of the reviews and facilitators/barriers to Community Linking

(Systematic/Non-Systematic Reviews n = 29)

ID	Main findings/conclusion	Facilitator	Barriers
Bertotti et al; 2019 ScR1	It is a scoping review of the navigation delivery role. Social Prescribing link workers share similarities with other roles, particularly health coaches and trainers. The role entails proactive involvement of the Voluntary, Community, and Social Enterprise (VCSE) sector and their recognition of the need to address health inequalities. They assist people with long-term health conditions or mental health issues. The review concluded that the future challenge of health care is the ageing population and multiple co-morbidities. It requires coordinated and integrated care between healthcare and non-healthcare professionals. Future research should focus on exploring the impact of navigator programs on people's health globally.	Service made accessible to clients from low socio-economic groups and Black Minority Ethnic groups. A relaxed attitude and easy-going, enthusiastic approach of link workers The Link Workers' listening skills, non-judgemental and empathic approach. Structured support (e.g., motivational interviewing, coaching, setting goals) Holistic support, which includes welfare, legal and debt advice, employment and housing and social isolation Trusting relationship with link worker, improved sense of social connectedness and reduction in service user anxiety Strengthening links between healthcare providers and the community (boundary spanners)	After the initial referral, a lack of continuous monitoring and feedback Not understanding the boundaries of their role. Lack of awareness of employment support for the community If there are more demands than resources and a high caseload If trainers/navigators are not from the local community with different socioeconomic backgrounds from their service users. Lack of access to community organisations, lack of continuity of staff and very high caseload Little evidence of championship by local medical leaders, CM found it difficult to integrate their provision
Cordis bright 2019 ScR2	The review highlighted the ability of Social Prescribing programmes to address the underlying social causes of ill health, thereby reducing the pressures and demands of primary/secondary care health services. However, the robustness of the evidence remained inadequate. Poorly designed smaller	Use an appropriate funding model for the programme, e.g., a General Practitioner practice-based or a Clinical commissioning groups/local authority-based model. Time to train/educate healthcare referring professionals. A clear, simple straight forward referral pathway.	No shared language in defining Social Prescribing that may help engage main stakeholders. Not identifying the target population. Low programme uptake and adherence

ID	Main findings/conclusion	Facilitator	Barriers
	scales studies were conducted. More evidence is needed for patient satisfaction, outcome, and cost-effectiveness.	Skilled link workers. A Patient-centred approach: Co-productive relationship between link workers and the patients. Various sectors working collaboratively, effective communication mechanisms and feedback loop	Insufficient standardised regulation and national guidelines Lack of robust evidence Lack of clarity around cost
De Marchis et al; 2019 SR1	This systematic review demonstrated that pooled analysis of the use of resources for food insecurity showed a moderate positive size effect, and pooled effect on the use of food or food vouchers has shown no effect. Fewer low-quality studies on the effectiveness of food insecurity intervention were conducted. Studies on the use of food service utilisation and patient health outcome to understand the role of the healthcare sector in addressing food insecurities need evaluation.	Referral-based intervention to food resource Food/voucher programme increases fruit and vegetable intake. Information on nutrition, cooking classes, and voucher distribution for fruits/vegetables. Caregiver acceptability of the intervention	Only addressing food insecurities without considering other social determinants of poor health
Leavell et al; 2019 LR1	The literature review of supported nature-based Social Prescribing/referral schemes that can provide effective social connections for loneliness and social isolation. The review concluded that understanding the take-up of these activities by vulnerable individuals. There is a need to assess various approaches involving individuals of varied demographic and social backgrounds. More experimental quantitative studies with large sample sizes, reliable and valid outcome measures and comparative groups are required.	Healthcare providers and third-party organisations (local non-profit organisations, municipalities, social services, and schools) participation for community referrals/links screening programmes. Tailored Referrals to individual needs, e.g., high-risk individuals would need weekly or biweekly. Easy accessibility of guided outdoor activities and transportation. Digitally supported prescription to outline the approximate outdoor activity duration, intensity, and frequency monitoring and recording individuals' behaviour possibly through cellular data.	Limited funding to evaluate nature-based interventions and social connections Unable to identify the connection between nature and individual behaviour and cultural background.

ID	Main findings/conclusion	Facilitator	Barriers
Pescheny et al; 2019 SR2	There is mixed evidence on Social Prescribing outcomes for improvements in health and well-being, health-related behaviours, self-concepts, and daily functioning. Tools to measure these outcomes varied between studies. Quantitative studies' results were more consistent, indicating service users experiencing improved health and well-being, self-concepts, feelings, health-related behaviours and day-to-day functioning, and reduced social isolation. However, findings were mixed, and no clear conclusion on the impact of Social Prescribing on service users could be drawn.	Identifying patients' needs. Navigator trusting relationships and need-driven support motivate and enable behaviour change and sustained service engagement. Navigators proactively solve daily issues and worries. A generalised Social Prescribing pathway	-
Husk et al; 2019 RR1	This realist review explores the efficacy of various types of Social Prescribing referral and support work. Statements were generated relating to how referrals should take place (Enrolment), how they are accepted (Engagement) and how the activity is completed (Adherence). The available evidence was methodologically insufficient to make generalised inferences on the efficacy of any one approach.	Patient enrolment: If the patient's needs are met through referral/consultation, they believe in the provider's ability to listen and address their concerns. Patient engagement: If the service/activity is accessible and first session travel is supported either through cost (such as transport or venue), time, reminder phone calls, written information, introductory sessions, or someone attending with them (a 'buddy'). Patient adherence: If the prescriber's are considered as informed leaders, and the experience is positive, or there is a change in symptoms	Participants' worries and concerns about staff training. Participants' concerns about staff experience and the environment in terms of facilities to treat patients with complex needs or specific conditions. Patient's perceived lack of improvement in health results in disappointment
Chatterjee et al; 2018 ScR3	This is a scoping review of the outcomes of Social Prescribing schemes. The main findings were that because of these schemes, there was a reported increase in self-esteem and	Collaborative working Making connections	Social Prescribing schemes not following guidelines

ID	Main findings/conclusion	Facilitator	Barriers
	confidence, improved mental well-being and positive mood, and decreased anxiety, depression and negative mood among participants. Gaps in the evidence were identified. The sample size of studies was small, and less effect size evaluation. A need to explore other less evaluated sources within the community, such as books on prescription, education on prescription, healthy living and time bank efficacy. Social Prescribing can be an adjunct to Improving Access to Psychological Therapies (IAPT) services or other such services. The evaluation process should integrate the views of all stakeholders, including the referrer, provider, commissioner, and patients. A mixed methods approach is ideal for Social Prescribing evaluation. Quantitative scales for baseline measures and progress. Qualitative measures to capture individual experiences during and after intervention	Considering wider stakeholders' opinion If service providers commission Social Prescribing directly, possibly in conjunction with local authorities.	
Lohr et al; 2018 ScR4	It is a scoping review exploring the role of community health workers with Community-clinical linking. It showed that this model could help professionals, academics, and policymakers maximise their care provision. Three identified research areas were training for community health workers, Clinical-Community Linking, follow-up methods, and community health workers' roles. A practical model is needed for the operationalisation of the linking requirements. Other considerations are follow-up after initial	Community Health Workers Core competencies/training, e.g., advocacy and patient support, capacity building, understanding how to address target disease, environmental assessment, problem-solving, and goal setting. Follow up by Community Health Worker. Empower Community Health Workers to practice their total community capacity.	Less utilisation of Community Health Worker roles in building individual and community capacity and providing direct services Care coordination where Community Health Workers are excluded and less engaged with the community resource Community Health Workers limited understanding of the scope of practice

ID	Main findings/conclusion	Facilitator	Barriers
	referral, maintaining links between various organisations, and the duration and frequency of patient and organisational interactions are also important.	The ability of Community Health Worker to work and engage locally with various services and community organisations. Integrating community health workers with community clinical linkages	Lack of rigorous evaluation to determine the effectiveness of clinic-community-linking programmes.
Pescheny et al; 2018 SR3	It is a systematic review that narratively synthesises a range of barriers and facilitators to Social Prescribing implementation and delivery. The included studies were either found in the grey literature or in the reference list. Most studies were of low quality and reported inadequately on methodologies. All the included studies listed barriers and facilitators to Social Prescribing implementation, but none of the studies explicitly described those components. There is a clear need for research studies on facilitators and barriers to Social Prescribing implementation to be rigorously designed and analysed. The reporting should be transparent and clear, giving due consideration to the dissemination process of research findings.	Implementation made with a scheduled plan over time. Allow time to develop a shared understanding of the programme and expectations between involved partners (General Practitioner surgeries, navigators, and the third sector). Pre-implementation series of workshops, briefings and networking events to be arranged and designed involving partners to share best practices and to discuss Social Prescribing service and standardised training. Referrers' training on how to explain Social Prescribing to patients, including words and examples they can use and encouraging referrals to Social Prescribing services. Steering group meetings to discuss processes and operational procedures. Shared understanding among partners from different sectors, commissioners, service users, and stakeholders. A flexible approach requires hearing what stakeholders need from the service, altering systems processes, and communicating accordingly. A clear scope of the Social Prescribing service, which patients to refer, how patients can be	Delayed implementation/delivery of Social Prescribing could be due to a multi-sector approach involving diverse stakeholders to project management. Following set dates to initiate and host Social Prescribing in General practices (A 'go live dates' approach) without proper preparation, e.g., developing relationships and trust between partners, gaining an insight of outcomes/expectations and agreeing mutually on effective working practices Limited resources/funds for recruiting skilled navigators and engaging with third sectors service providers Lack of shared understanding of Social Prescribing service and pathway among stakeholders, e.g., prescribers, navigators, service users, and service providers The prescriber's limited understanding of the Social Prescribing pathway may lead to uncertainty about how to explain Social Prescribing to patients, which may jeopardise referrals to Social Prescribing services, may lead to large numbers of inappropriate referrals, and impairs

ID	Main findings/conclusion	Facilitator	Barriers
		helped, and the capacity and skills offered by a navigator. Relationships between partners based on reciprocity and trust. The organisational readiness and General practice staff engagement in Community Linking. Creating a culture that supports the biopsychosocial model of health. Support and supervision for link workers. Availability of a wide range of good quality, easily accessible third sector-based services and activities.	programme delivery to the target group. General practice staff reduced engagement, higher turnover and lower patient engagement. Reduced availability of suitable service providers in the third sector
Wallace et al; 2018 ScR5	It is a scoping review demonstrating a wide range of boundary spanners roles to engage marginalised communities where it is difficult to have an institutionalised healthcare workforce. Individuals close to their communities serve best, and service providers value their roles as agents empowering the community and activating and challenging the system. Organisations' investment in this role depends upon the desire for the health expertise needed and the need for integration into a team of health practitioners. With the help of training supervision and organisational alignment, the boundary-spanner model can improve the community's health literacy and access to services. Future research should concentrate on systematically assessing the outcomes of various models of boundary spanners and on the use of emerging technologies. A	Identifying and employing boundary spanners within their community with shared experiences and demographics. Being a role model improved the mental and physical health of boundary spanners. Training, supervision, and ongoing support are central features of success. Creating a positive work environment and supporting staff with their workload, and enabling them to contact hard-to-reach individuals Health professionals thinking and change of attitude toward lay workers.	The conflict between host health organisations and the expectations of the community they belong to. Privacy issues of the community members due to data access. Insecurities of other health professionals because of navigators that they may encroach on their professional scope of practice Reluctance from the health team to accommodate new roles such as boundary spanners/lay workers

ID	Main findings/conclusion	Facilitator	Barriers
	collaboration between health services and communities can be mutually beneficial and be seen as a policy direction for managing health disparities and increasing community participation.		
Williams et al; 2018 SR4	This systematic review was conducted to evaluate the available evidence and research on supported playgroups that may positively influence outcomes for parents, children and the wider community. The findings showed that the parents and other stakeholders highly appreciate such programmes. The included studies design was of low quality. Evidence rigour was lacking on effectiveness in achieving the desired outcome in a child or parents' behaviour. A more precise theory of change that could provide a direction on content, delivery and outcomes is required about various types of supported playgroups and how they can satisfy the requirements of different families. For future research, randomised control trials or a comparison group in studies would be preferable and the use of more reliable measures for child and parents' outcomes.	Accessibility to government funding for certain services (based on local area knowledge, local service provider's priorities, and emerging opportunities). A clear explanation of expectations about how the programme would work and the development of a shared professional language. A theory of change could help in creating capacity and program continuity by ensuring that the activities are relevant and feasible within the available resources and that the programme's effectiveness is testable. The flexibility of activities content according to families' needs. The development of a framework for providing playgroup sessions could inform activity facilitators' training and may result in improving service quality. The facilitator's support, duration and contents of the session. Investing in evaluation	Staff qualification and training variation

ID	Main findings/conclusion	Facilitator	Barriers
Bickerdike et al; 2017 SR5	This systematic review explored the existing evidence of Social Prescribing schemes evaluations. Most Social Prescribing evaluations were poorly designed at a smaller scale. Due to some missing information of studies, determining who received what, for how long, with what effect, and at what cost was difficult. Lack of comparators introduced an increased possibility of bias; the follow-up period was short. Validated and standardised measuring tools were not used, and confounders were not adjusted. The evidence was insufficient to support either the success or cost-effectiveness of SP schemes. Future study designs should include a comparator group and transparency in reporting	Training and supervision of facilitators, which includes basic counselling knowledge, skills like team-building strategies and visits to community services, networking with community and voluntary services Training in group therapy and psychotherapy Resource Communication between General Practitioners and link workers Feedback on participants' progress encourages General Practitioners to support Social Prescribing	Lack of understanding of the service by the service user If expectations of the service users are not met Unsystematic planning with no evaluation process Limited resources
Burns et al; 2017 SR6	This systematic review concentrated on interventions that connect families with young children to community support organisations. A typology for linking intervention was identified. Signposting, referral, and facilitation were three key intervention types recognised in this review. More active interventions were more effective. The evidence from the included studies was of poor quality with poor methodology. The strength of evidence weakens with more complex, tailored, and individualised interventions due to methodological flaws. On the other hand, these interventions appear to be more successful at connecting to the intended organisations.	Relationship between the family and the service provider Link workers' awareness of local community organisations The capacity of services to provide and support tailored intervention Facilitation is preferred compared to signposting	-

ID	Main findings/conclusion	Facilitator	Barriers
Gottlieb et al; 2017 SR7	This systematic review examines the frequency and rigour of evaluations of interventions that bridge the gap between social and medical care. The findings showed that, initiatives addressing patients' social and economic needs are gradually being incorporated into the healthcare system. Most studies evaluating these programs were low quality and mainly focused on process and social outcomes. Future evaluations of healthcare utilisation and cost outcomes should include robust study designs and standardised metrics to advise on new investments. Capacity development and electronic record data integration from social and medical care strategies may contribute to a more holistic evaluation in this area.	Pre-implementation planning with a discrete aim to show what the programme intends to do before demonstrating its impact on health or resource utilisation. The program evaluation process integrating health and healthcare utilisation outcomes is more likely to affect sustainability decisions. Systematise and standardise social and economic needs assessments for evaluation Identifying families' resource needs for targeted interventions/evaluation and reducing resource waste.	Use a variety of metrics to assess the outcome measures in each category. The difficulty in quantifying care, such as the burden of illness, measuring care providers' experience. Research capacity issues like access to data on utilisation outcomes and healthcare outcomes. Funding availability for social intervention evaluation
Polley et al; 2017 ScR6	This review assessed the effectiveness of Social Prescribing on healthcare demand and cost implications. The evidence generally favours the Social Prescribing ability to reduce primary and secondary care demands. However, the evidence quality was poor. Several approaches are employed for Social Prescribing programs. The cumulative effect determines its success or failure, making it difficult to say conclusively which single method has provided a total solution. In conclusion, evidence quality must improve and be presented in a clear, consistent way. A standardised framework is required for the evaluation to assess the impact of Social Prescribing and compare various models.	A Targeted approach to the population can result in better value for money in terms of services Targeted intervention for patients who burden services Efficient use of available funds Shared funding between the clinical commissioning group and the local government.	-

ID	Main findings/conclusion	Facilitator	Barriers
Rempel et al; 2017 LR2	A literature review to determine the aims and measures used to evaluate Social Prescribing programmes. Various aims and measures were employed to evaluate Social Prescribing in the studies. The primary purposes were to improve mental/physical health and well-being, social well-being, and cost savings. The findings suggest that the current evidence has neither been undertaken entirely nor understood. A standard definition for social referral needs to be derived that reflects practitioners' and commissioners' intentions and what the programme is supposed to achieve.	N/A	N/A
Vareilles et al ; 2017 RR2	It's a realist review describing the process and contextual factor interventions to enhance the performance success of community health volunteers (CHV). A strong community connexion between community members and CHVs was established as one of the main elements in producing positive outcomes and a source of influence on individual motivation and attitudes of CHVs'. For future research and recommendations, empirical studies based on the stakeholders' assumptions on how such interventions are expected to work should occur. These can then inform the policymakers, programme implementation team, donors and the community.	CHVs a role models for the beneficiary community. A positive connection between community members and CHVs. Role clarity, not only for themselves but also for other health workers and beneficiary communities. Ability to exercise leadership, community engagement and mobilisation. The knowledge and skill-based training for CHVs include refresher training, acquiring new skills and the ability to solve problems. Supervision and logistical support. Reduction in the workload of formal health care workers, retention, satisfaction, and well-being. Work recognition of CHVs through the provision of monetary and non-monetary incentives. A driver for CHVs is the mechanisms of self-esteem/sense of pride/sense of duty/sense of community recognition. Good quality of community services availability, work efforts and active participation in the programme.	Attrition and reduction of involvement and effort due to dissatisfaction Lack of community mobilisation Poor leadership and sustainability of the programme Inappropriate health practises If the intervention is implemented without investment in strengthening the health system Loss of trust by the community in the health services

ID	Main findings/conclusion	Facilitator	Barriers
		Improvement in access to health care, reduction of patient waiting time.	
Ballard et al; 2017 SR8	This is a systematic review for improving Community Health Workers intervention in middle and low-income countries. The quality of evidence on the efficacy of Community Health Workers performance interventions was moderate in (1) improving certain behavioural outcomes for patients, (2) increasing service (3) improving Community Health Worker quality of care. Any adverse effects of these interventions either on patients, Community Health Workers or the health system were not reported. The evidence was insufficient to conclude the impact of measures on retention or to identify which performance improvement intervention techniques were more likely to succeed. The impact of an individual intervention component was difficult to assess as almost half of the studies used compound interventions. A variety of measurement instruments were used to assess the care quality across studies. Some were more valid than others, raising validity concerns. Community Health Workers performance improvement metrics development lacks consensus and hinders collecting information on this. Future research to assess the long-term impact of such interventions.	Service utilisation (Increasing the number of patients visiting health centres and identifying individuals who could benefit from these services) can be improved through Community Health Worker performance intervention. When recruiting Community Health Workers, emphasise career possibilities rather than benefits to the community. When supervising Community Health Workers, reminding them frequently of overdue tasks and following up on underperformance Tailoring incentives to measure individual preferences when incentivising Community Health Workers—but only for Community Health Workers performing a single repetitive task, not for Community Health Workers who must perform multiple or more complex tasks. Equipping Community Health Workers using a mobile phone-based procedural guidance	Availability of less support in work for Community Health Worker. Providing Community Health Workers with technology such as mobile phone-based guidance in areas where mobile phone reception is poor. No system to track Community Health Worker performance. Performance-based incentives may distort behaviour in unintended and undesirable ways when Community Health Workers have more complex objectives that necessitate multiple behaviours. Cultural barriers, and other societal norms and attitudes could influence intervention outcomes. Ambiguity regarding the availability of sufficient resources to implement and sustain the proposed clinical and/or managerial support for Community Health Workers. Under-resourced programme.

ID	Main findings/conclusion	Facilitator	Barriers
Munns et al; 2016 SR9	This is a systematic review synthesising quantitative and qualitative evidence on the effectiveness of home visiting programs of peer-led parenting support programs delivered to both rural and urban families. The program positively impacted parent attitudes and beliefs improved maternal knowledge, childcare skills and behaviours, and enhanced decision making, coping and organisational capabilities. The parent support program involves psychosocial and psycho-cultural methods that may help promote appropriate and lasting support to parents. An action research approach was suggested to promote ongoing learning that integrates parents' perspectives and experiences of peer home visitors, community nurse facilitators, and community parenting support agencies. The cost-effective analysis would recognise the economic benefits of such programmes.	Trust and supportive relation with Home Visitor (HV). A respectful and non-judgemental approach from the HV Flexibility in working of HV. Developing strategies for establishing, maintaining and terminating the relationship with parents/carers. Building mother's self-esteem, reinforcing parenting ability and at the same time maintaining professionalism. The sense of self-worth of HVs in helping families and trust, mutual respect and valuing of partnership within the program facilitated the feeling of being an equal team member. Safe and supportive working environment A reflective approach and education sessions for all staff	Lack of trust in HV Lack of partnership and collaboration leads to a lack of cooperation and positive relationships between parents and HV. Difficulties in working with a new home visitor A lack of supervisor appreciation and acknowledgement contributes to the feeling of frustration among home visitors.
Byrne et al; 2016 ScR7	This review aims to understand home volunteering programmes for assisting families with young children and propose a conceptual pathway of services for families who require extra assistance. Volunteer programmes bridge the gap between difficult-to-engage families and professional services. Limited scientific evidence supports that	-	-

ID	Main findings/conclusion	Facilitator	Barriers
	volunteer home visiting services can impact a family's health and well-being. More empirical research based on measures that represent the rationales of such programmes is required to investigate in future.		
McCollum et al; 2016 SR10	A systematic review investigating the level of equity within various Community Health Worker programs in multiple contexts and attributes of Community Health Worker programs. Policymakers must be aware of the features that jeopardise equity. Barriers to health services uptake can be overcome (both supply and demand) through Community Health Worker. A universal approach to Community Health Worker interventions can improve Community Health Worker service access and use equity. The review identified gaps in Community Health Workers programme quality monitoring approaches and suggested that in the assessment tool, equity be included. More research is needed to explore Community Health Worker's role in identifying social determinants of health in their community.	Community Health Workers local recruitment, rather than centrally, and from underserved populations. The service's proximity to the local community. Home-based services. Support from non-government organisations for supervision/monitoring of home visits. Awareness of activities in the community. Community Health Worker involvement in group and/or one-to-one education activity. Patients escorted to the facilities by Community Health Worker. Counselling and problem-solving skills training for Community Health Workers. Supportive supervision.	A low number of work force in a hard-to-reach area. At the planning stage, if supply and demand barriers are not addressed, restricting the equity of health services provided by health facilities may also affect the equity of Community Health Worker programs. If Community Health Worker is not local to the community, or if the intervention design does not account for adjusting the ratio of households to Community Health Workers for various geographic areas such as mountains versus plains, those residing farther away from the Community Health Worker are less likely to receive home visits. Participants need to pay for the services. Absence of specific activities such as behaviour change and communication. Lack of social connections with Community Health Worker and Inability to mobilise the community.
Kilgarriff et al 2015	This review maps the main components of Social Prescribing and its impact. The findings showed that General Medical practitioners and the patients believed that Social Prescribing	Accompanying the patient to the activities Collaboration among stakeholders.	Patient disengagement. Long waiting times result in increased

ID	Main findings/conclusion	Facilitator	Barriers
ScR8	improved the health and well-being of the participants and reduced healthcare use. However, the evidence is limited to support this. Funding prioritisation and evidence gaps that demonstrate Social Prescribing services efficacy needs addressing. The outcome measures should be standardised to evaluate the intervention.		patient disengagement. Capacity issues of community resource.
Brunton et al; 2015 SR11	It is a systematic review of community engagement approaches, both in the form of effective approaches (outcome evaluations) and appropriateness (process evaluations). The evidence suggests that higher levels of community engagement are linked to greater beneficial effects. Community involvement by coalitions, collaborations or partnerships covers health issues such as healthy eating and physical activity. No study targeted older people, reflecting an essential gap in the research literature. Primarily moderate to low overall extent of community engagement across all aspects of study design, delivery and evaluation were observed. The majority of outcomes showed beneficial effects for a range of health behaviours, clinical measures, health/social status, self-efficacy and knowledge, attitudes or intentions. However, the present findings do not demonstrate any clear trends in terms of effectiveness in the subgroups examined. The strength and direction of the effects and the length of the intervention or final follow-up measure did not seem to have an association. The breadth of the range of interventions,	Youth involvement in developing interventions to impact other youth and the broader community. A coalition of community partners, researchers, health providers and community health workers as active and equal partners in the research process, providing unique community knowledge, critical input and guidance. Culturally appropriate intervention implementation through a community action board of leaders, activists, residents and peer leaders. Collaboration in the development of data collection tools and methods. High engagement generally reported positive trends in self-efficacy.	Low engagement

ID	Main findings/conclusion	Facilitator	Barriers
	populations and outcomes presents a challenge for analysis and interpretation. The studies were of poor methodology, lacked an appropriate description of community engagement, and there is no reliable tool for characterising community engagement. It is difficult to determine what it involves and separate potentially active components and compare results reliably across studies.		
Mossabir et al; 2015 ScR9	It is a scoping review, the evidence shows that patients with mental illnesses who were referred to community activities appear to have some legitimate psychosocial benefits. Participating in local activities and their connections to daily life provide a potentially sustainable way for people to manage their health needs and reduce their use of health services. The review also emphasises the linking mechanisms could assist service providers who want to use this approach to assist people with long-term health conditions. Few social interventions, such as Social Prescribing schemes, have been empirically evaluated. Such studies were mainly discovered through a search of grey literature. Several empirical studies on the effects of art or exercise on prescription have been conducted, but these programmes did not connect participants to a variety of groups that have been identified as a means of addressing the	Facilitators' to be flexible, trustworthy, empathetic and accessible. Skills in tailoring activities to the needs and preferences of participants. The ability to encourage attendance. Home visits for participants who are unable to attend appointments. Accompanying participants to community organisations. The facilitator/Health Trainer's skill in communicating with the public, empowering people to come up with their solutions to problems and providing personalised care. Developing relationships with both clinicians and voluntary and community groups. The single point of contact provided by facilitators based within the general practice. The physical placement of facilitators within the General Practitioner practice ensures the effective engagement of healthcare staff ensuring that the confidential information did not leave the practice upon referral of patients to the scheme.	An ambiguity of facilitator role when based in General Practitioner surgeries. Clinicians' apprehensions about referring to voluntary organisations and the sustainability of services. Health Trainers expressed conflicting pressure of integrating with the practice team and also continually engaging and keeping up to date with community groups and activities. Health Trainers did not feel fully accommodated by primary care services, regarding the provision of reasonable physical space and clinical supervision. Reservations on the part of General Practitioners in referring their patients to the intervention. Inappropriate referrals to the services such as referrals of patients with very severe mental health problems to the Social Prescribing scheme. Practices unable to identify patients' suitability for Social Prescribing. Participants refusal for the intervention

ID	Main findings/conclusion	Facilitator	Barriers
	limitations of existing self-management assistance.	Adequately staffed interventions enabled facilitators to see patients quickly.	and their perception of it as irrelevant to their needs. Availability and accessibility (including venue) of the activities Lack of transport, literacy and more waiting time. Confidentiality and disclosure issues.
Thomson et al; 2015 ScR10	This scoping review was conducted to determine the efficacy of various referral options to provide definitions, models, and examples of Social Prescribing schemes and the degree to which these schemes were evaluated. The main findings showed that participants' health and well-being, low mood, self-esteem, sense of control, and social isolation had improved. Non-UK schemes covered larger scattered areas and populations, connecting mental and physical health. The focus of Randomised Control Trials was on cultural activities. The UK-based Randomised Control Trials were on exercise referrals. The recommendations were to encourage other healthcare professionals and agencies to participate in the community referral scheme. A multiagency preventive approach is required. And a need of evaluation for every Social Prescribing scheme. Comparing a baseline and progress over time and lived experience over time, both before and after the program, will be beneficial.	Directly commissioned from service providers, possibly in collaboration with local government authorities. Possibly the National Health Service commissioning process should include Social Prescribing schemes. Personal budgets for patients with long-term disabilities to purchase care to help them control their conditions. The use of a link worker or referral agent with knowledge of local resources or organisations can improve access of the patients to voluntary or community organisation.	Lack of funding. Due to community health programs temporariness, commissioners, physicians, and service users could not shape them. Lack of knowledge of the available resource and time for primary care staff.

ID	Main findings/conclusion	Facilitator	Barriers
Iacovou et al; 2013 SR12	A systematic review aims to investigate community kitchens to see if they impact participants' and their families' social and nutritional health. According to the review, community kitchens could benefit individual participants' nutritional intake, food security issues, and social experiences. However, to make evidence-based recommendations for public health strategies, more comprehensive research methods, both qualitative and quantitative, are required to evaluate the social and nutritional effects.	The programme's long-term viability depends on community engagement and self-help. Community workers may facilitate these programmes	-
Giugliani et al; 2011 SR13	A systematic review was conducted to evaluate community health workers' effectiveness. The available evidence indicated that Community Health Worker intervention is advantageous specifically for mother and child health, reducing inequality and infectious/ non-communicable diseases. The quality of evidence was low. There were gaps in Community Health Worker intervention research evaluation that need to be prioritised at the national level with high-quality studies.	Funding Political engagement. Incorporating community strategies into the healthcare system and policies. Community Health Worker training, supervision, and integration in a healthcare team. Role clarification, ensuring that each professional's role is understood and that activities are coordinated.	Inadequate training, qualification, and wages. A lack of coordination and sustained supervision.
Kane et al; 2010 RR3	A realist approach is used to determine whether Randomised Control Trials can provide an understanding of Community Health Worker working strategies for improving child health. The hypothesis developed through Randomise Control Trials was unrefined and broad. It	Training based on knowledge, supplemented by continuous mentoring, raises self-esteem, self-efficacy, and the assurance of having extra support. Good referral support from local health services gives Community Health Worker a sense of belonging, credibility, legitimacy as a	Community Health Worker efficiency may be jeopardised if a different context is used, such as if they are appointed by the political establishment rather than by the beneficiaries. If Community Health Worker are not supervised.

ID	Main findings/conclusion	Facilitator	Barriers
	needed to be tested and refined for future studies.	part of the system, a sense of being valued and a perception of social status improvement.	Lack of clarity on Community Health Worker role.
Bhutta et al; 2010 SR14	This systematic review was on the global experience of Community Health Workers showed that, Community Health Workers provide a wide range of services. The services have aided in the reduction of maternal and child mortality and the burden and cost of malaria and tuberculosis. However, the pace of progress is slow. And the reason for this is a weak economic and health system in low-income countries. Community Health Workers are valued in communities across studies. They serve as an important link between communities and the health and social care systems. Knowledge gaps were identified, such as the evaluation of the cost-effectiveness and sustainability of this program, the improvement of access and equity, the effectiveness of paid and volunteer workers, the effectiveness of various payment models across various tasks and settings, the difference in the quality of care between healthcare professionals and Community Health Workers, and the comparison of prevention strategies to curative strategies.	Improving healthcare system. Creating alternate cadre and roll shifting. Supervision for Community Health Workers. Incentives for Community Health Worker. Behaviour changes in the community. Consultation between stakeholders.	Shortage/retention of healthcare staff. Lack of equipment and drugs. Lack of refresher training for Community Health Worker. The traditional belief of the community.

5.3.5 Guidelines Recommendation

Aims, expected outcomes, and main recommendations of guidelines are shown in Table 3 (Appendix 9). The overview included six guidelines on community collaboration and Community Linking (Table 3, Appendix 9). Two of these had a low risk of bias (G4, G6 Table 4, Appendix 10), and three had moderate (G1, G3, G5 Table 4, Appendix 10). The target audience included Health and social care policymakers, managers and commissioners, Voluntary Community and Social Enterprise providers, Primary care networks that support Social Prescribing, directors of public health and members of the general public. The secondary target audiences in a WHO health policy system guideline were development partners, various funding agencies, agencies taking health initiatives, donors, contractors, researchers and community health workers. The high/moderate quality guidelines G3, G4, G5, and G6 have taken evidence from multiple sources, including case studies, Social Prescribing evaluations, systematic reviews and consultation with numerous stakeholders.

The British Red Cross guidance document 2019 (G1) was specifically on managing loneliness with Community Linking, advocating a person-centred approach. The expected outcome was to reintroduce lonely, isolated people into the community by providing emotional and practical support (British Red Cross, 2019). The guideline development group included a diverse group of individuals with lived experience in partnership between the British Red Cross and Co-op, the Loneliness Action Group and the All-Party Parliamentary Group; however, systematic reviews and meta-analysis evidence were not provided (G1).

G2 was Quality Assurance for Social Prescribing: A guide to support Social Prescribing programmes in England 2019. The document belonged to the National Social Prescribing Network England and was funded by the national lottery community fund. Many organisations and individuals were consulted, but the recommendations were not linked to the evidence or systematic reviews/meta-analyses.

G3 is the National Health Services England (NHS) Personalised care guide 2019, "Implementing a comprehensive model". It has a Social Prescribing component that includes "Social Prescribing and community-based support Summary guide" and "Social Prescribing link workers: Reference guide for primary care networks – Technical Annex" Annex A to K is a toolkit for Social Prescribing from creating

a shared Social Prescribing plan with partners, recruitment procedure, a framework for link workers role, induction and supervision material ' and learning pathway, how to develop a support plan and personalised care, establishing a referral system, and measuring the impact of well-being on individuals, communities, and community groups. Appendix A of the primary document shows what has already been delivered and the evidence attached.

G4 is a World Health Organization guideline on health policies and system support to optimise community health worker programmes (2018). A very comprehensive document containing detailed information on the guideline development process, various stakeholder involvement and the evidence attached to the guidance recommendations. It provides recommendations from community health workers' training/supervision to operational intervention design and implementation issues.

G5 is a National Health Service England guide who commissioned the University of Westminster to conceptualise Social Prescribing in healthcare (2017).

G6 is the National Institute for Health and Care Excellence guidance 2016 on community engagement and contains recommendations after considering the available evidence. It has relevant information, from identifying the resource for implementation to community health worker training and evaluation/feedback.

The National Health Service England guideline (G3) on universal personalised care 2019 emphasises the importance of people being involved in their care within their communities because this aligns with their values and beliefs. This may help to reduce the number of unnecessary procedures (G3). The World Health Organization guideline 2018 was intended to assist national and international partners in developing, implementing, and monitoring community health worker programmes. This will result in a more unified system with increased awareness and integration of the Community Health Workers programme into the health system and in the community (G4). National Health Services England commissioned Marie and colleagues in 2017 to create Social Prescribing guidelines. The expected outcomes were a cost-effective, sustainable system for improving physical and emotional well-being. It should help build community resources, a change in community behaviour, voluntary sector involvement, and management of social determinants of health (G5). The National Institute for Health and Care Excellence (NICE) published NG44 2016, a

guideline on community engagement, to increase community contribution to local programmes promoting health and well-being and reducing inequalities. A variety of health and social outcomes, such as improved self-esteem, social networks, and social support, were anticipated (G6).

It can be seen from Table 3 (Appendix 9) that the main features of guidance and recommendations extracted that can inform Social Prescribing/Community Linking success and implementation are:

- More research and evaluation, including effectiveness and cost-effectiveness (G6).
- Collaboration between partners such as the National Health Service and partners, the Voluntary and Community Sectors, the Social and Health care sector to establish health and well-being and address social determinants of health (G1, G3, G5, G6). Develop a mechanism to connect Community Link Workers to networks and establish strong cross-sector relationships.
- Funding and sustained long-term resources are required to ensure continuity of the services (G3, G5, G6); Infrastructure and capacity of the local voluntary, community and social enterprise sector is established (G5); consideration of caseload (G3); Create an operational procedure based on priority groups, projected referral numbers, referral costs, and workforce efficacy (G3).
- Recruitment, training and supervision of Social Prescribing workforce are all needed (G1, G3, G4, G5, G6); Skill and experience are aligned according to workforce development (G2); competency-based certification (G4); People in peer and lay roles are being engaged to reflect local needs and objectives (G6); Link workers must have the attributes and skills to connect with referring practitioners, individuals, and the local charitable, community, and social entrepreneurship sectors (G5).
- Person-centred approach (G1, G3, G5, G6).

Evaluation and feedback (G3, G4, G5, G6) are essential elements of Social Prescribing/Community Linking implementation; Stakeholders must be able to communicate clearly about the outcome of services (G5).

The Consolidated Framework for Implementation Research model (see Chapter 3) was used to report evidence on the facilitators and barriers to Social Prescribing / Community Linking implementation.

The main evidential findings were described narratively, drawing from high and medium-quality sources. See Table 5-1 for an extracted summary of the facilitators and barriers to Community Linking implementation.

There are five main domains of the Consolidated Framework for Implementation Research (Figure 5.2). Each domain has constructs to help develop and verify theories about what works, why and where in various settings (Damschroder et al., 2009). Thus, the evidence is arranged in these areas.

The CFIR Framework Domains & Constructs

Domain 1: Intervention characteristics **Constructs** A. Intervention source B. Evidence strength and quality C. Relative advantage D. Adaptability E. Trialability F. Complexity G. Design quality and packaging H. Cost	Domain 4: Characteristics of individuals **Constructs** A. Knowledge & beliefs about the intervention B. Self-efficacy C. Individual stage of change D. Individual identification with the organisation E. Other personal attributes
Domain 2: Outer setting **Constructs** A. Patient needs and resources B. Cosmopolitanism C. Peer pressure D. External policies & incentives	Domain 5: Process **Constructs** A. Planning B. Engaging C. Executing D. Reflecting & Evaluating
Domain 3: Inner setting **Constructs** A. Structural characteristics B. Network and communication C. Culture D. Implementation climate E. Readiness for implementation	Adapted from Consolidated Framework For Implementation Research online resource (CFIR Research Team, 2022).

Figure 5-2: The Consolidated Framework for Implementation Research Domains and Constructs

5.3.6 The Characteristics of Community Linking Intervention

The constructs of the first domain of the CFIR framework focus on intervention characteristics of the implementation process. This includes the source of intervention, the strength and quality of the evidence, the relative advantage, adaptability, trialability, quality of design and the cost.

According to the reviews, the navigator/link worker role was viewed as a more effective connection between the community and healthcare providers in producing positive results (ScR1, SR11). Bertotti and colleagues, in 2019, compared the link worker's roles with health trainers and health coaches. They found a difference in their orientation towards the positive engagement of the Voluntary Community and Social Enterprise (VCSE) sector and their acknowledgement of the necessity to manage health inequalities (ScR1).

Financial resources are crucial to assist service providers in recruiting skilled navigators due to relatively low pay and partnering with the third sector because limited funding does not support them (SR2). Social Prescribing programmes lack continuing financing, which stops them or reduces them to a web-based leaflet model only directing service users. The future of pilot Social Prescribing programmes appears uncertain because they are funded through grants rather than commissions. Due to the temporary nature of these projects, clinicians, commissioners, and service users could not influence the services offered (ScR10).

The guidelines G5 and G6 showed a need for sustained and long-term funding availability for Social Prescribing implementation. Listening to what stakeholders want from the service, adjusting systems and procedures, and communicating according to their needs are all part of a flexible approach. Creating new relationships and collaborations based on reciprocity and trust facilitates the process (SR3). Contrary to this, lack of access to community organisations, lack of continuity of staff and very high caseload proved to be a barrier. The guidance documents G4, G5, and G6 advocate collaboration among partners, especially National Health Service, the voluntary sector and social care.

In terms of implementation, a number of aspects in this domain can be synthesised:

- **Intervention source** (whether intervention is internally or externally developed)
  - Facilitators: Social Prescribing schemes based on collaborative commissioning through primary care, Clinical Commissioning Groups (CCGs), local agencies, voluntary and community sectors (G3); A shared understanding of the implementation process (SR3); All stakeholders contribute to research, offering information and sharing ideas (SR11, G3).
  - Barriers: Intervention implementation without investing in strengthening the health system (RR2); Lack of partnership and shared understanding among stakeholders (SR2, SR3).
- **Adaptability** (the extent to which the intervention can be adapted, refined and tailored per local requirements).
  - Facilitators: Flexible approach and listening to all stakeholders (SR3, ScR3); Flexibility during development, implementation and delivery of Social Prescribing service (SR2); Flexibility in the working of community workers (SR9, ScR9); Tailoring incentives according to individual preference (SR8).
  - Barriers: Lack of flexibility (SR2, SR3).
- **Trialability** (being able to test the intervention and undo implementation if needed).
  - Facilitators: Pre-implementation workshops to design and discuss Social Prescribing services (SR3); Lessons learned from the Social Prescribing pilot (SR3).
- **Cost**
  - Facilitators: Sufficient sustained funds for intervention implementation (G3, G5, G6, SR5, SR13); Funding availability - either commissioned from service providers/local authorities or via patients by providing personal budget to patients (ScR3).
  - Barriers: Limited financial resources (SR3, SR5, SR8, ScR10); ambiguity regarding resource availability (SR8).

There are also reported facilitators under complexity (potential difficulties in implementation such as duration, disruption and complicated steps towards implementation) in terms of making the Community Linking process as simple as possible (G6).

5.3.7 The Outer Setting for Community Linking Interventions

The constructs for the second domain of the CFIR framework focus on organisational structural, political, and cultural context, such as needs and resources for patients, multiculturalism, peer influences, external policies and incentive schemes.

Accessing people's needs to tailor referral pathways facilitates improved patient outcomes (ScR1, RR1). Bertotti and colleagues, in 2019, mapped the UK literature on navigation roles and outlined the types of support for service users by link workers. Depending upon the patient's need, it ranged from providing information; to structured support; to accompanying patients to service after referral (ScR1). Husk and colleagues, in 2019, conducted a realistic review of 109 Social Prescribing studies. They found patient enrolment statements in 24 studies on how referrals should be made to match patients' needs and expectations. The statement was used to extract themes. It showed a series of relationships between the referrer, the link worker, the patient, and the activity that should be matched to the patient's needs for a successful outcome (RR1).

The National Institute for Health and Care Excellence (NICE) guidelines (2016) on community engagement advocate involving the community in peer and lay roles to represent the needs and priorities of the locals (G6). Recognition of work through monetary and non-monetary incentives for community workers could be worthwhile (RR2, SR8). However, the quality of evidence was moderate, indicating that performance-based incentives could produce undesirable effects by giving more attention to incentive-linked tasks and not so much to others (SR8). An obstacle to implementing and delivering Social Prescribing services was reported as a 'go live dates' approach to implementation in general practices, i.e., following fixed dates to implementing Social Prescribing in General Practices without establishing a trust or building relationships among partners (SR3).

The main synthesised implementation factors refer to assessment of patient need and networking with external resources ('cosmopolitanism' in the CFIR construct list).

- **Patient needs and resources** (the degree an organisation knows and prioritizes patient needs, barriers and facilitators to those needs).

- Facilitators: A patient needs assessment is necessary (G3, G4, G5, G6).
- Barriers: Lack of partnership and collaboration between parents and community health workers (SR9).

- **Cosmopolitanism** (networking with external organisations is achieved by an organisation).
  - Facilitators: Good relationships and effective communication between stakeholders across sectors (SR3); Increased understanding /collaboration among National Health Service partners (G1, G3, G5, G6); a coalition between community partners, researchers, health providers and community health workers (SR11); Confidentiality and disclosure issues of voluntary groups (ScR9).
  - Barriers: Lack of partnership and service level agreement among partners (SR2, SR3).

5.3.8 The Inner Setting for Community Linking Interventions

The CFIR framework constructs for the third domain focus on structural, organisational characteristics, networks and communications, culture, and political context in terms of implementation.

Several reviews and guidelines have emphasised the value of clear communication and shared understanding among all stakeholders within and across sectors (SR3, ScR9, G3). The importance of the participation of partners in briefings, networking, and standardisation of training was also highlighted (ScR1, SR11).

Pescheny and colleagues' 2018 review of the facilitators and barriers to Social Prescribing services implementation and delivery (7 evaluation reports and 1 conference paper) identified the importance of organisational readiness and general practice staff engagement. There is a need for a culture that embraces the biopsychosocial health model with a clear scope of service, ability and skills of a navigator to identify characteristics of the patient needing referral and linking for relevant interventions to assist (SR3). However, a collaborative multi-sector approach to project management, i.e., involving a diverse group of stakeholders, could contribute to delayed Social Prescribing implementation and delivery. In addition to this, a lack of shared understanding of Social Prescribing services and pathways among stakeholders, including prescribers, navigators, service users, and service providers, was a barrier to Social Prescribing (SR3).

Lack of clarity and understanding on behalf of the referrer can be counterproductive, resulting in inappropriate referrals that hinder the programme's delivery to the target group (SR3).

The significance of training for community health workers was emphasised both in reviews and guidance documents. The intervention protocols should include knowledge and skill-based disciplines. For example, to support patients, raise awareness and educate them, the training should comprise refresher training and new skills training such as problem-solving and goal-setting and regular supervision (SR3, ScR4, RR2, RR3, G1, G4). Lohr and colleagues' 2018 scoping review (n=47 studies) on Community Linking programmes in the United States identified the need for community health workers training standardisation in core competencies to work in a broader range of activities (ScR4). Lack of training and supervision was considered a barrier (SR14). Positive and supportive environments boost the self-esteem of community workers (RR2). Bertotti and colleagues indicated that a lack of continuous monitoring and feedback after the initial referral could cause obstacles to Social Prescribing (ScR1).

Intra-organisation network and communication factors are key to implementation as its organisational culture.

- **Network and communication** (Intra-organisational social network web and formal/informal communications).
  - Facilitators: Intra-agency collaboration, networking, workshops, and operational group meeting (SR3); regular supervision of link worker (ScR4, ScR5, SR8, SR13, SR14, G3, G4, G5, G6); supervision and ongoing support for facilitators (ScR5, SR5, SR10, RR3); equipping link workers with mobile technology (SR8).
  - Barriers: absence of social connections among community health workers (SR10); lack of supervision (RR3).
- **Culture** (Values and norms of an organisation).
  - Facilitators: Norms and values of adopting a bio-psychosocial approach (SR2); Creating a positive work environment and changing the attitude and thinking of health professionals toward lay workers (ScR5, G5); Creating an informal atmosphere (G6); Empowering Community link Workers (ScR4); A positive, supportive working environment boosts the self-esteem of community link workers (RR2).

- Barriers: lack of appreciation and acknowledgement of community health workers (SR9).

There are also barriers to implementation climate (e.g. relative priority), such as reluctance from the health team or insecurities to accommodate a new lay worker role (ScR5) and providing less support in work to community health workers (SR8).

5.3.9 Characteristics of the Individuals Implementing Community Linking

The constructs for the fourth domain of the CFIR framework focus on characteristics relating to the individuals (patient/client) involved in the intervention and/or implementation process (e.g., link workers and participants).

These factors, such as knowledge and beliefs about the intervention, self-efficacy, individual stage of change, individual identification with the organisation and other personal attributes, are, as mentioned above, important for both implementation and ultimate success.

Various reviews and guidance documents specify the individual characteristics of community health workers. Bertotti and colleagues mentioned that an enthusiastic approach by health coaches/link workers with a relaxed attitude serves as a facilitator. Their good listening skill and empathetic, non-judgemental, respectful way of working and providing structured support to individuals such as motivational interviewing, setting goals and coaching are helpful (ScR1, SR9). A skilled and knowledgeable leader influences participants' adherence to various activities. The leadership abilities of a community worker facilitate, motivate and encourage participants to continue participating in activities (RR1). Mossabir and colleagues (2015) have found that a facilitator should be flexible, trustworthy, empathetic and approachable. A trusted relationship of service users with link workers reduces anxiety and enhances connectedness within the community. They also strengthen links between healthcare providers and the community. They should have the skill to tailor activities according to participants' needs/preferences and inspire them to attend (ScR9).

In terms of implementation, case overload was seen as the important barrier (ScR1) as well as simple lack of knowledge of the available resources (ScR10). Facilitators, according to the CFIR framework, were:

- **Self-efficacy** (perception of an individual of their abilities to execute the action of implementation)
  - Facilitator: Self-esteem, sense of pride, sense of duty and community recognition of Community Link Worker (RR2); organisational skills (G5).
- **Individual identification with an organisation** (the relationship and commitment with an organisation).
  - Facilitator: Community link worker sense of belonging, credibility and integrity as a member of a system (RR3).

In addition, there were many personal attributes of workers cited in the literature as being important facilitators for implementation: Community Health Workers are empathetic and approachable (RR1, ScR9); leadership ability of Community Health Worker (RR1); skills to tailor activities according to needs (ScR9); relaxed enthusiastic approach (ScR1).

5.3.10 Process of Implementing Community Linking

The constructs for the fifth domain of the CFIR framework focus on implementation processes such as planning, engaging (opinion Leaders, formally appointed internal leaders, champions), executing, reflecting and evaluating. In the UK, Social Prescribing is becoming popular; however, the quality of evidence needs further addressing. Robust methodological research studies and a rigorous evaluation process must be incorporated into this (SR2, RR1, ScR3, SR6, LR2, SR8, SR11). Two systematic reviews by Pescheny and colleagues in 2019/18 (SR2, SR3) identified that if an intervention was made over time, this helps to develop a productive partnership between general practitioners, navigators and the third sector. This provides time to understand the programme and also about partners expectations. Before programme implementation, there should be networking, workshops, standardising referrer training, and meetings with steering groups to discuss operational issues and procedures (SR2, SR3). The evaluation should include reviews from all stakeholders, including referrers, providers, commissioners, and patients, to ensure that primary care objectives were achieved and delivered (ScR3). Guidance documents G4, G5 and G6 recommend

having an evaluation and feedback framework within the Social Prescribing implementation.

Link workers and health trainers take a more comprehensive approach to address inequality, such as social isolation and offering welfare, legal, debt, jobs, and housing advice (ScR1).

Support and supervision of Navigator are crucial (SR3, RR2). Shared understanding among each partner from different sectors, commissioners, service users, and stakeholders. A clear scope of the Social Prescribing service, which patients to refer, how patients can be helped, and the capacity and skills offered by a navigator (SR3).

Improvement in access to health care, reduction of patient waiting time, reduction in the workload of formal health care workers, worker retention, satisfaction and well-being are all facilitators of the process (RR2). If the caseload is high with greater demand, outweighing resources, this hinders implementation operation (ScR1).

Overall, most of the included studies in the reviews were found to have poor methodology (SR2, RR1, SR6, SR11), a lack of appropriate descriptions of community engagement, and no reliable tool for characterizing community engagement (SR11). All community stakeholders should participate as active and equitable stakeholders in the research process, offering relevant community information, valuable insights, and guidance to the process. They can also create culturally appropriate data collection tools and methods (SR11).

Facilitator/Health Trainer is skilled in communicating with the public, inspiring and empowering people to come up with their solutions to various issues, and providing personalised management. Establishing ties with clinicians and voluntary / community organisations was also considered an important responsibility for the facilitators to create an intervention profile. The facilitators based within the general practice provided a single point of contact identified by healthcare staff as making the referral process straightforward. This also ensures successful participation of healthcare staff, and staff felt reassured that confidential information did not leave the practice upon referral of patients to the Social Prescribing scheme (ScR9).

One review found no conclusive evidence that Social Prescribing successfully improves health and well-being, health-related behaviours, or daily functioning. This could be due to the different tools used to assess these outcomes across studies (SR2). There were methodological flaws across studies, and it was impossible to generalise any one Social Prescribing referral and support scheme (RR1). However, the findings of qualitative studies were more consistent (SR2). Most of the studies were found either in the grey literature or in the reference list, were mostly of low quality and reported inadequately on methodologies. It indicated a need for research studies to be rigorously designed and analysed. The reporting should be transparent and clear, considering the dissemination process of research findings (SR3). A need to derive more differentiated and concrete definitions of social referral that precisely reflect what practitioners and commissioners intend for programmes to achieve was also identified (LR2).

A strong community connexion between community members and Community Health Volunteers (CHVs) was established as one of the main elements in producing positive outcomes and a source of influence on individual motivation and attitudes of Community Health Volunteers'. For future research and recommendations, empirical studies based on the stakeholders' assumptions on how such interventions are expected to work should occur. These can then inform the policymakers, programme implementation team, donors and the community (RR2).

Link workers considered their role critical in developing personal relationships with service users. They serve as a link between the community and healthcare providers and are regarded as contributing meaningfully and effect change (ScR1). Wallace and colleagues reported in 2018 that community health workers' mental health had improved because of the importance of their role, respect and status they enjoy in the community. Core elements of success are Job knowledge and training that came through supervision (ScR5). If Community Health Volunteers/workers are supported fairly and equitably, and their work is appreciated and valued, this results in a positive outcome. The main driving force is a sense of pride, community and organisation recognition, self-esteem, and a sense of duty (RR2, RR3). An unsupported environment can produce a negative outcome. An ability to plan and organise activities, over time,

strengthens ownership and self-efficacy. These mechanisms played a role in the positive outcomes (RR2).

Thomson and colleagues 2015 explored General Practitioner's outcomes and perceptions of improvement. The number of visits to General Practitioners and referrers (primary and secondary care) has reduced, and several options to supplement their medical care were provided (ScR10).

Implementation factors relating to process are very much overlapping with those that influence success. There are reported barriers to implementation if there is unsystematic planning of Community Linking programmes (SR5) or if supply and demand are not addressed at the planning stage (SR10). Facilitators are to do with engagement: operational group meetings discussing implementation procedures (SR3); Social Prescribing champions in clinical commissioning groups and general practices encourage referrals to services (SR3).

Finally, extracted evidence shows the importance of reflecting and evaluating (feedback about the progress and quality of implementation):

- Facilitators: Monitoring and evaluation of programme involving all stakeholders opinions (ScR3); Feedback on participants' progress (SR5); Evaluation of Social Prescribing programme (G3, G4, G5, G6); Feedback between navigators and service providers (SR3, SR5).
- Barriers: Lack of monitoring and feedback (ScR1); no evaluation process (SR5); no system in place to track community health workers performance (SR8).

5.4 Discussion

Non-medical treatments such as Social Prescription or Community Linking are becoming more common, and the evidence suggests that they can improve health and well-being (Tierney et al., 2020, Munoz et al., 2020).

A systematic overview was carried out to derive the main aspects of Community Linking complex intervention, ranging from identifying needs to linking to services with sustained contact and influencing the outcome and identifying the facilitators and barriers to such interventions. The five domains of effective implementation of the CFIR framework guided the reporting and identified several strategies that an organisation should consider when implementing Social Prescribing.

5.4.1 Main Findings

The systematic overview findings highlighted a number of aspects of programme delivery. The main findings were to identify high-quality evidence, obtain resources and be flexible in approach. Build trust among partners and assess participants' needs to provide a tailored pathway. The inter-sectoral communications are required to understand the organisations' needs better. And an optimum level of training and mentoring, as well as feedback for the Community Health Workers, was identified. The Community Health Workers' personal characteristics should be such that they are perceived as leaders with information and are believed and respected by the community, and participants' perceptions of the activity being beneficial and the service easily accessed. The partners should have enough time to develop understanding, communicate/network, and implement and evaluate the process. Only two high-quality systematic reviews focused specifically on families with preschool children (SR6, SR9). Respectful and non-judgemental support enables participants to engage in various support programmes, overcoming fears, improving mother's self-esteem, influencing their coping styles, and reinforcing parenting skills (SR9). Parents of young children prefer more active facilitation over signposting (SR6). Preschool children have unique needs during their early years, depending entirely on their parents. Our findings on adults can be applied to parents, influencing family support networks and the well-being of children indirectly.

This systematic overview indicates the importance of working collaboratively while considering the needs of all partners. The findings concur with the results of Fixsen and colleagues, who identified the value of intersectoral relationships. They used the Critical System Thinking (CST) approach and confirmed that various stakeholders' interests must be considered to address complex real-life issues. An integrated approach to multifaceted problems must be provided (Fixsen et al., 2020). According to another systematic review, involving stakeholders in designing Social Prescribing implementation appears to be an effective approach (Thomas et al., 2021).

Funding is required to sustain service, and funding consideration is another important component in this systematic overview. Bertotti and colleagues evaluated a Social Prescribing scheme using a realist approach. They found that

a lack of available funding can bring into question the sustainability of Social Prescribing services, as respondents from community organisations expressed concerns about funding cuts and the ability to continue providing services (Bertotti et al., 2018). Social Prescribing / Community Linking long-term sustainability is a challenge because of the temporary nature of funding and the dependency on the voluntary sector (Islam, 2020).

Patient-centred care views the individual as an equal partner in the assessment and planning of care, considering the individual's preferences and needs (Royal College of General Practitioners, 2014). According to the evidence, patients value patient-centred care and increase their trust in healthcare professionals (Wolf et al., 2017). This overview showed that patient-centred approaches could help the Community Linking process.

Community health link workers are primarily non-health professionals (paraprofessionals) or lay individuals who understand their community culture. They receive much briefer training compared to health professionals to facilitate appropriate access to health/social care in that community (Olaniran et al., 2017). The importance of training and supervision was highlighted in this overview (ScR1, SR3, ScR5, RR2, RR3). Scott and colleague's overview have also identified similar findings (Scott et al., 2018). The training of community health worker in human behaviour and behavioural change and their in-depth understanding of the community helps them signpost/refer/facilitate and support access to health and social care facilities. In this way, their remit of service at times extends beyond mere Community Linking. In reality, the training they receive is variable. There is a need to identify minimum training standards, especially in human interactions and behaviours that may be the primary facilitator in their field of work (Kiely et al., 2020).

According to the systematic overview, participant adherence to Community Linking schemes is dependent on their perceptions of their need. This is also consistent with a study conducted in Germany. According to the researchers, patients who have received a social prescription were more likely to use community services than those who were self-referred, possibly because they were convinced of the need for the services (Golubinski et al., 2020). This overview reported a positive outcome for participants engaged with community

link workers. Similar findings were shown in a systematic review where individuals living in isolation felt better following intervention (Lee et al., 2020).

The overview showed the need for continuous evaluation of these projects since the feedback from the evaluation could feed into updating operational processes and, ultimately, improvement in service provision. Woodall and colleagues advocated that a better and more in-depth understanding of Social Prescribing services can be obtained by combing quantitative, measurable changes in service user outcomes with a comprehensive qualitative account for programme evaluation (Woodall et al., 2018). Using a mixed-method approach, quantitative and qualitative data for evaluating Social Prescribing schemes also improves generalizability (Moffatt et al., 2019).

No systematic or non-systematic review has highlighted the disadvantages of Social Prescribing, probably because the intervention implementation and evaluation are at an early exploratory phase. However, there was an element of caution in some reviews on applying this intervention without considering the local area context. For example, if the participants may not understand non-medical, non-NHS services, their expectations would not have been met, causing dissatisfaction among service users.

Any of the included reviews did not explore the system-level outcomes of community organisations. The challenges faced by the community and voluntary organisations are significant and need to be incorporated. A systematic review conducted by Bach- Mortensen and colleagues reported that the third sector organisation practitioners face capacity and capability challenges. The main obstacles are insufficient resources, problems with clients and the community and lack of experience and skill in delivering services (Bach-Mortensen et al., 2018).

Another concept worth investigating is the role of digital Social Prescribing, particularly in times of pandemics when human interactions are limited.

Through our systematic overview, we have mapped current practice in Community Linking as practised in General Medical practices. Important points were to provide a tailored pathway and a trusting relationship with the families; participants need assessment is required. Inter-sectoral and intra-organisational communications, networking, and collaboration are required to understand the

needs of the stakeholder. In terms of Community Health Workers; an optimum level of training, mentoring, and feedback is needed. Procuring resources and being flexible in approach are essential. Before we take opinions from Dental Health Support Workers, it was best to know how Community Linking is practised in medical settings. We will translate this knowledge to enhance the Community Linking component of the Childsmile programme within dental services.

5.4.2 Strengths and Limitations

The strengths of this overview were that this was the first overview of systematic reviews and guidelines on Community Linking to inform for child oral health promotion programme. We used Covidence software to manage the overview. A comprehensive search strategy was applied, using published / unpublished and grey literature. Independent appraisal of the documents by three reviewers using four checklists. Standard procedures and guidelines (PRISMA-ScR) for reporting were followed. Data extraction and reporting were guided by a theoretical framework (CFIR) of implementation.

The limitations of this overview were that only English language reviews were included. There is still a possibility that reviewers may have missed some unpublished/published and grey literature evidence. And due to heterogeneity in the evidence, we were unable to synthesise it quantitatively.

5.4.3 Conclusion

In conclusion, Community Linking can play a pivotal role in addressing social determinants of health. However, the health and social care system is intricate, constituting statutory and non-statuary providers; Community Linking must be carefully incorporated into health and well-being provisions. Financing these services is also a challenge since no permanent resource has been identified. The cost-effectiveness of these services needs to be established. The concept of improving child oral health is through supporting parents of very young children. This process is no different from any service where social, community/voluntary and health organisations are integrated. Social prescribing for children's oral health is relatively new and has not been explored enough. The findings of our review support the utility of Community-Linking projects in improving general health and well-being. It's good to map current practices of Community Linking in other settings before asking Childsmile staff their opinions on their

Community Linking methods and perceived barriers and facilitators in optimising the pathway.

The next chapter is on acceptability and feasibility testing on enhancing Community Linking within the Childsmile programme. It is an online survey of Dental Health Support Workers about their views.

Chapter Six

Acceptability and Feasibility of Enhancing Community Linking in Childsmile: a National Survey of Dental Health Support Workers (Study Three)

6.1 Introduction

This project's first study (Chapter 4) reported on a secondary analysis of the Childsmile monitoring and evaluation data to investigate Community Linking practice within the Childsmile programme. It investigated which families are referred for DHSW support and which services families are then referred to. The second study (Chapter 5) is a systematic overview of recent evidence and best practices for Community Linking to inform the programme.

This chapter reports on study three, an online survey of Dental Health Support Workers (DHSWs) in Scotland in 2021 to support implementation efforts to improve child oral health and reduce inequalities. It assesses the staff's view on the acceptability and feasibility of enhancing the Community Linking process within the Childsmile programme. If the staff are engaged and involved in decision-making, this results in a better quality of care by the National Health Services organisation (Ham, 2014). DHSWs opinions are vital as they work closely with the families in the community, refer families of young children to various services, interact with the families, facilitate engagement with services, and identify barriers to this engagement.

6.1.1 Survey Research History

Surveys are the most common method for conducting social science research. Historically, they developed to collect data from a large population, such as during a census. Survey research history is rooted in Victorian Britain when social reformers gathered information on working-class life and poverty (O'Day and Englander, 1993). Extensive, rigorous processes and conventions have developed over time, for example, to assess the reliability and validity of survey items, reduce non-response, and describe data (Ponto, 2015).

Surveys are instrumental when aiming to quantify and describe general patterns in people's beliefs, attitudes, or opinions. A well-designed survey can capture and quantify self-reports (such as an agreement with a particular viewpoint) that would otherwise be difficult to observe or interpret (Ziniel et al., 2019). Survey respondents apply cognitive processes whereby they understand and interpret the question, form an opinion, match their perspective to a response category (proposed by the researcher), and indicate their answer in line with social desirability, personal views and belief systems (Behr et al., 2014). Generally, responses are not treated as entirely objective or subjective; some overlaps and interrelations appear over time, making it possible to undertake social inquiry through quantitative items (fixed-response) and qualitative items (open-ended) simultaneously (Behr et al., 2014).

6.1.2 The Theory Behind the Survey

In health services research, complex, multilevel systems and processes are explored, which may involve quantitative and qualitative data (Creswell et al., 2004, Curry et al., 2013). The type of research question influences method selection. Quantitative methodologies increase generalisability and make comparison possible. Qualitative methods are more generally used to investigate why or how a phenomenon occurs, develop a theory, or explain the nature of an individual's experience. A survey can employ aspects of both using open-ended and closed-ended questions to be analysed using mixed methods (Creswell and Hirose, 2019). Mixed methods research studies combine the benefits of quantitative and qualitative approaches, yielding a relatively flexible and pragmatic approach to addressing current healthcare issues (Fetters et al., 2013).

Implementation Science has been defined as "the scientific study of methods to promote the systematic uptake of research findings and other [evidence-based practice] into routine practice, and, hence, to improve the quality and effectiveness of health services" (Bauer et al., 2015). Chapter three introduces implementation science which underpins this thesis.

The MRC stresses the importance of context in implementation. This is generally approached using theories, models, and frameworks (Kislov et al., 2019). There are well-grounded models and frameworks to ensure rigour when assessing barriers and facilitators to implementation improvement efforts. One review of

implementation frameworks/models building blocks identified the process model (implementing translational research to practice) and the deterministic framework (determinants of barriers and facilitators that impact the outcome) (Huybrechts et al., 2021). Major examples are the Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors (Aarons et al., 2011), The Ottawa Model of Health Care Research (Logan and Graham, 1998), the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) and the Generic Implementation Framework (Moullin et al., 2015). Process models and deterministic frameworks make it possible to identify barriers and facilitators, actions and steps that can inform and guide interventions (Huybrechts et al., 2021)

In this chapter, we now report on a survey of the DHSW workforce underpinned by the Consolidated Framework of Implementation Research (CFIR) model and programme theory in general, which aims to gather further important information on the acceptability and feasibility of enhancing/optimising Community Linking in the Childsmile programme.

6.2 Methods

6.2.1 Survey Design

A population-based online survey was designed for DHSWs. The survey tool is appended (Appendix 12). Questions employed a closed-ended five-point Likert scale and open-ended free-text items.

Survey questions were grouped based on domains of the CFIR implementation model (Chapter 3). The following is a brief description of each of the five CFIR framework domains (Figure 6-1), indicating how the questions were organised.

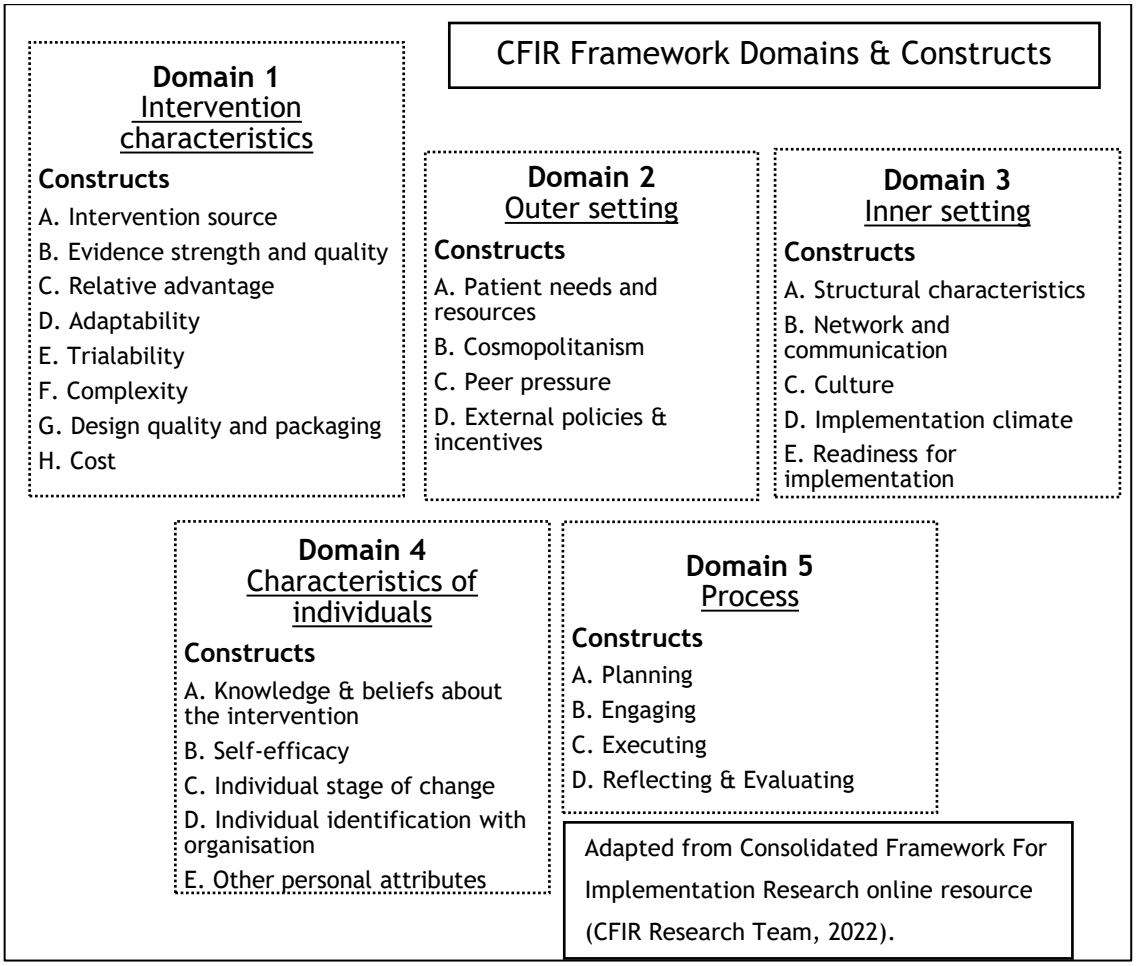


Figure 6-1: CFIR Framework for Implementation Research (Five Domains & their Constructs)

6.2.1.1 Intervention Characteristics

The first set of items refers to awareness, previous experience, and perception of the utility of Community Linking.

The questions for DHSWs were on their awareness of Community Linking within the Childsmile programme, their direct experience of Community Linking in their current role, services where referrals were made, and whether any feedback was received from the referred families and the services where the families were referred.

6.2.1.2 Outer Setting

This set of items refers to the attributes of the community DHSWs work in. These questions related to whether DHSWs felt they were able to link families and whether the families needed additional support to attend services such as finances or transport.

6.2.1.3 Inner Setting

This set of items refers to the attributes of the inner organisational settings, the proximal context of delivery, the role in delivering the intervention, administrative aspects and job constraints. The role items covered work context during the COVID pandemic and also more generally as in 'work as usual'.

The questions related to (a) having sufficient time to identify families, (b) Community Linking being part of their role/job description, (c) line management support in helping to employ Community Linking, (d) community organisation readiness to accept referrals and (e) whether there is a need to reorganise dental services to enhance Community Linking.

6.2.1.4 Individual Characteristics

This set of items refers to the attributes and characteristics of those delivering the intervention.

The questions focused on personal skills and training in identifying appropriate community organisations and families needing support (whether DHSWs can signpost or actively facilitate families to community services).

6.2.1.5 Process

This set of items refers to the overall opinion of various planning aspects, such as training, workload, and availability/lack of community services.

The survey is appended (Appendix 12). Demographic information such as the participant's age, educational qualification, employment health board, and employment duration was also collected.

6.2.2 Stakeholders' Involvement in the Survey Design

The Childsmile Central Evaluation and Research team, a Dental Health Support Workers Advisory group, and Childsmile coordinators and managers were contacted during the survey design. An early draft was sent through for their approval, and they were fully involved in reviewing all items. The purpose of involving the stakeholders was a) to identify any gaps in questions and b) to validate the content as reflective of the implementation context of Childsmile Community Linking and its workforce. Some small changes were made during a discussion with DHSWs and managers to ensure that the language was suitable for DHSWs. The advisory group of Dental Health Support Workers was consulted, and Childsmile managers/coordinators corrected any expression/statement

written in the survey which did not represent the working practices of Dental Health Support Workers.

Likert scale anchors (response options- see Appendix 12) were standardised as an agreement scale to a given statement. This allowed us to be consistent with the 5-point Likert agreement scale to avoid confusion with different operationalised concepts and constructs (Chyung et al., 2018).

The survey length was also important so that it should not take too long to complete. Following consultation, the survey was piloted with the Dental Health Support Workers advisors to determine its usefulness and completion time. Feedback from piloting was used to improve the survey wording and question sequence.

For survey item 3a (see Appendix 12) on current linking, the Health Informatics Centre, Childsmile (practice intervention) early analysis was used to design response items.

Finally, the systematic overview findings were used to map out survey questions. For example, when asking about barriers and facilitators, known factors from the evidence were included for opinions, such as the importance of active facilitation, issues with training and resources etc.

6.2.3 Dental Health Support Workers Online Survey Procedure

The JISC (Joint Information Systems Committee) online survey tool was used for this study (JISC, 2022). The University of Glasgow has an institutional licence for this (JISC online survey, formerly known as Bristol online survey), which Postgraduate research students can use for their research projects.

Ethical approval procedures are included in the main methods chapter. The participant information sheet and consent form for the recruitment of DHSWs are appended (see Appendix 11).

After a data protection review (GDPR) by the Childsmile coordinators and managers, the Dental Health Support Workers mailing list was provided to the study supervisors. An email invitation was sent to Dental Health Support Workers together with the participant information sheet (Appendix 13) using mail merge. Researchers' contact details were specified in the invitation, and there was an opportunity to ask questions via email. Indication of consent was built into the

online tool (see Appendix 12). The ethical approval application includes information about our initial contact email (Appendix 13), with a two-week reminder provision and then no further contact (Appendix 3).

The online survey began on the 29th of April 2021 and ended on the 30th of July 2021.

6.2.4 Quantitative and Qualitative Analysis

IBM SPSS version 27 software was used for data analysis. Descriptive statistics and frequencies were used for reporting fixed-response results, together with visual presentation through bar charts with percentages of responses noted.

Open-ended qualitative data were imported to QSR-NVivo v12 qualitative analysis software, and themes were extracted. This process was akin to a Template Analysis (Brooks et al., 2015). This is a form of thematic analysis that is more deductive than usual; it allows interpretation of qualitative data using a priori themes (the 'template') to guide coding while still allowing flexibility and thus for new subthemes to emerge (King, 2012). This type of thematic analysis was conducted because we used the CFIR framework as a template for arranging questions and, therefore, responses.

This involves initial familiarisation of the statements, preliminary coding/ organisation of data, and developing emerging themes to organise clusters of responses. Barriers to Community Linking were coded and were described thematically with illustrative verbatim quotations under each topic area of the survey below.

We also used 'word clouds' to visualise text data on the frequency of words to overcome barriers to Community Linking. The commonly used terms appear more prominent and bolder (Atenstaedt, 2012).

6.3 Results

A population-based National survey was administered to the eligible Dental Health Support Worker workforce of Scotland. A total of 109 emails covering fourteen Scottish health boards were sent. Thirty-nine responses were received following the first invitation. There were two mail delivery failures. Two Dental Health Support Workers were absent from the office (automated response indicated that one was on placement and the other out of office), and two more were on maternity leave. Per the ethical approval application protocol, reminders were sent to 64 non-responders after two weeks. Twenty Dental Health Support Workers responded, with one withdrawing their response (left their post). Thus, from a total of 102 possible participants, 57.8% (59/102) responded. Distribution by geographical health board is shown in Table 6-1.

Table 6-1: Percentages of Participants (numbers) by Geographical Health Board (n=59)

Scotland Geography	**Health Boards**	%(n)	Total
West of Scotland	Ayrshire & Arran, Greater Glasgow & Clyde, Lanarkshire	41% (24)	53
South of Scotland	Borders, Dumfries and Galloway	10% (6)	10
East of Scotland	Fife, Forth Valley, Lothian	20% (12)	12
North of Scotland	Grampian, Highlands, Orkney, Shetland, Tayside	29% (17)	27
	Total	100% (59)	102

Table 6-1 shows that 13/14 health boards are represented. As expected, the larger boards contribute the most to staff participation.

Figures 6-2 and 6-3 show the self-reported level of experience and age of participating DHSWs.

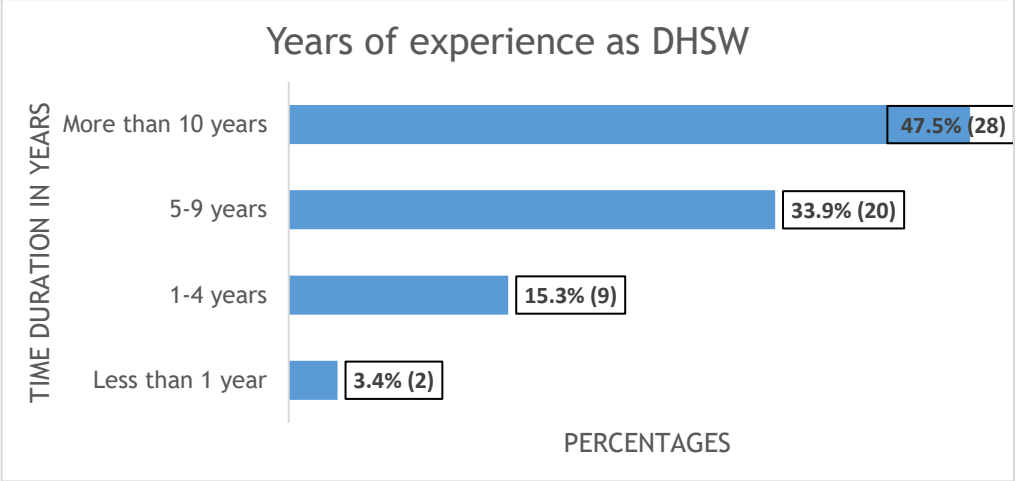


Figure 6-2: DHSWs' job-related experience in years (n=59)

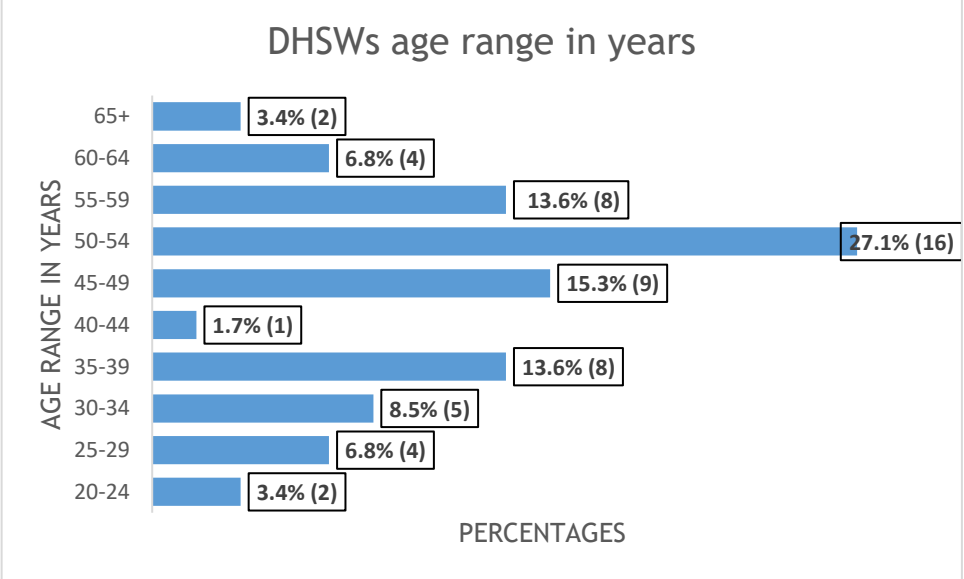


Figure 6-3: Dental Health Support Workers age range (n=59)

It can be seen from Figures 6-2 and 6-3 that most DHSWs had more than five years of experience, with almost half reporting experience of more than ten years. There was an age spread with a majority (56%, 33/59) aged between 45 and 59 years old. DHSWs were also asked about their highest educational qualification, and a majority of them (83%; 49/59) had A-level or Scottish Higher qualifications.

6.3.1 DHSWs Opinion about Community Linking Intervention and General Experience

Figures 6-4 and 6-5 show DHSWs' responses on a 5-point Likert scale of agreement regarding their awareness of Community Linking and whether they believe Community Linking is a good way to improve oral and general health.

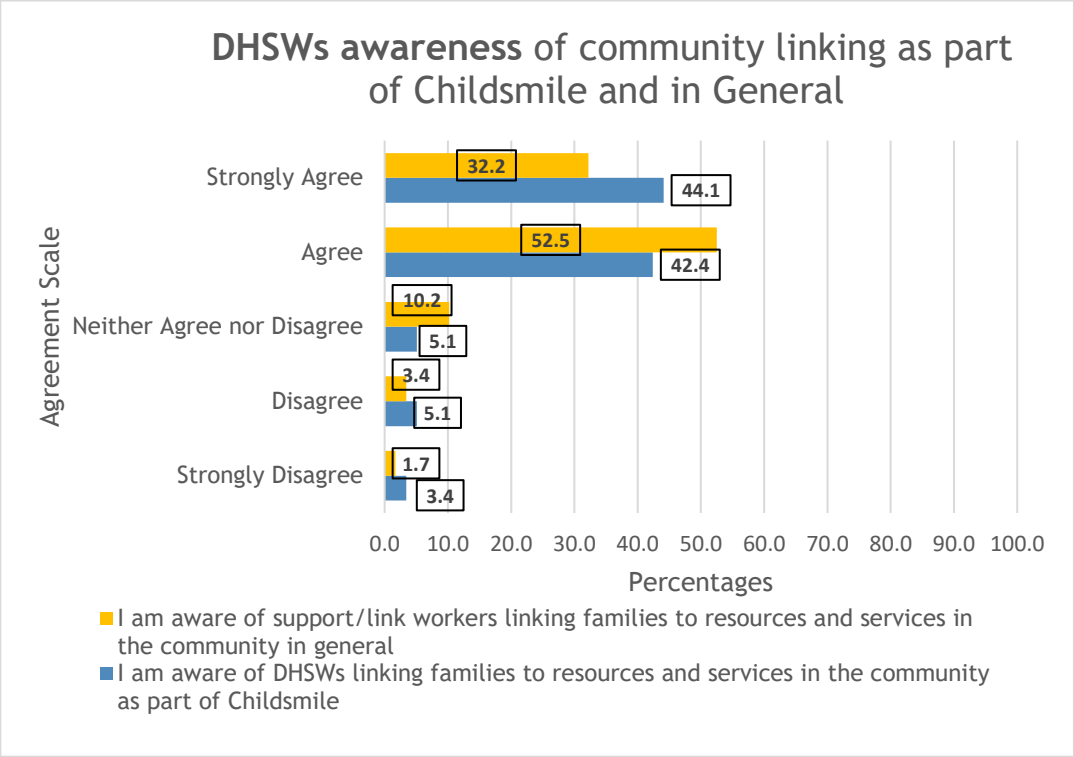


Figure 6-4: DHSWs awareness of linking families for support both in general and as part of the Childsmile program (n=59)

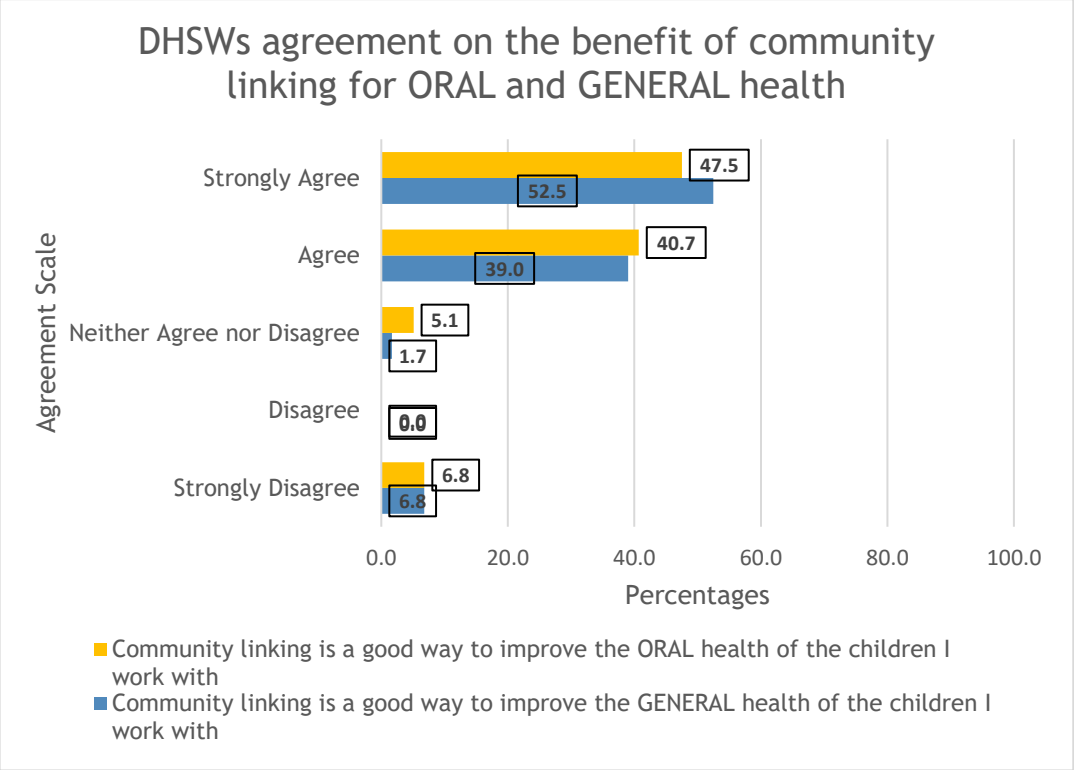


Figure 6-5: DHSWs agreement on the benefits of Community Linking for ORAL and GENERAL health (n=59)

A large majority (86.5%; 51/59 for Childsmile) (85%; 50/59 for general) of DHSWs were aware of Community Linking both in Childsmile and in general. They believed in the benefits of Community Linking for both oral (88%; 52/59) and general (91.5%; 54/59) health. Only four (7%) respondents strongly disagreed with this being a means to improve oral/general health.

> "*Although I have not encountered Community Linking in my Childsmile role, I am well aware of the benefits 3rd sector agencies, in particular, can offer as my previous work experience was in this field*" [R51].

Just under three-quarters (72.4%; 42/59) of DHSWs had direct experience of signposting or linking families to community resources/services or dental services. However, more than a quarter, 29%, disagreed that Community Linking is a key part of their role as a DHSW (17%; 10/59 neither agreed nor disagreed, 8.5%; 5/59 disagreed, and 3% 2/59 strongly disagreed).

DHSWs provided a range of thematically similar responses when asked to explain why they think this is or isn't a good way to improve the child's oral/general health.

In terms of oral health, the open-ended responses often reflected and expanded on what was indicated in the closed-end questions. There was general agreement that tackling wider issues the family may face, such as financial hardships, food insecurity, and lack of parenting support, would have the knock-on effect of improved health behaviours, including oral health. Suggestions were made for having cordial, professional relationships with families, and various agencies involved should work collaboratively to support families.

"To improve oral health, we have to look at all factors in a child's/family's health, so it is very important to work with/ link to community organisations". [R18]

"Improving other areas of life can also have a positive impact on oral health". [R20]

In terms of general health, Dental Health Support workers open-ended responses emphasised the importance of a holistic approach to health and well-being. There was a consensus on boosting families/parents/carers mental health through improving social skills, confidence and building a 'safety net' that would help them know where to go for support. Most services give messages with clear overlap.

"Many of the services cross over with the same messages, so the more times the families and children hear the same messages from different health professionals, the better" [R23].

"If health professionals all work together, then it will improve the general health of children overall" [R9].

In the next section of DHSWs survey, the CFIR framework domains are used as a template to guide the survey questions and responses.

6.3.2 DHSWs Opinion about their Role and Experience in Community Linking Intervention

A large proportion of respondents regard Community Linking as an essential element of their role as DHSW (30.5%;18/59 strongly agree, and 41%; 24/59 agree), as shown in Figure 6-6.

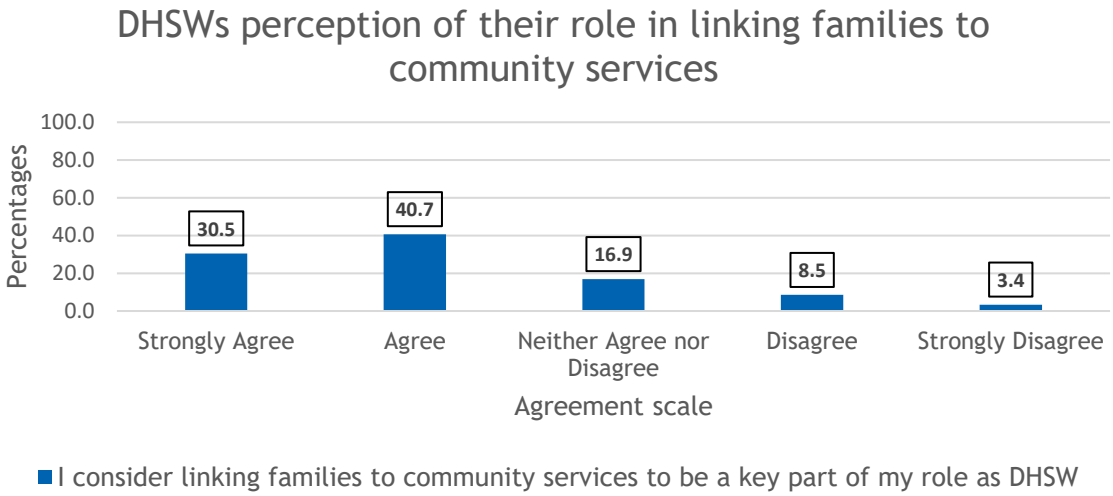


Figure 6-6: DHSWs perception of linking families to community services as a central part of their role (n=59)

When asked about their Community Linking practice experience, almost three-quarters of respondents (72%;42/59) said they had experienced linking families to a community resource/service. Most DHSWs said they could identify appropriate organisations/services to link families. Figure 6-7 shows that 59% (35/59) agreed and 25% (15/59) strongly agreed on a five-point Likert scale that they could identify appropriate community organisations. Similarly, most DHSWs responded positively to identifying families who need support and could benefit from the process, indicating that most DHSWs have already been practising Community Linking. Figure 6-7 indicates that more than half, i.e., 54% (32/59), agreed, and 32% (19/59) strongly agreed that they could identify the families with whom they work who could be referred.

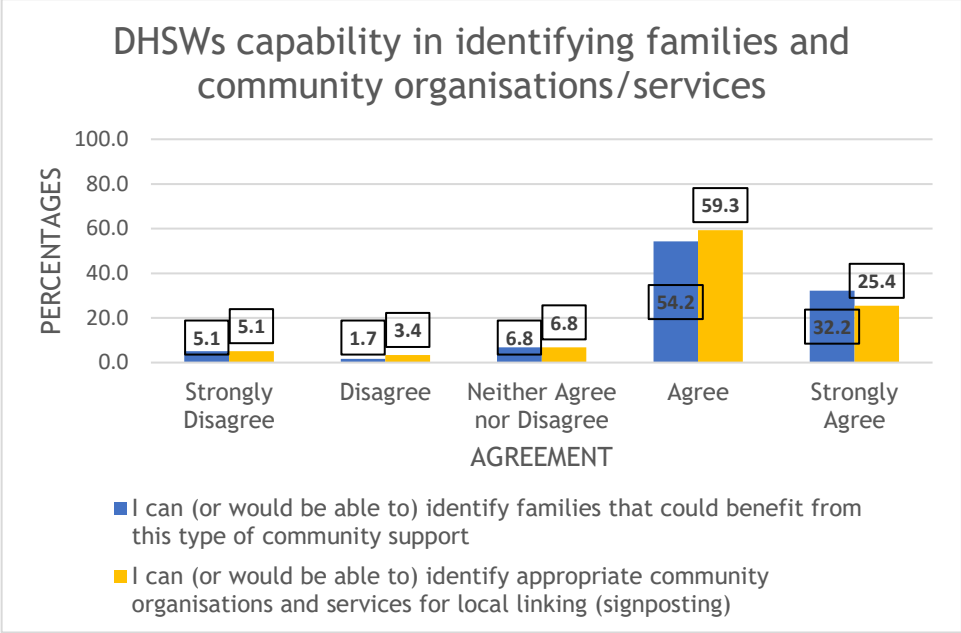


Figure 6-7: DHSWs self-reported capability in identifying a) families for suitability and b) community organisations/services (n=59)

6.3.3 DHSWs Opinion about their Training, Skills and Ability to do Community Linking

Figure 6-8 shows DHSW responses to whether their training and skills would equip them to: carry out Community Linking in general, signpost families (basic information provision), actively link families to services, speak to families about community services, and follow up to sustain links.

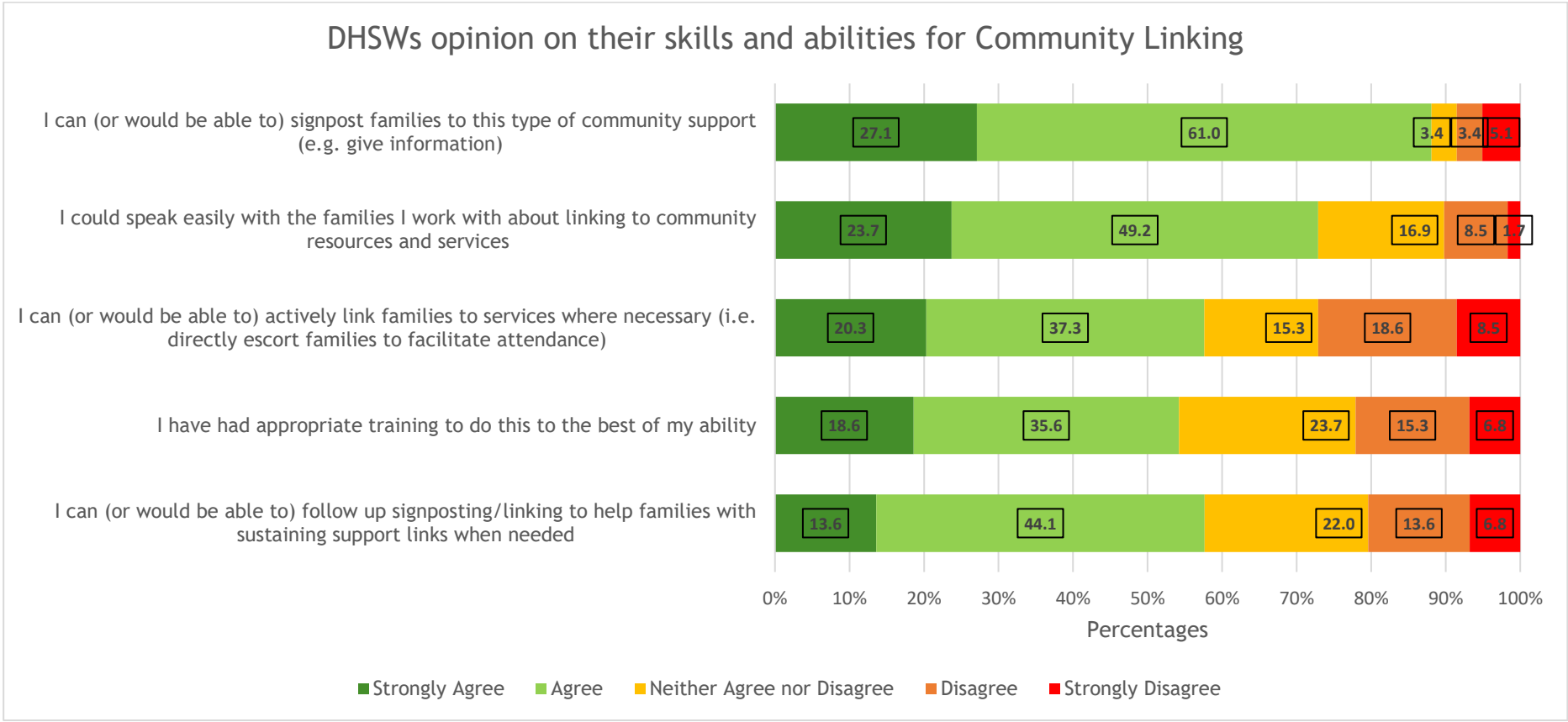


Figure 6-8: DHSWs opinion on their skills and abilities to carry out Community Linking and to follow-up families for sustained support (n=59)

DHSWs clearly believe they can signpost families (88%, 52/59 agreed or strongly agreed on this). They are less clear on following up to sustain support (only 58%, 34/59 agree or strongly agree) which the evidence says is optimal (Chapter 5).

More than half (19%; 11/59 strongly agreed, and 36%; 21/59 agreed) responded that they have the training to carry out the task. However, almost a quarter (24%; 14/59) neither agreed nor disagreed, and 15% (9/59) disagreed with sufficient Community Linking training. In terms of being able to signpost families, 27% (16/59) strongly agreed, whereas more than half (61%; 36/59) agreed that they could link families for community support.

DHSWs were also asked about the type of signposting support they provided. One method was to hand over information such as leaflets or verbal information to the families: the majority of DHSWs could such provide information on community resources to the families (27%, 16/59 strongly agreed, and 61%, 36/59 agreed to this). The other signposting type was actively supporting the family and physically taking them to the facilities or services, 20% (12/59) strongly agreed to this, and 37% (22/59) agreed that they could physically take them to the facilities. Nineteen percent (11/59) disagreed that they would be able to escort families physically for service attendance.

As shown in Figure 6-7, more than half of DHSWs (58%, 34/59 strongly agree or agree) believed in their capability to follow up with families after referral for ongoing assistance and sustained support. In comparison, almost a quarter (22%; 13/59) neither agreed nor disagreed with this. Twenty percent disagreed (14%; 8/59 disagreed and 7%; 4/59 strongly disagreed) that they can follow up with families for support continuity.

When further asked about their Community Linking role as part of the Childsmile Programme, open-ended themes indicated that Dental Health Support Workers were mindful of training needs and more information requirements on community organisations. They also indicated a lack of time in their current role to deal with social issues.

"*I don't have time to follow up with family. Feel pressured to streamline interventions with families*" [R40].

"*The volume of work we experience prevents us from being able to do this effectively. Training Community Linking would be helpful*" [R48].

6.3.4 DHSWs Opinion about Families' Abilities and Characteristics to Attend and Sustain Support

Figure 6-8 shows opinions on the families with whom DHSWs work in terms of their ability to attend and sustain contact when referred and whether they may need special assistance such as transport or finance.

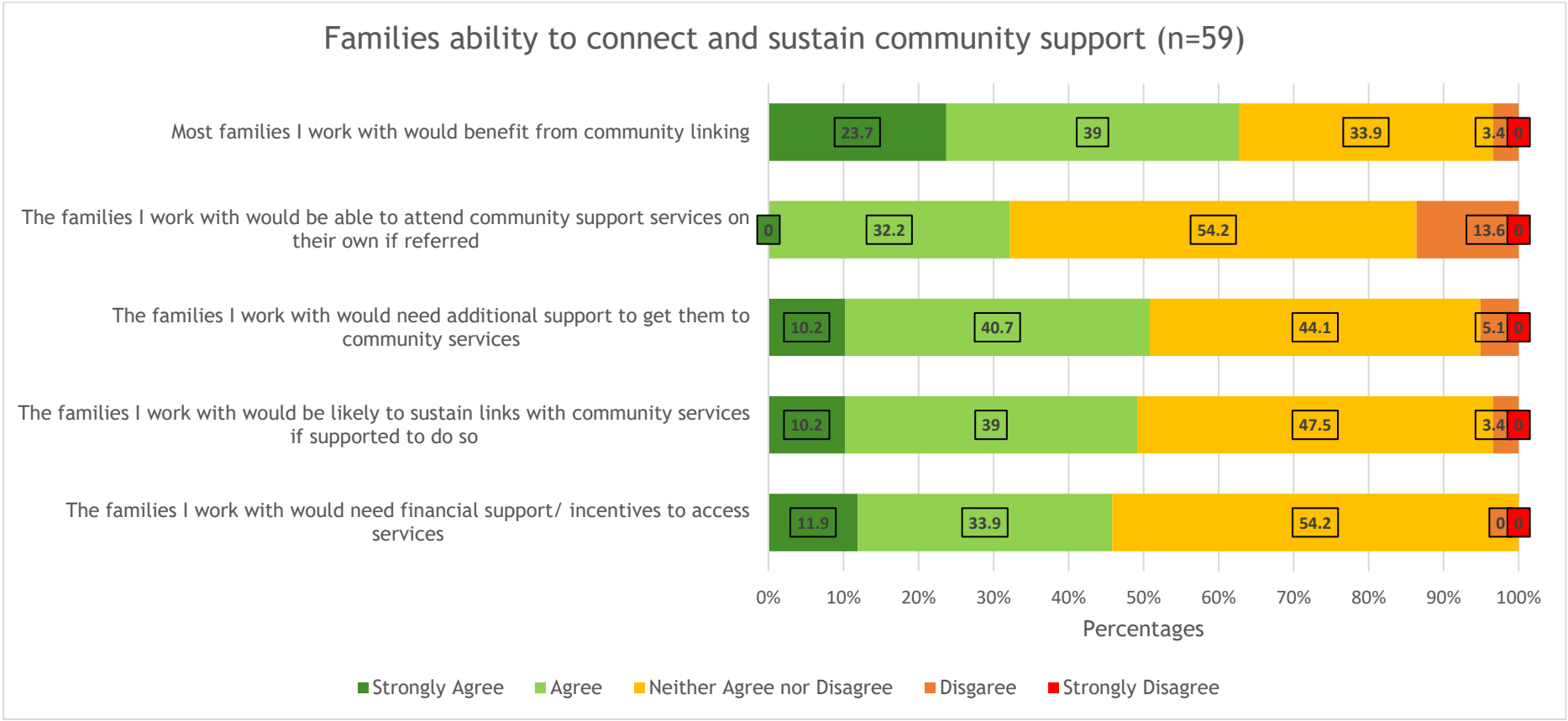


Figure 6-9: Families' ability to connect and sustain community support with whom DHSWs worked

More than half of DHSWs responded (24%; 14/59 strongly agreed, and 39%; 23/59 agreed) that community-linking support would benefit the families they work with. Nevertheless, 34% (20/59) neither agree nor disagree that Community Linking would be helpful to the families for whom they work. It seems that there were some reservations about the families' ability to access community resources on their own, with more than half (54%; 32/59) neither agreeing nor disagreeing; despite this, 32%; 19/59 agreed that if referred, these families would attend the services themselves. When asked if increased support for families to get them to community services would benefit them, there were mixed responses (10%; 6/59 strongly agreed, 41%; 24/59 agreed, 44%; 26/59 neither agreed nor disagreed). Regarding the requirement for financial assistance or incentives for families to attend community services, more than half (54%; 32/59) neither agreed nor disagreed.

Further open-ended responses about their working experience with the families showed mixed responses as to whether families would be able to participate in and benefit from Community Linking or not. Most DHSWs were working with deprived families. Some would be happy to engage, while others would not. However, they may not feel isolated if assisted, and an accompanying support worker would make them more comfortable accessing services. In addition, they also benefit from financial advice and guidance, especially vulnerable young parents with financial difficulties. Some families were said to be not very highly educated and had issues around self-esteem, which made engagement difficult.

" The families that I work with most of the time can attend services that I highlighted to them. If there is a language barrier, some of these services will provide interpreters, face-to-face, or language lines. If they need support to attend to the venue, I can meet up with the family and walk with them, but I am not allowed to take them in my car." [R13].

"Vulnerable families require more support to attend appointments and community resources, i.e., Taken to the appointment" [R16].

"Some families do not have disposable income so might not be able to afford money to travel to groups. Also they can have low self esteem so this can be a huge barrier when accessing these groups the first time. Some of the families I work with have a lack of education so could have low literacy skills making filling in forms or use of IT equipment to register for groups difficult." [R46]

"I think many families would link up well but would need to be given dates, times etc. and often have to access public transport to attend appointments groups etc." [R23].

Opinion on access to remote areas, DHSW mentioned, *"Rural areas with travel links expensive and limited services available."* [R53].

6.3.5 DHSWs Opinion about Organisational Support and Service Re-organisation for Optimising Community Linking

DHSWs were confident that their line managers would support them to optimise Community Linking within the Childsmile program. When asked if they thought their line managers would be willing to help them in employing Community Linking, over three-quarters of DHSWs believed that their line managers would be willing to assist them in completing this objective (78%; 46/59). No respondents disagreed.

DHSWs were asked about the willingness of community services to accept referrals from Childsmile in their area. More than half of DHSWs were unsure whether local community services would accept referrals from Childsmile as part of a Childsmile-enhanced Community Link Pathway (68%; 40/59 reported "do not know", 30.5%; 18/59 said "yes" and 2% 1/59 reported "no").

More than half (68%; 40/59) of DHSWs were not sure if any re-organisation of local DHSW services would be required to achieve an upgraded Community Linking Pathway. Just, 22% (13/59) reported "no" that they do not think re-organisation of their services would be needed.

6.3.6 DHSWs Opinion about Community Linking Pathway Barriers

The opinions of DHSWs on perceived minor and major barriers were sought to optimise the Community Linking Pathway. The following barriers were considered and extracted from the systematic overview (chapter 5).

1. Lack of training for DHSWs, 2. Lack of DHSW confidence/ capability, 3. Time pressure during family contact, 4. High caseload, 5. Staff turnover, 6. Lack of DHSW knowledge of community services, 7. Communication with families, 8. Parent/ carer disengagement, 9. Transport/ geography in reaching families, 10.

Lack of community services/ provision, 11. Family problems in accessing services, 12. Lack of feedback/ follow-up.

Figure 6-8 is shows DHSW's perspective on these barriers to Community Linking and whether they believe it is a major, minor, or not a barrier.

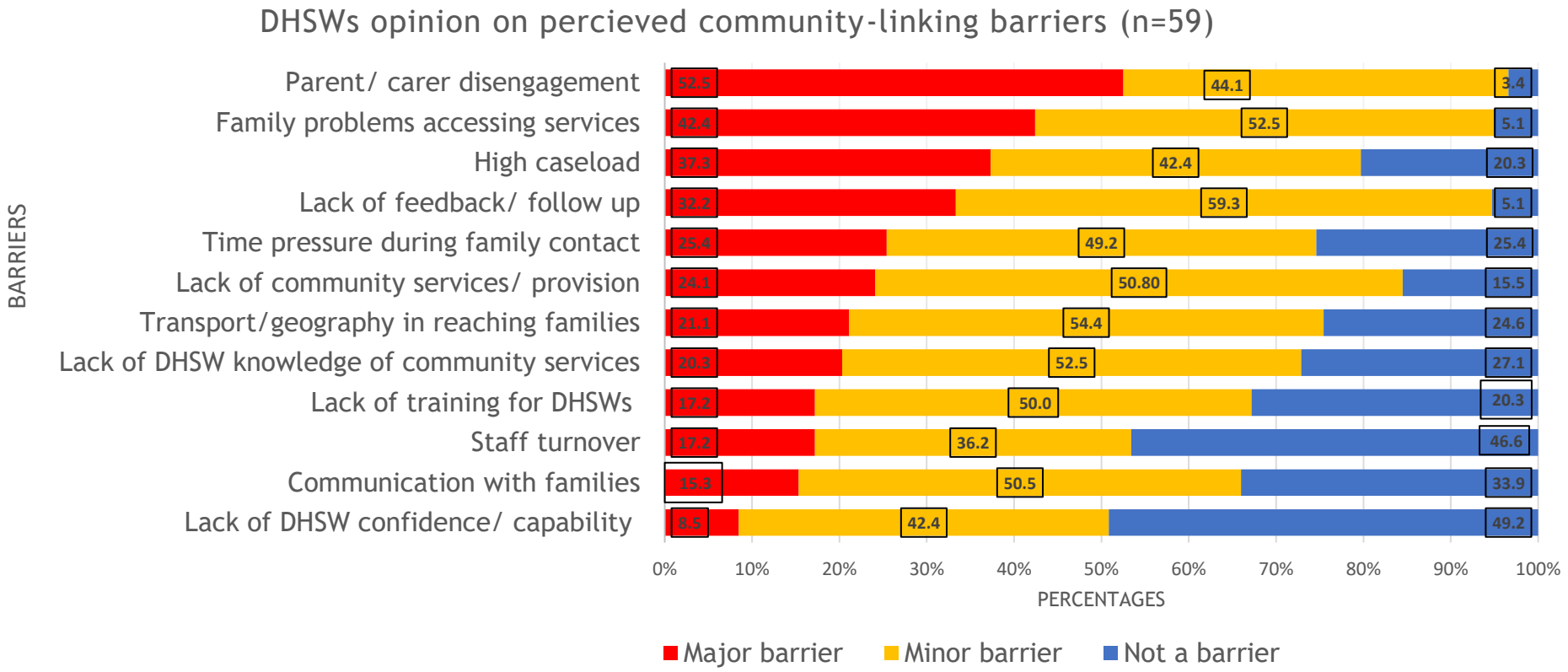


Figure 6-10: The opinions of DHSWs on perceived minor and major barriers to optimising the Community Linking Pathway

Figure 6-10 ranks the barriers in order of importance to the DHSWs; the most common barrier was parent/carer disengagement 52.5%, (31/59) of DHSWs ranked this as a major barrier, followed by family problems in accessing the services 42%, (25/59) of DHSWs ranked this as a major barrier. High caseloads and lack of feedback and follow-up were considered major barriers by 37%, (22/59) and 32%, (19/59) of DHSWs. There are less perceived issues with communication with families and DHSW confidence/capability, which were ranked as major barriers by only 15.3% and 8.5% of DHSWs, respectively.

According to the open-ended question responses, the barriers were quite similar to close-ended responses; a few additional ones were a lack of knowledge about Childsmile services among other health professionals and inaccessibility to broadband in rural areas.

"*Every new Health Professional to have an in-depth knowledge of our service" [R3].*

"Lack of transport in more rural areas and lack of reliable broadband connections" [R9]

Dental Health Support Workers' open-ended responses regarding training/skills barriers to Community Linking were generally around not being wholly aware of the complexity of their role and not having appropriate training to identify family needs. Furthermore, insufficient financial resource availability, lack of communication between services, and a larger geographical area to cover for Community Linking intervention.

"*lack of up-to-date knowledge of all that is available to families. A training for DHSW on this instructing clearly all that can be offered to support families would be hugely helpful and beneficial*" [R24].

6.3.7 DHSWs Opinion on Overcoming Barriers to Optimise Community Linking

Through open-ended questions, DHSWs' perspectives on overcoming the barriers to the successful operation of Community Linking within the Childsmile programme were asked. The main themes that emerged were a) Collaboration and open communication between various agencies. b) Training and support for Dental Health Support Workers. Training should include ways and methods of collecting information on community initiatives and the ability to liaise with

other services and share appropriate information. c) Family assistance includes being sensitive to family dynamics and employing motivational techniques. Establishing and maintaining trust. Financial and transportation assistance to families for them to attend services. Providing information on language classes or interpreter support where needed. Encouragement on using Near me (a service that uses the Attend Anywhere platform to deliver video consulting services), better internet, and services made available locally for the families.

The following were some of their responses.

"Training *and support for Childsmile staff, improved communication between agencies as not always aware of other initiatives" [R6*].

"Refresher training regarding Childsmile and community linking, more collaboration with other services and better communication" [R20].

We used a Word Cloud to visualize how to overcome the barrier to Community Linking responses of Dental Health Support Workers (Figure 6-11). It shows word frequency, emphasising words that frequently appear in the main text. It highlights families, communication, services, support and training. The highlighted texts were in line with the main themes, for example, engaging and communicating with the families, interagency communication, service support and training for DHSWs.

Figure 6-11: Word Cloud on how to overcome barriers to Community Linking

6.3.8 COVID-19 Impact on the DHSW Role

This online survey was conducted during the COVID-19 pandemic, which caused significant disruption to our work. We asked DHSWs open-ended questions about the pandemic's impact on their jobs. Themes from open-ended questions indicated that most DHSWs were twice redeployed to the National Health Service to support the response to the pandemic, with some being redeployed up to four times. Few were redeployed to General Practitioner surgeries, tests and trace, and local vaccination clinics; a minority of DHSWs continue to support families along with their public health team and have adapted to work from home. Work was limited to phone calls, online support through school libraries, *Microsoft Teams*, *Near me, Anywhere* video calls, and online virtual oral health groups. Over the phone, family engagement was complex and reduced. They distributed dental packs and distributed information online or at their doors. Dental practices were not accepting referrals. One DHSW said, "*My Job has been very affected as I work mostly within schools and nurseries! Since March 2020, I have not been back in a school as I was deployed to our local hospital to help with the pressure put on the hospital with covid-19"* [R7].

Some were initially redeployed. And when they returned to work, the work had changed and adapted to the new circumstances. There was a larger area to cover, and only half of the staff returned. Some took office-based jobs, while others were left with no work. Some people started their jobs during the pandemic and reached out to their families via social media and phone calls. There were DHSWs who were redeployed and, at the same time, maintained Childsmile contacts via phone. One DHSW said, "*My job at the moment is now completely office-based and is now predominantly telephone interventions, we do offer near me video consultations, but most parents don't want to do this*" [R16].

A few found this a beneficial learning experience and have seen redeployment as a chance to improve skills.

6.4 Discussion

The aims of this research were to understand the DHSW's current Community Linking practices and assess the feasibility and acceptability of enhancing Community Linking in the Childsmile programme. A national online survey of the Scottish DHSW workforce was conducted using a mixed-methods approach.

6.4.1 Main findings

We found that a large majority of DHSWs were aware of Community Linking as a process and its health and well-being benefits, both for oral and general health. DHSWs had some experience with Community Linking in their current role; just less than three-quarters of those surveyed considered this their primary job purpose, suggesting that Community Linking was not a new concept for them, and they were already employing it to assist families. The significant minority who disagreed that linking families to community services is a key part of their role as DHSWs were likely to have been employed in different ways such as supporting Fluoride Varnish application in education settings. Some may also have been redeployed as part of the Covid response. A large majority of DHSWs responded that they could also identify the organisations or the families needing support. More than a quarter sometimes received feedback from services, and only a half sometimes received it from families, indicating that taking feedback was not in their regular practice. DHSWs' open-ended responses emphasised a holistic approach to positively affecting oral and general health, for instance: teamwork, collaboration with other agencies, supporting families to make the right choices, skill development and encouraging parents to feel more confident and empowered.

Most (around three-quarters) felt training would better equip them to perform Community Linking tasks. This seemed more to do with learning about available community resources than skills training for engaging/ communicating with families. Nevertheless, it seems that to release the full potential of the DHSW workforce; there is a need for standardised training on various aspects of the Community Linking process.

Training is required not only for dealing with people but also for collaborating with stakeholders and other organisations. Hazeldine and colleagues' qualitative study looked at early implementation from the perspective of link workers (UK Social Prescribing programmes evaluation). They found that concerns were

raised about their training, mainly when dealing with people who had mental health issues. The training enabled them to gain confidence in making referrals (Hazeldine et al., 2021). Skivington and colleagues did a qualitative study on the benefits and challenges of delivering a primary care-based Social Prescribing initiative in Scotland. They identified barriers as a lack of staff continuity, a high caseload, and difficulty accessing community organisations (Skivington et al., 2018), concurring with our findings.

Frostick and colleagues conducted qualitative research with the frontline Social Prescribing workforce (Community Link workers) to evaluate three Social Prescribing schemes in London and southeast England. It indicated that link workers were aware of the complexity of their role and highlighted the need to have clarity on the remit of their work. The researchers concluded that link workers could bring about a positive change in individual attitudes and behaviour; however, it is pertinent that their training should be regulated and supported with clear goals and an understanding of the demands of this intricate role (Frostick and Bertotti, 2019).

In terms of DHSWs perspectives on the families they worked with, just under half agreed that more support would be beneficial to assist them in reaching out for these services. Few people would require more intensive and long-term assistance, depending on socio-economic circumstances. A qualitative follow-up study on service users' perspectives of link workers (n=24) and Social Prescribing was conducted in the west of Newcastle upon Tyne (England). The findings showed that it is essential to have a person-centred intervention to sustain people's engagement for Social Prescribing. There should be an ongoing provision of appropriate referrals to other organisations when needed and an emphasis on gradual behaviour change for up to two years. People who require ongoing support due to their social, cultural, economic, and family circumstances, or multiple morbidities, usually feel disadvantaged due to a lack of continued support (Wildman et al., 2019). Our survey findings showed that potential disengagement of parents/caregivers and difficulties in accessing services might be significant barriers to Childsmile Community Linking optimisation.

Our survey findings also showed that around two-thirds of DHSWs were unsure if any change or re-organisation of local DHSWs service would help or be needed to enhance Community Linking within Childsmile. One possible explanation could

be that the main goal of Childsmile is to improve children's oral health. Most DHSWs assisted parents with their children's dental registration, home toothbrushing assistance, or fluoride varnish application in schools/nurseries. Nevertheless, 72% (42/59) of them were directing people to community organisations. Though Community Linking for social problems is a new concept in dentistry, DHSWs were already practising this, so they may not have considered any organisational reorganisation. They are also giving 'front line' opinions. To fully assess the potential of this intervention in dentistry, stakeholder involvement at the management level would be necessary.

The survey findings showed that, in general, barriers to Community Linking were knowledge of community resources and a perception of increased workload.

Open-ended responses on overcoming barriers showed the importance of inter-organisational communication, collaboration and teamwork among various agencies and building stakeholder trust. Building good working relationships with other professionals can create a safety net for parents, boosting their mental health and confidence. During the last decade in the UK, to help improve health service deliveries and sustain partnerships, new initiatives on forming links were experimented with to build networks and communities of practitioners (Miller et al., 2017). A systematic review of 53 papers using realist review methodology on inter organisation collaborations in healthcare found that partnership synergy can be increased by working collaboratively with trust, interpersonal communication and faith that could maximise performance (Aunger et al., 2021).

6.4.2 Strengths and Limitations

The strength of the DHSWs online survey was that it was theory-based, with the CFIR model for implementation research being used to guide the survey design. It was also a nationwide survey, and we received a reasonable response rate with thirteen Scottish health boards participating. We consulted stakeholders such as a DHSWs advisory group, Childsmile managers and coordinators and the Childsmile central evaluation and research team to help us design the survey questions, which were also piloted before the launch.

A limitation of open-ended survey questions is that while they can be thematically analysed/illustrated, they cannot be further explored through follow-up questions or prompts as in an interview (Ball, 2019).

6.4.3 Conclusion

In general, good awareness and acceptance of Community Linking among DHSWs was observed through this online survey. Future implementation barriers were identified, such as lack of time/resources, fostering feedback links, and enhanced staff training.

Further feasibility and acceptability work has to be established with all other stakeholders, e.g., managers, coordinators, and families. The effectiveness of this implementation might then be tested by final piloting and future trials on enhancing Community Linking within the Childsmile programme. The following chapter now synthesises data from the study chapters and summarises the thesis, following which there is a general discussion.

Chapter Seven
Thesis Synthesis and General Discussion

7.1 Thesis Synthesis

As outlined in the introduction, the Childsmile programme is a multifaceted national oral health improvement programme for children. For this intervention to be meaningful in the long term, the practitioners' knowledge and experience should be complemented with the best available research evidence and the opportunity to continuously make improvements through ongoing evaluation to deliver preventive care to children in Scotland (Deas et al., 2013, Macpherson et al., 2010, Turner et al., 2010). The evaluation and monitoring strategy for the Childsmile programme is based on recommended approaches for evaluating complex interventions (Craig et al., 2013, Skivington et al., 2021). A complex intervention involves the interaction of several components. In designing and evaluating such interventions, it is necessary to theorise the design and model various mechanisms and contextual factors that are likely to be involved (Craig et al., 2008). A logic model can aid in the diagrammatic representation of a planned intervention. It demonstrates how the various components, including processes and outcomes, will interact with one another and function (CDC, 2020). According to Mills and colleagues, logic models for complex interventions may allow staff and researchers to assess the settings in which they will be working in advance and establish facilitation strategies (Mills et al., 2019)

Process evaluation is a method to understand how an intervention functions by meticulously attempting to comprehend the implementation, its mechanisms, and contextual factors that influence it (Hulscher et al., 2003). The Childsmile programme began with stakeholders consultations and integrated a logic model into a theory-based approach for process evaluation, focusing on what factors are associated with outcomes to assess the impact of the intervention and the processes involved (Childsmile, 2022c).

In this thesis, we investigated Dental Health Support Workers' community-linking practices (Chapter 4) as part of programme evaluation by analysing population-wide linked secondary data to understand how Dental Health Support Workers support young children's families. Questions included: What are the

characteristics of families who are linked to community services? And which types of community services are families being linked to? We further investigated best practices for Community Linking (Chapter 5) by conducting a systematic overview of the evidence, substantially from the medical domain, as there is a lack of evidence available in the dental literature. We were interested in extracting facilitators and barriers to success with a view that findings might be extrapolated to the dental community setting. The results were reported using the CFIR framework, which provides a structured way to understand an implementation process, including barriers and facilitators in a particular setting that could be extrapolated to some other settings as well (Damschroder et al., 2009). These two studies were used to inform an online theory-based survey of support workers with questions again framed according to the CFIR model.

The online survey (Chapter 6) included open-ended and closed-ended questions about current experiences and perceptions of the acceptability and feasibility of enhancing the Childsmile programme through optimising the Community Linking pathway. The analysis employed a mixed-methods approach, with quantitative data analysis for closed-ended questions and qualitative thematic extraction for open-ended questions, resulting in final recommendations. Results are brought together and synthesised into a programme theory in this chapter.

In this short section, we bring these results together and synthesise them into programme theory. The derived logic model (Smith et al., 2020) for enhancing the Childsmile Community Linking programme visually presents the process in Figure 7-1.

The logic model reflects the work described in this thesis (see Logic Model Figure 7-1), embedded in ongoing monitoring and evaluation of the programme and in the context of policy and other external factors.

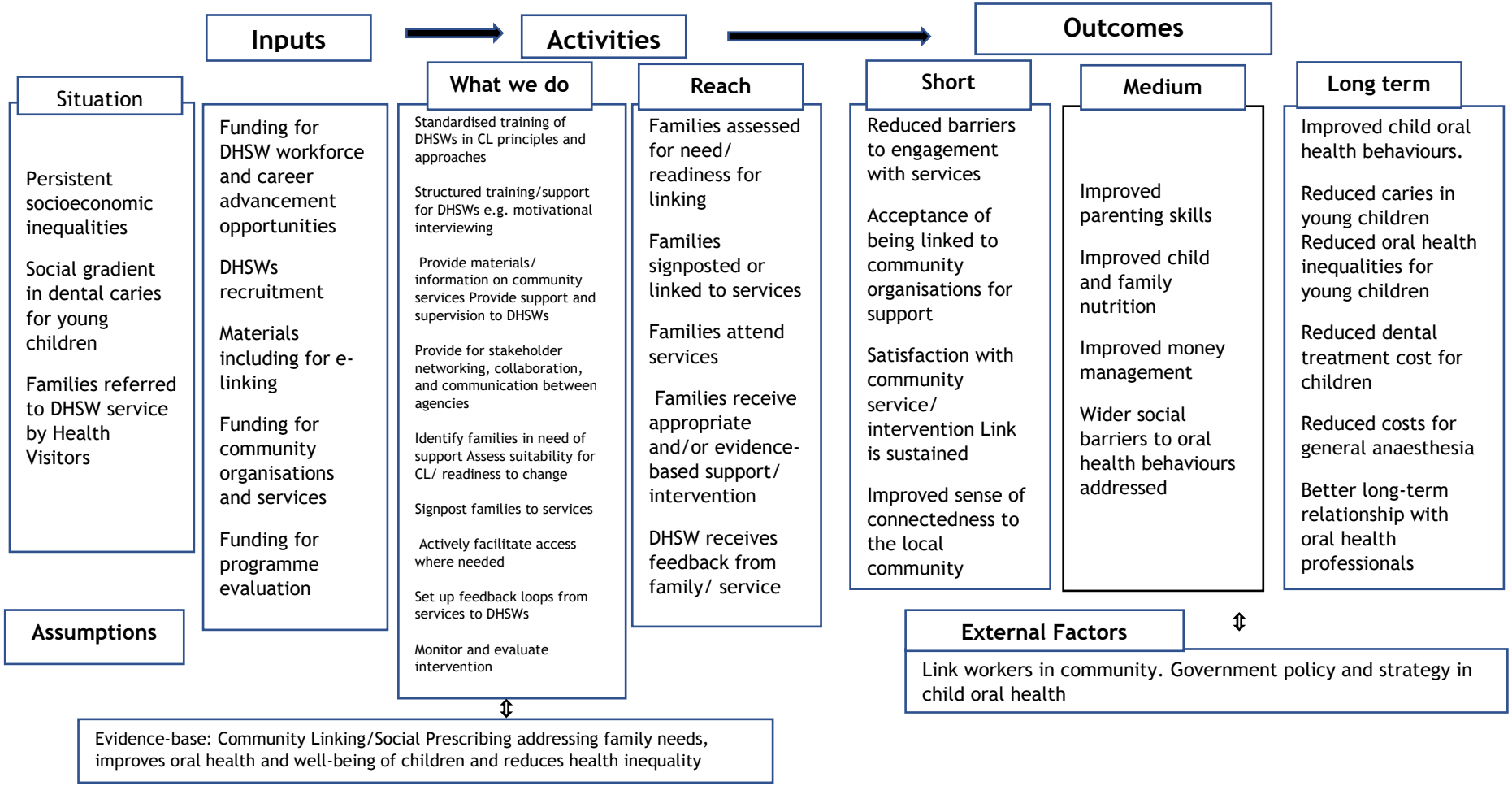


Figure 7-1: The Logic Model of the Childsmile Community Linking

1. Situation

In the current situation in Scotland, children's oral health is improving; however, there are persistent socioeconomic inequalities in oral health (Logic Model Figure 7-1). There is a social gradient in dental caries for young children. The families are referred to the Dental Health Support Worker service by Health Visitors for support.

2. Inputs (Resources/material required to support the intervention): As shown in the logic model (Figure 7-1), the resources and materials required for Community Linking are funds made available to carry out the effort or initiative to recruit DHSWs workforce and their career advancement activities. Funds availability also for community organisations/services for programme execution. Materials such as e-linking are required to contact families and organisations. Funding for programme evaluation and monitoring would also be required (see Figure 7-1). The systematic overview showed a need for sustained fund availability to recruit/train community link workers and to monitor and evaluate this complex intervention. The online survey also showed DHSWs opinions on the importance of procuring funds for training and recruitment.

3. Activities (A. What we do. The initiative's resources to steer the course of change, what actions are needed and B. Reach, how to reach them)

A. What we do: As derived from the logic model Figure 7-1, activities would involve providing DHSWs with standardised training in Community Linking principles and approaches. Structured training and support for DHSWs, such as motivational interviewing and providing materials/ information on community services. Support and supervise DHSWs. Networking, collaboration and communication among stakeholders are needed at every level, from planning to execution. Identifying and assessing families' needs for Community Linking suitability followed by relevant support. Actively facilitate access for families where needed and set up a feedback loop from services/families to DHSWs for ongoing improvement and follow-up (Logic Model, Figure7-1). The overview has highlighted a need for training and stakeholders' inter-agency and intra-agencies collaboration and networking to holistically support families. The online survey showed that DHSWs expressed the need to know local community resources and intersectoral communication/networking. DHSWs identified a lack of training as a barrier, as reported by almost half of the respondents. More than half (59%;

35/59) identified lack of feedback and follow-up as a minor barrier, and more than a quarter (32%; 19/59) identified it as a major barrier. DHSWs should be able to provide structured support to individuals, such as motivational interviewing and goal setting. Thematic analysis of open-ended responses also showed workload and time barriers when working with families. Staff training is critical to overcoming the barriers related to local community resource knowledge. The importance of building trust with families/motivational interviewing and active facilitation in accessing services was identified by the Dental Health Support Workers online survey. DHSWs recruitment and extensive training can be achieved only if we have sustainable resources. The overview also highlighted the need for training/mentoring and funding availability for such activities.

B. Reach: The logic model (Figure 7-1) indicates that the families should be assessed for their need or readiness for linking and signposting or are linked to community services. Families attend services and receive appropriate evidence-based support and intervention. Dental Health Support Workers stress the importance of receiving feedback from the family and community services. A need for regular feedback, monitoring and evaluation was highlighted for quality assurance to improve the Childsmile Community Linking component (see Figure 7-1).

Our systematic overview illustrated that a tailored pathway could only be provided after assessing the needs, which improves intervention outcomes. It also showed the importance of taking feedback after the intervention, easy accessibility to community services, first-time travel cost support and introductory attendance with a buddy was preferred. The systematic overview findings also demonstrated monitoring and evaluation of Community Linking interventions are critical for a successful implementation. The online survey of DHSWs reported that almost half of DHSWs had sometimes asked for feedback input from families (52.5%; 24/59), and more than a quarter (30.4%; 14/59) never asked for it. From the secondary analysis of the DHSWs activities, very few families received more than one visit form the DHSW, so follow-up to establish the success of any Community Linking activities would be difficult under this current model, and there would be a need to provide support/resources and training to allow DHSWs to spend more time in follow-up activities. Regarding

feedback from the services to where they refer families, 39% (16/59) reported receiving feedback sometimes, and 46% (19/59) reported they had never received feedback from the services. Open-ended responses on overcoming barriers indicated that active facilitation and transport provision could achieve sustained participant engagement.

4. Outcomes

Short-term outcomes: The logic model (Figure 7-1) shows the programme theory whereby these activities will lead to short-term outcomes such as reduced barriers to engagement with services, better acceptance of intervention from families linked to community organisations for support and improved levels of satisfaction with community service. Engagement with community services is thereby likely to be sustained, and there is an improved sense of connectedness to the local community (Figure 7-1).

The overview showed short-term outcomes, such as feeling connected and belonging to the community among participants in the included studies.

The open-ended online survey responses showed that DHSWs think collaboration with other agencies creates a safety net for parents who feel supported.

Medium outcomes: Medium-term outcomes are expected to be children's carers/parents improved parenting skills leading to better child and family nutritional status and well-being. The theory is that they will acquire better money management skills which will help address broader social barriers to oral health behaviours (see Figure 7-1).

The overview showed a sense of empowerment and improved motivation and physical health among participants involved in Community Linking interventions.

Long-term outcomes: According to the model, children's oral health behaviour will improve, caries among young children will be reduced, and as this intervention is targeted to those most in need, we would expect that oral health inequalities for young children will be reduced. Children’s dental treatment and general anaesthesia costs will also be reduced. A further long-term outcome would be a better relationship with oral health professionals leading to improved oral health (Logic model Figure 7-1).

Assumptions: The main assumption, underpinned by moderate quality evidence, is that evidence-based Community Linking/Social Prescribing addresses family needs, encourages families to engage with community resources, and thus improves children's oral health and well-being and reduces oral health inequality.

Evidence-base: Our categorisation of existing Community Linking analysis showed that almost a quarter (23%; 53820/238291) of families received Dental Health Support Workers assistance with the children's oral health, nutrition/diet and community support. This support was targeted to those from more deprived communities with greater need. Of the contacted families, 14% (7487/53820) were linked to the community. Children's families were mainly referred for support to Dental Health Support Workers by the Health Visitors. Dental Health Support Workers provide tailored support to families by linking them to various services for diet/nutrition and weaning support, local parent-baby support groups and others (financial support, parenting classes, language support). The community component's programme delivery varies in different health boards.

Through a systematic overview, we explored the best practice in Community Linking across many healthcare sectors. The systematic overview observed a clear connection between link workers (equivalent to DHSWs), healthcare providers and the community. The community link workers enthusiastic approach, good listening skills, and relaxed and respectful attitude were critical. All stakeholders' equal involvement in the implementation of the intervention, adjusting the system according to their needs, active communication, and joint effort create a relationship of reciprocity and trust.

Dental Health Support Workers opinion was explored about their Community Linking role through an online survey. It showed the situation: most DHSWs were aware of Community Linking as a process and its health and well-being benefits, both for oral (80% 52/59, Agree/strongly agree) and general health (91.5% 54/59, Agree/strongly agree). DHSWs had some experience of Community Linking in their current role (72%, 42/59 Agree/strongly agree) and can also identify the organisations (85%, 50/59 Agree/strongly agree) or the families (86.4%, 51/59 Agree/strongly agree) needing support. More than half of those surveyed considered this as their primary job purpose. Online survey open-ended responses showed that DHSWs regard themselves as dedicated, motivated and

hardworking when dealing with various professionals and can recognise and support people.

External factors: The Government's policies and strategies for child oral health are broadly in line with the programme, for example a clear focus on prevention through Delivering Better Oral Health (DBOH, 2021) which is an evidence-based tool kit to support the dental team to improve oral and general health.

7.2 General Discussion

This project aimed to enhance the Childsmile programme by optimising the Community Linking pathway for families with young children, improving children's oral health, and reducing inequalities in oral health. Three studies were conducted for this purpose. The first study was undertaken to learn how Dental Health Support Workers refer children's families to various services and their Community Linking methods (pre-pandemic). The second study explored the implementation of Community Linking interventions to summarise best practices in Community Linking interventions from other settings, such as general medical practices and to appraise the evidence for improved health and well-being outcomes and extract the facilitators and barriers to successful service provision for both service users and providers. The third study used the results from study one and study two to design and deliver an online theory-based survey of the current DHSW workforce to explore the acceptability and feasibility from the Dental Health Support Worker's perspective of enhancing Community Linking within the Childsmile programme to optimise the pathway.

Bedos and colleagues (McGill University Canada) established the need for dental professionals to focus on social determinants of health. They proposed a three-level framework that includes the patient/family, community and society (Bedos et al., 2018). The individual/patient level (micro-level) of care involves person or family-centred care. Community-level care (meso-level) is learning about the community and the circumstances they live in and identifying community's need and providing care accordingly. The community services offered should be accessible to all. The societal level care (macro-level) includes health-promoting policies and programmes (Bedos et al., 2018). Hodgins and colleagues used a quasi-experimental approach to explore Dental Health Support Worker's intervention rollout within the Childsmile programme across Scotland. The researchers linked three Scottish national population-wide databases to demonstrate Dental Health Support Workers were effective in connecting children to primary-care dental services and prevention at a younger age in a children cohort (n= 35236) born in 2010-2013. The families supported by Dental Health Support Workers attend dental practices more, approximately nine months earlier than those who did not receive additional support (Hodgins et al., 2018). This study was conducted as part of the Childsmile programme theory-

based evaluation (Macpherson et al., 2010, Turner et al., 2010) As well as this success in linking to dental services. Since the commencement of the Community Linking component of the Childsmile programme in 2011, Dental Health Support Workers have been providing tailored support and advice to families, including baby feeding programmes and parent-baby support groups; nevertheless, to date, there has been no previous evaluation conducted to identify Dental Health Support Worker's practices in linking to various community services to support families needing assistance with their social circumstances. There was a need to assess the Community Linking component of the Childsmile programme to optimise the pathway because inequalities in oral health are persistent in Scotland and require addressing. Our results broadly support this continuing activity for success and are outlined in the derived programme theory. This is important because Current Medical Research Council (MRC) guidance indicates that a 'programme theory' should be produced for an intended intervention or when implementing changes to a programme (Skivington et al., 2021). A programme theory is critical and enables one to understand interventions in terms of their component parts and the context or setting in which they will be situated. These components include resources and materials as well as the processes or activities by which the programme activities are believed to lead to the intended outcomes (Davidoff et al., 2015).

Baker advocated a system science analytical approach for dental public health issues (Baker, 2019). Instead of concentrating on individual components, System science focuses on the whole system (Mabry and Kaplan, 2013). Health policy decision-making or intervention depends upon a system science approach that considers a model for the dental caries system involving demographics, attitudinal, behavioural, biological and social components. Therefore, system science can explore various heterogeneous individuals and their environmental interactions as a holistic process for oral health (Baker, 2019).

Community Linking works alongside medical management to optimise patient care and address individuals' unmet social needs. It has the potential to manage social determinants of health which account for eighty percent of modifiable factors affecting patient outcomes (Hood et al., 2016). Social Prescribing was introduced in the UK in 2006 to promote better health by empowering individuals to manage their chronic conditions (Department of Health GB, 2006).

The Scottish Government's health and social care policy is built on the ethos of integrating services to provide them when needed. Social Prescribing is one way of delivering this. The Scottish Government was committed to rolling out Community Linking across Scotland and provided 250 community link workers by 2021 (NHS Scotland, 2019). Our secondary analysis findings showed that Community Linking/signposting increased over the years, indicating that the Childsmile programme has taken up the Scottish government initiative. More than three-quarters of children's families were linked to nutrition and diet, followed by less than a quarter for local parents and baby support groups. Dental Health Support Workers work closely with Health Visitors to provide early intervention for child health and well-being. This seems to be the reason for linking families mainly for baby nutrition and dietary services.

The key findings of the systematic overview on Community Linking highlight several aspects of programme delivery; these were identifying high-quality evidence, obtaining resources, being flexible in approach, building trust among partners, assessing participants' needs to provide a tailored pathway, and having inter-sectoral communications to understand the organisations' needs better. And a need for an optimum level of training and mentoring, as well as feedback for the Community link workers. Public Health Scotland's publication on learning from the early adopters of Community Linking implementation aimed to explore implementation delivery at early adopter sites in Scotland. Learning from these projects could help the further rollout of this scheme. Qualitative interviews and focus groups were carried out involving a wide range of stakeholders, e.g., link workers, service managers, General Medical Practice staff and Health and Social care managers (Public Health Scotland, 2020b). It showed that role clarity within this intervention and multi-disciplinary group team working were important. The study highlighted points relevant to Community link workers. These were, General practitioner's primary-care team and community organisations' harmonious relationships, line management support, supervision, peer support to share community resource knowledge, and minimum training requirement should involve mental health issues awareness, networking and availability of learning opportunities and access to IT services, in addition to regular monitoring and evaluation of the implementation (Public Health Scotland, 2020b). These findings were in line with our results.

The systematic overview showed that a multilevel pragmatic approach is required; ongoing rigorous research and evaluation will highlight further evidence. According to our findings, the Community link workers' characteristics should be such that they are perceived as leaders with information and respected in the community. Services are easily accessible to service users and participants' perceptions of the activity being beneficial. All the involved partners should be provided with enough time to understand the process, communicate, network, and finally implement and evaluate the intervention. Our systematic overview favoured the Community Linking intervention for the health and well-being of the participants.

On the contrary, a recent systematic review (8 randomised and non-randomised control trials and one economic evaluation) on Social Prescribing link workers impact on health outcomes, conducted by Kiely and colleagues from Dublin showed a lack of evidence of Social Prescribing intervention success (Kiely et al., 2022). It can be argued that a complex intervention such as Community Linking efficacy cannot simply be assessed through randomised control trials. A randomised controlled trial is conventionally considered a gold standard and uses quantitative methodology (Hariton and Locascio, 2018). However, integrating quantitative and qualitative methods for complex public health interventions is suggested (Davis et al., 2019) and also recommended by the Medical Research Council (Skivington et al., 2021) to get optimum answers to the research question, especially those involving social factors.

Community Linking for children's oral health has not been explored enough. To my knowledge, only one systematic review was found on children's oral health and family community-based support. The results were therefore extrapolated from the systematic reviews on the Community Linking model employed in general medical practices. However, our findings from the online survey showed that DHSWs had high awareness of Community Linking; they already had some experience with Community Linking in their current role. More than three-quarters of respondents acknowledged that this is a good way to improve a child’s oral and general health. The Royal Society of Edinburgh published a report (a desk review called “Social Prescribing from origin to opportunity”). They conducted a literature review followed by stakeholder interviews (link workers, Social Prescribing programme managers, community organisations

representatives and people with lived experience). The report's literature review findings identified the need for Social Prescribing in a patient care pathway. The report also showed that Social Prescribing has been operative in Scotland in various forms and seems to be making a difference in people's lives. The researchers identified three main barriers to Community Linking implementation: awareness, resources and knowledge. The recommendations were to be aware of the variation in the Social Prescribing process, a need to raise awareness, easy accessibility for all and availability of sustained resources for statutory and voluntary sectors (Benedict Lejac, 2021).

The families were linked to various services depending on their needs, more than three-quarters for local parents and baby support groups and Health Visitors/Nurses and three-quarters for nutrition/feeding or weaning support. There was a lack of feedback input from services (families were referred to) and from the families. Only just half of the Dental Health Support workers occasionally received feedback from services and families. More than three-quarters would be able to identify appropriate community organisations for linking and would also be able to identify families in need. Half of DHSWs were doubtful, and more than a quarter believed that the referred families would attend the services themselves. And under half of the respondents were of the opinion that the family would require financial assistance to attend services. The main identified major barriers include families/carers disengagement reported by almost half of the respondents and problems accessing services by slightly less than half.

A retrospective cohort study (n=501) was conducted in the USA to investigate an association between patient connection with factors such as demographics, needs and resources. The study's findings suggested the referral pathway may impact patient links to the resources for social needs. It concluded that more accessible resources, facilitating access to services through optimisation of community services pathway to be embedded within the health system, is more effective in fulfilling social needs (Lian et al., 2021).

For successful patient connection, dose, duration and follow-up of intervention are also of significant importance. Manian and colleagues conducted a study (n= 38,404, 2012-2017) in the USA to investigate a relationship between the dose of intervention and success in connecting to social need resources. The logistic

regression (multinomial) demonstrated that a higher dose of intervention was related to successful contact with services. They adjusted for patients, characteristics of the site and needs, and the odds ratio ranged from 1.62-2.89. The study concluded that successful contacts with services are dependent on the dose of intervention. Face-to-face contact is more successful than phone interventions (Manian et al., 2020).

Thematic illustration of open-ended responses of the online survey showed workload and time barriers when working with families; lack of knowledge of the area, inability to transport families to facilities, and lack of knowledge about Childsmile services, among other health professionals. Lack of family engagement/motivation/willingness and parents/carers language issues, inaccessibility of broadband in rural areas and dealing with vulnerable families with limited resources would complicate the process. The facilitators were collaborative working, e.g., with social services and education. Active facilitation (accompanying or making it easier for service users to access the services) in accessing services was also a facilitator. The evidence highlights that more people are likely to attend community services if professional referrals are made compared to self-referral. A study on non-clinical referral adherence using records from community and navigation services in Germany (January 2018 to December 2019) showed that individuals receiving a referral are likely to attend community services. And their level of adherence is more compared to self-referred individuals (Golubinski et al., 2020).

Another USA prospective study investigated social needs screening in primary care using paediatric clinic data (n= 4948 from December 2017- November 2018). The Community Health Workers' referrals resulted in median attempts of 3 (range 1-13) per referral. The social needs of the families were housing (40%), assistance with benefits (19%) and insecurity regarding food (15%). The reason for unsuccessful referrals (49%) was a disengagement with community health workers. Households having four or more attempts were more likely to report successful referrals than families with three attempts or fewer (aOR = 1.92, 95% confidence interval = 1.06-3.49). The follow-up period of more than thirty days was also less likely to result in a successful referral than less than thirty days follow-up (aOR = 0.43, 95% confidence interval = 0.25-0.73) (Fiori et al., 2020).

A study on patient's perspectives using qualitative (telephone interviews) research methods (n=102) found that patients appreciate the help provided by the advocate assistant (Community Health Worker) and also their follow-up visits. They also think that this therapeutic relation positively influences their problem-solving ability that impacts their health and well-being in general (Hsu et al., 2020)

According to our survey, more than half of respondents reported that the minor obstacles were lack of community services provision, lack of follow-up and feedback and transport/geography problems in reaching families, alongside a lack of communication with the families.

A few more minor barriers include a lack of knowledge of Dental Health Support Workers on community services reported by more than half of the respondents. Half of the respondents reported the need for Dental Health Support Workers' training, and less than half reported time pressure during family contact.

Jenna Rhodes and colleagues applied an interpretative phenomenological approach to explore Greater London link workers' roles and training needs. They conducted semi-structured qualitative interviews with nine link workers. The main themes were a need to define their role, promote it, and how to cope with the position's emotional demands. Regarding the training, they think the initial training did not prepare them for the demands of their role. Their findings showed a need for in-depth knowledge of the local services and the development of an online resource and a comprehensive training requirement (Rhodes and Bell, 2021). This concurs with our findings from the online DHSW survey.

The Scottish Government is committed to addressing child poverty and providing support to families to meet their basic needs. Dental Health Support Workers utilising community resources to address social needs is aligned with the government's ambition for a holistic support approach for families with multiple needs. According to a document, "Best Start, Bright Futures: tackling child poverty delivery plan 2022 to 2026", the plan is to invest £500 million in whole family well-being funding to make changes to the services. The Scottish child payment has also been doubled. There is an increase of 6% to Scottish Social Security benefits, including the Best Start Grant. Financial support to low-income parents is expected to reduce child poverty by 5% (The Scottish Government, 2022).

Community Linking seems feasible for dental services. Unlike link workers, who are embedded in the General Medical Practitioner services, DHSWs are associated with the nursing services and work closely with Health Visitors. The main focus of this component of Childsmile is early intervention. So, concentrating at the early developmental stage when children depend on their parents is important for child well-being. That is the time when proper support for parents can help children. However, the DHSW component is not restricted to children of early age; the referrals are not only from Health Visitors. Families who come in contact with the nursing staff can only get so much; they may need dental team services. The dental team and even self-referrals are reflected in our provisional pathway.

In the next phase, optimisation of the Dental Health Support Workers Community Linking pathway will include collaborative work with Childsmile staff (managers, coordinators) and families. The use of the RE-AIM model (Reach Effectiveness-Adoption Implementation Maintenance/sustainment) may be beneficial at the next stage. The RE-AIM model was made for the evaluation of interventions in Public Health (Glasgow et al., 1999). It allows researchers to identify and measure the process and outcomes. It motivates policymakers, planners/evaluators of various programmes to concentrate on essential elements of the programme, such as external validity that can help sustained implementation and on the adoption of intervention that is effective, evidence-based and generalisable (Kwan et al., 2019, RE-AIM, 2021).

7.2.1 Limitations of Social Prescribing

Community Linking/Social prescribing is considered a non-medical way to manage social issues to support health. The needs of those referred may be complex, and it is not clear how people are currently assessed for suitability. For example, those with social anxiety could feel themselves in a challenging situation in group activities, resulting in heightened anxiety causing more distress (Apter, 2019). Also, participants who feel that their needs are not addressed through non-medical, non-NHS services may feel dissatisfied (Bickerdike et al; 2017). Social prescribing should not be considered a ‘one-size-fits-all’ alternative to traditional patient management; rather, it may be seen as an important adjunct alongside mainstream management.

7.2.2 Strengths and Limitations

This project has some strengths and weaknesses. The project focused on Community Linking/Social Prescribing for families/parents/caregivers with young children (ages 0-3) to support them according to their needs, allowing them to focus on their young children's oral health. It is a holistic approach to children's oral health promotion, which was the first of its kind. To my knowledge, it has not been introduced in any other part of the UK yet. The goal was to reduce oral health inequality by addressing the family's social determinants of health. A theory-based implementation process with embedded evaluation was used. We used a logic model to outline the main findings as a guide to implementation and evaluation. A mixed-methods approach was undertaken, taking advantage of both qualitative and quantitative methodology. We followed the Consolidated Framework for Implementation Research framework for systematic review and an online survey. This project was a part of a larger Childsmile project, exploring enhancing Community Linking for improved child oral health.

The limitations were that we used secondary data to analyse Dental Health Support Workers practices of Community Linking. The researcher has no means to have information other than what was provided. The response rate for our online DHSWs survey was 58% (59/102). The common problem with survey research is its poor response rate. Forty percent of the response rate is considered adequate (Story and Tait, 2019), so our response rate seems reasonable.

However, a limitation was using open-ended survey questions for qualitative analysis due to COVID-19 restrictions and the inability to conduct face-to-face interviews. Face-to-face interviews with Dental Health Support Workers would have given us nonverbal clues that cannot be collected through open-ended survey question's responses. To better understand the participant's views, the questions could be rephrased, or the line of questioning could be expanded (Dialsingh, 2008). The primary missed literature in an overview was Community Linking application in the dental settings. The quality of data collected for secondary analysis was through tick box data, and there was no provision to provide a detailed explanation of the content of the intervention. Details of how the intervention was delivered and how family or services received it could not be clearly established.

Chapter Eight
Conclusion and Recommendations

8.1 Conclusion

This thesis describes how a mixed-method theory-based approach has been used to answer a number of important questions and articulate a programme theory for an improved Community Linking pathway in Childsmile.

The synthesised evidence from the three studies in this thesis shows firstly that the evidence base for Community Linking affecting health and well-being outcomes is mixed, with a number of reviews having a high risk of bias. There is some good evidence for improved outcomes for individual adults with long-term/ chronic mental and physical conditions, but a lack of studies on improving child health outcomes through parent/ family support. Research and guidance pertaining to dental services linked to the community are lacking.

The intervention is highly complex, and what works when for whom is often subject to local circumstances. However, a range of interconnected factors can be extracted from the literature that seems to broadly facilitate success; funding and resources; communication and partnership working with services; assessing family need and actively helping them to access and sustain service links; and qualities of link workers such as empathy and flexibility.

Some level of support for families is already being accessed through the Dental Health Support Worker service, and that more deprived families receive the intervention. However, this is variable in proportion and in services utilised across the country's health boards. There is a lack of information on whether this support is needs-based, tailored to individual family circumstances, and whether linking is having the desired effect on outcomes. Important aspects, such as active facilitation of service contact, are not currently captured.

Dental Health Support Workers are generally aware of linking, see it as a good way to improve general and oral health, and see it as part of their role. They are mostly experienced and feel they have the personal and interpersonal skills to work with families in this pathway. We have identified that training and support would be necessary, particularly in terms of local service provision and having an

up-to-date portfolio of support services. The main other resource issue is time to spend with families, which varies across the country, depending on referral modes and other organisational aspects.

The Childsmile program is gradually evolving, incorporating evidence-based guidelines, research and evaluations to promote oral health and reduce inequalities in oral health. Funding has been allocated to extend the DHSW workforce. Our project identified training needs for Dental Health Support Workers. Behaviour modification techniques such as motivational interviewing and reflective thinking are included in staff training by NHS Education for Scotland. Furthermore, Communication skills are included like active listening, friendliness, adapting your communication to the audience's needs, being confident, offering and accepting feedback, empathy, and being respectful. They are also taught collaboration and shared decision-making. They are trained to overcome barriers to area knowledge by getting to know the area and gathering information on what is happening by visiting community centres, local libraries, and councils and learning about the various available initiatives to support people.

8.2 Recommendations

The recommendations are as follows.

1. An integrated approach is necessary, bringing together Childsmile programme managers and coordinators, health visiting teams, link workers, community organisations and staff, parents/families, and others such as National Health Service Education for Scotland, who support staff training.

2. Thought needs to be given as to; a) how to maintain a database of available community services, b) how to appraise and accredit these as appropriate for families, and c) who should be responsible for keeping this up-to-date.

3. Community and voluntary sector services need to be aware of referrals from Dental Health Support Workers, and two-way communication links based on shared understanding need to be maintained.

4. Actively facilitating families to a community resource, monitoring initial family contact with services, sustainability of contacts, and perceived and validated health outcomes is vital if an enhanced embedded programme is to be successful.

5. The active parts of the intervention, such as assessing family need/ readiness for linking, might be incorporated into training in similar behavioural areas, such as motivational interviewing for behaviour change. Support workers should be mentored to develop the necessary skills and experience.

6. The logic model can be used as a guide to implementation, monitoring, evaluation and research. It allows framing of the key questions- what are we doing, what should we be doing, is it reaching the right families, is it working, etc.

7. Variability across health boards is worthy of attention. Flexibility can be supported according to local needs, but some national standard principles and operating procedures might be of value.

8. Incorporating the current pathway into the wider Childsmile logic and context requires further work. For example, dental teams offer an alternative referral pathway from the usual contact through health visiting; engagement is necessary to facilitate awareness and promote the service in the dental arena. This also applies to pharmacists, nurses, and general medical practitioners. Educational settings also incorporate Childsmile components and are a potential way to engage with families.

9. Research into parent/family perceptions of barriers and facilitators needs to be conducted, and patients/public need to be involved in setting research and service priorities.

10. Tools and techniques (such as for 'triaging' families to the service) need to be further explored and developed.

11. Use of routine data for monitoring and evaluation needs to be explored, again involving key stakeholders from the programme and the users. The use of logic models as part of a theory-based approach, together with national monitoring data from routine administrative databases, should continue to help determine evaluation strategies and priorities for Childsmile.

12. Ultimately, the goal should be to develop a programme of work. The current exploratory research and the programme theory can help guide studies into feasibility and acceptability in practice, and designing, piloting and carrying out studies of effectiveness in achieving short, medium and long-term outcomes.

This would address the aforementioned evidence gap pertaining to family support in general and oral health in particular.

8.3 Wider Implications of the Project

The evidence for the effectiveness of Community Linking/Social Prescribing is still emerging across primary care and the community. This study has contributed to the evidence-base by showing that a targeted Community Linking model delivered by Dental Health Support Workers to families of young children is feasible, that targeting of those most in need appears to be possible, and that linking to community resources and third sector organisations can be done. This is the first project to evaluate Community Linking within a national public health improvement programme aiming to improve child oral health and inequalities. As stated above, a full outcome and impact evaluation of the Dental Health Support Worker component is still required, however, elements of the programme are adaptable to other settings (such as Community Linking by health visitors) and other countries where the lay health worker model already exists. Closer links between the Childsmile programme with third sector organisations and parents/carers is already underway. This should lead to enhanced support for families to address the wider social determinants of health, leading to enhanced pathways for prevention and, ultimately a reduction in inequalities in oral and general health.

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10.3 Appendix 3: Ethical Approval, University of Glasgow Faculty of Medicine Research Ethics Committee for the Dental Health Support Workers Online Survey

University of Glasgow

Dr Alastair Ross

MVLS College Ethics Committee *Project Title*
Community Linking in Childsmile (CLINCH) study
200200027

The College Ethics Committee has reviewed your application and has agreed that there is no objection on ethical grounds to the proposed study.
We are happy therefore to approve the project, subject to the following conditions.

- Project end date as stipulated in original application.
- The data should be held securely for a period of ten years after the completion of the research project, or for longer if specified by the research funder or sponsor, in accordance with the University's Code of Good Practice in Research: (http://www.gla.ac.uk/media/media_227599_en.pdf)
- Any participant identifiable data should only be held for as long as is needed for this study.
- The research should be carried out only on the sites, and/or with the groups defined in the application.
- Any proposed changes in the protocol should be submitted for reassessment, except when it is necessary to change the protocol to eliminate hazard to the subjects or where the change involves only the administrative aspects of the project. The Ethics Committee should be informed of any such changes.
- For projects requiring the use of an online questionnaire, the University has an Online Surveys account for research. To request access, see the University's application procedure at https://www.gla.ac.uk/research/strategy/ourpolicies/useofonlinesurveystoolforresearch/.
- You should submit a short end of study report within 3 months of completion.

Yours sincerely

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10.4 Appendix 4: Health Informatics Centre, Childsmile Practice Intervention Data Typology Themes (categories) and Coding for Signposting

Services coding and explanations

Services	Description
1. Oral Health Dental practice for registration GDP Dentist Dental appointment PDS (Public Dental Services) Community Oral health promotion programme Fluoride application Pharmacy oral health DIAL (Dental Information and Advice Line)	This theme involves referral and support in maintaining oral health and prevention for future caries experience. Dental practice for registration GDP, Dentist, Dental appointment, PDS (Public Dental Services) Community Oral health promotion programme, Fluoride application, Pharmacy oral health DIAL (Dental Information and Advice Line)
2. Nutrition / Diet Breastfeeding	This theme involves providing advice or guidance on nutritional / diet support to improve the health and growth of a child **Breastfeeding:** The detailed advice and guidance about building a close and caring relationship with your baby. How to get ready to start breastfeeding. What are the benefits of breast milk over formula? and what is the difference between the two; The importance of physical contact with your child; how breastfeeding

Services	Description
Weaning fayre (Starting solid sessions) Eat better feel better Diet	works, this include positioning and attachment; breastfeeding when you are out and about and returning to work http://www.healthscotland.com/documents/120.aspx **weaning fayre (Starting solid sessions)**: When a baby is 12 weeks old, the Health Visitor sends an invitation to the nearest start solid sessions as soon as possible. These sessions make weaning enjoyable for both mother and the baby. If the mother misses a session, she can attend any event at any time/date. The available sessions provide advice and guidance on how to start offering your baby first foods at six months of age, how to prepare the nutritious food that your baby can enjoy, how to take care of babies' teeth, baby language development skills and much more https://www.nhsggc.org.uk/your-health/healthy-living/starting-solids/# **Eat better feel better (website):** The aim is to provide families with easy and inexpensive food and snack options to keep children healthy and happy. Cooking skills can be enhanced through videos. There are exclusive deals and money-saving tips to sort out difficult eaters. https://www.parentingacrossscotland.org/info-for-families/resources/eat-better-feel-better/ https://www.parentclub.scot/articles/eat-better-feel-better **Diet / Dietician:** Healthy eating suggestions based on the needs of the child. Dietician provides dietary tips on how to eat well and how to feed children healthy despite life challenges.
3. Local parents/ baby groups Mother and toddler group Local toddler groups Baby massage group Baby bounce and rhyme time Local groups information Family support Bookbug Library	This theme involves unstructured parent and baby groups, which are set up to promote informal socializing and peer support among parents, mostly with recreational activities for the children. **Mother and toddler group:** These are the organised indoor and outdoor events and programs for children and young people, including babies and toddlers, led by volunteers, the third sector, parents, or peers. These activities are designed to allow parents to spend more quality time with their children in an environment free of daily pressure, ensuring that family time receives the recognition it needs. https://www.homestartglasgowsouth.org.uk/group-support/ Local toddler groups, Baby massage group, Baby bounce and rhyme time These are local groups that involve activities for mothers and babies. Such as play groups, music and singing, babby massage in a relaxed environment, dancing and yoga exercise. https://www.whatsonglasgow.co.uk/activities/children:-baby-and-toddler-activities/ **Local groups information, Family support, Bookbug Library, Baby buggy walk, Community centre:** Local groups for family support. Such as the Bookbug library; to share stories, have fun singing songs and rhymes with the child (https://www.scottishbooktrust.com/bookbug), Baby Buggy Walks is a free activity to engage in are a great way for parents, grandparents, and caregivers to meet new people, talk, and exchange experiences while walking in a healthy and friendly atmosphere with professional walk leaders https://www.pathsforall.org.uk/buggy-walks . The advantages are getting to know other parents, reduced anxiety and better mood, socializing and exchanging information, being more involved and feeling more fit, setting up good habits in children, being outdoors in nature and fresh air. A community centre is a facility that is run by a voluntary group of local residents for the good of the general public – by the people for the people in action. It acts as a centre for a range of activities and for all age groups (http://www.communitygroup.co.uk/community-centre-the-heart-of-the-community.html **Young mum support groups** Young mothers may find it difficult to connect with other mothers of all ages and may be hesitant to join support groups. Home-start runs a project with the help of the British Red Cross and Co-op to manage isolation by organising groups for mothers under the age of 25 to meet, talk, and regain their confidence.

Services	Description
Baby buggy walk Community centre Young mum support groups Post-natal group	(https://www.home-start.org.uk/supporting-young-mothers) , **The post-natal group** is for pregnant women and mothers with children under six months. The group is run by perinatal experts, midwives, psychologists, physiotherapists, antenatal and post-natal instructors. https://www.inspiringscotland.org.uk/maternity/pop-up-pregnancy-and-postnatal-support-scotland/ https://maternalmentalhealthscotland.org.uk/resources/links-to-charities-and-support-groups
4. Parenting skills Triple p programme (positive parenting programme) PEEP (People Early Education Programme)	This theme involves referral to more formal and structured activities, which consists of the willingness of parents to take responsibility for attending Triple p programme (positive parenting programme) From all over the world, the Triple P – Positive Parenting Program has been shown to work by using clear, simple techniques, assisting parents in raising happy, confident children, establishing family routines and guidelines that everyone can follow, and balancing work and family life with a lower level of stress https://www.triplep-parenting.uk.net/uk/triple-p/?cdsid=l04lqi5oeodu4df5ct94g08950 The programme is supported by over 30 years of ongoing research. It is intended for mothers, fathers, caregivers an opportunity to learn and practice new ways to improve a relationship with their child. The groups inspire parents/caregivers to set the goals and put the techniques learned in the class to use at home. They choose suitable methods and ideas for the family, including plans to encourage good behaviour and successfully manage misbehaviours. The Triple P program's five main principles include providing a safe environment for children to explore, experiment, and improve their skills. When children require assistance, care, or attention, be present to foster a healthy learning environment. When children misbehave, use an assertive approach by remaining consistent and responding quickly, setting realistic goals for your children and yourself as a parent. As a parent, one must look after themselves and make certain that their personal needs are met. https://www.earlystartgroup.com/parenting/what-is-triple-p/ https://www.parentingacrossscotland.org/info-for-families/resources/free-parenting-classes-and-courses/ PEEP (People Early Education Programme): At Peep, parents learn how small activities can have a significant cumulative positive impact on their child's learning. PEEP sessions include warm welcome; singing and rhyme time; story time; encouragement and guidance; borrowing books and play packs; an opportunity to talk to other parents and caregivers; and suggestions for enjoyable play activities that help children learn (https://www.peeple.org.uk/).
5. Financial Support GEMAP service (Financial and money advice and Benefits service) NHS Money matter service	This theme involves information on programs that may provide financial advice or advise on benefit. **GEMAP service (Financial and money advice and Benefits service):** Money and financial problems can be perplexing and confusing. GEMAP is a service that views clients as individuals rather than cases, which is the most effective way to engage people. They encourage them to make positive changes in their lives by offering encouragement. Furthermore, all their services are completely confidential and free of charge. The services they offer are fighting for sanctions, claiming for personal independence payments, the Scottish welfare fund, tax credits, housing benefit, reduction in council tax, universal credit, being in debt, money management, a management plan for debt, bankruptcy (sequestration), processing minimum assets, plans for a temporary payment, write-offs, negotiated settlements, debt arrangement scheme, trust deeds, financial inclusion (financial what?), budgeting and Financial Planning, saving, borrowing, insurance, bank accounts, credit union accounts and consumers' rights. http://www.gemap.co.uk/about-us/. **National Health Service Money matter service (Money matter):** It is an online money advice service that offers an unprejudiced advice on variety of financial issues and concerns. Their services include in-Work Benefit Checks, Welfare Benefit check, Employment & Support Allowance, Sanctions, Attendance Allowance, Welfare Benefits, Child Disability Living Allowance,

Services	Description
Money matter Food bank Job centre Healthy start info Sure start	Personal Independence Payments, Income Support, Housing Benefit, Discretionary Housing Payment, Council Tax, Scottish Welfare Fund, Job Seekers Allowance, Child Benefit, Social Fund Loans, Benefit Reviews/Mandatory Reconsiderations, Benefit Appeals, Tribunal Hearings, Energy advice, Grant applications. http://www.moneymattersweb.co.uk/services/nhs-debt-and-mental-health/ **Food bank:** A food bank is typically, a non-profit organisation that gathers and distributes donated food to those in need. https://www.merriam-webster.com/dictionary/food%20bank In comparison to the rest of the UK, Scotland has a relatively high use of food banks. Low income, job loss, and benefit delays can all result in sudden or severe poverty, leading to a crisis. People in need are referred to the charity by a Health Visitor or social worker. Individuals who receive a referral will receive a 3-day supply of nutritionally healthy food as well as access to other services. The Trussell Trust, for example, works with professional agencies and community organisations to provide access to their food banks through a voucher referral scheme. Housing associations, children's centres, and welfare services are a few examples of organisations that can assess needs and make appropriate referrals. Once someone been referred, they'll receive a three-day supply of non-perishable canned and dry foods. https://www.scotlanddebt.co.uk/articles/cost-of-living/nearest-food-banks-in-scotland-what-are-your-options **Jobcentre:** A job centre in the UK is a government office that offers unemployed people information and advice about available open jobs. https://dictionary.cambridge.org/dictionary/english/job-centre The introduction of job centres plus in 2001 resulted in the Employment Service and Benefits Agency being housed under one roof, providing an integrated service for all. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/214567/rrep781.pdf **Healthy start info:** Every week, a woman who is pregnant has a child under the age of four or is expecting a child and is under the age of eighteen herself may be eligible for free vouchers to spend on milk, new, frozen, and canned fruits and vegetables, fresh, dry, and tinned pulses, infant formula milk, and vitamins through Healthy Start. https://www.healthystart.nhs.uk/ Instead of Healthy Start, “Best Start Grant and Best Start Foods payments” are available in Scotland. The Best Start Grant is paid out in three instalments. Each payment must be made only once per child. The three Best Start Grant payments are Pregnancy and Baby Payment, Early Learning Payment, and School-Age Payment. https://www.mygov.scot/best-start-grant-best-start-foods/ https://www.gov.uk/healthy-start#:~:text=If%20you're%20pregnant%20or,30%2C000%20shops%20in%20the%20UK. **Sure start outreach:** Sure Start is a program for low-income parents and their children under the age of four. This programme provides a wide range of initiatives to assist children in improving their academic skills, health and well-being, and social and emotional growth. https://www.education-ni.gov.uk/articles/sure-start https://www.etini.gov.uk/sites/etini.gov.uk/files/publications/surestart-evaluation-report-may-2018.pdf Sure Start Scotland is part of a larger initiative to encourage social inclusion "by providing a meaningful start in the lives of young children." This program began in 1999 and had four main goals: to aid in the social and emotional growth of children, improve children's welfare, and support families and communities by improving children's learning abilities. https://lx.iriss.org.uk/sites/default/files/resources/084.%20Mapping%20Sure%20Start%20Scotland%20-%202002.pdf Sure start (mother grant): The Best Start Grant Pregnancy and Baby Payment has replaced the UK Government's Sure Start Maternity Grant in Scotland. https://www.gov.scot/policies/social-security/best-start-grant/

Services	Description
6. Smoking cessation Smoke-free homes service	This theme involves smoking cessation advice and support for parents Smoking cessation: Stop smoking is a service provided by the National Health Service. Because everyone is unique, the individual must choose the method used to quit smoking. It all comes down to determining what works best for them in order to increase their chances of leaving permanently. Stop smoking advisors have the expertise dealing with and supporting people who are struggling to quit smoking. There are various ways to quit smoking. This include making a phone call or an online chat with an advisor, taking local stop smoking support in the form of support groups or one-on-one support at neighbourhood pharmacies or local General Practitioner surgeries, meeting with an advisor and working through planned sessions, accepting support from family or friends, evaluating for nicotine addiction, making a workable plan, and requesting for a quit smoking pack. https://www.nhsinform.scot/healthy-living/stopping-smoking https://www.nhs.uk/better-health/quit-smoking/?WT.mc_ID=JanQuitSmokingPPC&gclid=EAIaIQobChMIpbjCnru17wIVDrrtCh00xQncEAAYASAAEgJoyvD_BwE&gclsrc=aw.ds Smoke-free homes service This service is intended to reduce second-hand smoke (SHS) consumption at home. An activity and resource pack has been developed to provide parents with second-hand smoke awareness sessions. During the sessions, the following major topics are covered: Carcinogenic chemicals in cigarettes and second-hand smoke. How to calculate second-hand smoke? Health risk for children who are exposed to this. Myths or misconceptions about SHS held by parents and caregivers. There are numerous benefits to keeping your home smoke-free. The difficulties of maintaining a smoke-free home and how to overcome them; developing a proposal to make home free of smoke. https://www.ashscotland.org.uk/what-we-do/children-young-people-and-tobacco/smoke-free-homes/
7. Language Support Language group	This involves support to parents and children whose first language is not English Language group This is a support group for parents/families who do not speak English as their first language. https://education.gov.scot/parentzone/learning-at-home/covid19/support-for-families-for-whom-english-is-an-additional-language-eal/
8. Statutory services Social worker Link worker Health Visitor Minor ailment service Speech and language	This is about health and social care statutory services to support parents and children **Social worker:** A social worker provides individual and family counselling and advocacy and intervenes when vulnerable people need help and support, e.g., safeguarding. They assist a diverse range of people, including the elderly, those with learning disabilities, and those with physical or mental issues. Typically, they provide care for a limited period to assist people in adjusting to life changes such as illness or age-related problems, injury, or bereavement. Social workers assess an individual's care needs to ensure that they continue to receive high-quality care and provide counselling and information and intervene when someone requires assistance or protection. They keep track of things and write reports based on their findings. https://www.skillsforcare.org.uk/Careers-in-care/Job-roles/Roles/Social-worker.aspx Social care encompasses all forms of personal and practical assistance for children, adolescents, and adults who require additional assistance and support. It also helps care homes and unpaid carers so that they could continue to work in their role. Social care collaborates with health and social care partnerships, the National Health Service, local authorities, people who have been working in social care support or social work, individuals who may need support, care inspectors, and independent and voluntary sectors. https://www.gov.scot/policies/social-care/ **Link worker:**

Services	Description
Staff nurse / nursery nurse / school nurse Dietician	A link worker is a non-clinical position. They are chosen for their ability to listen, support, and empathize with others. Their role is to connect people to community resources and to support people in developing resilience, skills, and connections. https://www.england.nhs.uk/personalisedcare/social-prescribing/faqs/ The link workers offer practical information and support on issues such as housing, debt, and benefits and signpost or refer individuals to community organisations. https://www.networks.nhs.uk/nhs-networks/releasing-capacity-in-general-practice/messageboard/8-use-social-prescribing/285510759/36453776/released_nalw_link-worker-report_march-2019_opt **Health Visitor:** The Health Visitor in Scotland, is the designated specialist and first point of contact for all matters concerning children under the age of five, including health, well-being, and child safety. The mandatory checks are at pre-birth; 10-14 days; 3-5 weeks; 6-8 weeks; 3 months; 8 months; 13-15 months; 27-30 months; 2 years; 4-5 year. https://www.rcn.org.uk/clinical-topics/children-and-young-people/health-visiting **Minor ailment service:** The Minor Ailment Service is an NHS service available from pharmacies across Scotland to children, people over the age of 60, people with a medical exemption card, and people receiving certain benefits. If a person enrols in the Minor Ailment Program, in that case, the pharmacist has the authority to prescribe medication for a minor illness or complaint if the pharmacist believes the individual needs it. There will be no fees for this. https://www.gov.scot/publications/nhs-minor-ailment-service-local-pharmacy-2/ **Speech and language:** This service is available to children, young people and their parents/ caregivers/ relatives diagnosed with speech, language, or communication needs. It encourages good speaking and listening skills. Speech and language therapists provide information and literature, directing children and young people, parents, caregivers, friends, and others to the best evidence-based information available. Specific advice, programs, workshops, and learning, as well as support is provided. http://slctoolforhv.nes.digital/ http://slctoolforhv.nes.digital/speech---language-therapy.html **Staff nurse, nursery nurse, school nurse:** A nurse is a person who provides necessary services for the preservation, restoration and promotion of health and well-being. They are trained in fundamental scientific nursing knowledge and must meet specific educational and clinical competency criteria to practice. https://medical-dictionary.thefreedictionary.com/Nursing+staff, The field of nursing, is fast-growing, and they work in a variety of capacities in a wide range of settings.
9. Others	This theme involves any other service not covered by previous categories

10.5 Appendix 5: Secondary Analysis Tables and Calculations

Table 1. Characteristics of the families referred to and contacted by DHSWs and linked to community services/resources

		Not referred (not in HIC) % (n)	Referred not contacted/not contactable % (n)	Referred and successfully contacted but no signposting % (n)	Referred and signposted % (n)	Total % (n)	X^2 value	Df	P value
Overall total count		75.9 (180860)	1.5 (3611)	16.6 (46333)	3.1 (7487)	100 (238291)			
Sex	Males	51.3 (92708)	52.9 (1912)	51.3 (23778)	50.4 (3776)	51.3 (122174)	6.224	3	.101
	Females	48.7 (88152)	47.1 (1699)	48.7 (22555)	49.6 (3711)	48.7 (116117)			
HPI	Core	53.3 (90909)	51.9 (1800)	59.6 (24941)	48.0 (2865)	54.3 (120515)	1708.608	6	<0.0001
	Additional	45.2 (77168)	45.9 (1592)	37.3 (15608)	45.9 (2740)	43.7 (97108)			
	Intensive	1.5 (2641)	2.3 (79)	3.1 (1293)	6.0 (359)	2.0 (4372)			
	Missing	(10142)	(140)	(4491)	(1523)	(16296)			
SIMD	Q1	20.6 (37191)	30.7 (1102)	36.7 (16966)	52.1 (3893)	24.9 (59152)	10180.048	12	<0.0001
	Q2	20.5 (37004)	24.4 (878)	22.6 (10460)	16.7 (1245)	20.9 (49587)			
	Q3	19.9 (35797)	17.6 (634)	18.2 (8395)	12.7 (946)	19.3 (45772)			
	Q4	20.1 (36163)	15.4 (552)	12.8 (5903)	10.5 (786)	18.3 (43404)			
	Q5	18.9 (33983)	11.9 (429)	9.7 (4463)	8.1 (604)	16.6 (39479)			
	Missing	(722)	(16)	(146)	(13)	(897)			
HB	Ayrshire & Arran	6.9 (12502)	9.7 (349)	5.4 (2490)	3.0 (225)	6.5 (15566)	70469.103	33	<0.0001

	Borders	1.9 (3412)	2.9 (127)	1.7 (781)	0.7 (51)	1.8 (4371)			
	Fife	8.5 (15363)	4.3 (156)	2.8 (1279)	0.5 (36)	7.1 (16834)			
	Forth Valley	6.6 (11980)	3.2 (114)	2.4 (1103)	0.2 (12)	5.5 (13209)			
	Grampian	13.6 (24604)	6.5 (233)	1.4 (670)	2.3 (170)	10.8 (25677)			
	Greater Glasgow & Clyde	14.6 (26410)	10.6 (381)	41.9 (19398)	86.8% (6495)	22.1 (52684)			
	Highland	4.3 (7751)	2.5 (304)	32.7 (3907)	2.9 (214)	5.0 (11962)			
	Lanarkshire	7.5 (13531)	24.4 (879)	50.3 (14602)	3.4 (258)	12.2 (29012)			
	Lothian	22.0 (39729)	22.4 (809)	3.5 (1463)	0.1 (10)	17.6 (42001)			
	Tayside	9.7 (17493)	2.7 (97)	2.6 (468)	0.1 (6)	7.6 (18058)			
	Dumfries & Galloway Orkney Shetland Western Isles	2.8 (5070) 1.6 (2861)	4.2 (153) 0.2 (7)	1.3 (590) 1.1 (33)	0.0 (3)	2.4 (5813) 1.2 (2901)			
	Missing	(154)	(2)	(40)	(7)	(203)			

Note: HPI (Health Plan Indicator), Q (Quintile), SIMD (Scottish Index of Multiple Deprivation).

10.6 Appendix 6: Search Strategy of the Systematic Overview

OVID (Embase/Medline)

Community health services and scoping review

Community health services and systematic review

Community health service and realist review

Link worker and systematic review

Link workers or signposting or navigation and systematic review

Community Links worker and signposting

Community institutions or link workers

Social prescribing and systematic review

Signposting and systematic review

Community Links worker or systematic review

Community support and systematic review

Community links worker or signposting or

Scoping review

ASSIA (Proquest)

Community health services and scoping review

Community health services and scoping review AND children

Community health services and systematic review

Community health services and systematic review AND children

Community health service and realist review

Exp community links worker and referral and systematic review

Exp community institutional relations, link workers/

community institution and signposting and systematic review

Social prescribing AND systematic review

Social prescribing OR systematic review

(referral OR signpost*)

signposting and community support review

Community linking and systematic review

Navigation and systematic

Navigation "OR" systematic review

Signposting "AND" systematic review

Signposting OR systematic review

(social (service* or agenc* or work or welfare or community link)) systematic review

((charit* or volunt* or communit* or nonprofit) (agenc* or servic* or organisation*)).mp. Systematic review

Exp voluntary health agencies/systematic review

Exp social welfare/systematic review

CINAHL

"Community health services AND scoping review"

Community health services AND scoping review “AND children

"Community health services AND systematic review"

"(Community health services AND systematic review") AND Children"

"Community health service AND realist review"

"Exp community links worker and referral and systematic review"

"Exp community links worker and referral and systematic review" AND children

(MH "Systematic Review") OR (MH "Community Health Workers") OR "("Exp community links worker and referral and systematic review") AND children"

"Exp community institutional relations, link workers/ community institution and signposting and systematic review"

(MH "Community Networks") OR (MH "Institutional Review") OR "("Exp community institutional relations, link workers/ community institution and signposting and systematic review") AND children"

(social (service* or agenc* or work or welfare or community link)) systematic review

((charit* or volunt* or communit* or nonprofit) (agenc* or servic* or organisation*)).mp. Systematic review

Social prescribing and systematic review

Social prescribing and social prescription and referral and reviews

Community links worker or signposting and systematic review

PUBMED

Community health service and scoping review

Community health services and systematic review

Community health service and realist review

Exp family/ AND Community Linking/AND systematic review

Exp carers/((carers) AND (Community Linking)) AND (systematic review)

Link worker AND systematic review

Navigation and systematic review

Signposting

Exp social welfare/ systematic review

Exp link workers AND systematic review

Social prescribing and systematic review

Social prescribing or systematic review

Signposting and systematic review

Databases: Medline/ CINAHL/ Embase /ASSIA

1. Exp family/ Exp parents/
2. Exp carers/ or guardians/
3. Exp referral and consultation/
4. Exp community institutional relations, link workers/
5. (referral OR signpost*)
6. Community Linking
7. Navigation
8. Signposting
9. (social adj2 (service* or agenc* or work or welfare or community link)).mp. (mp=title, abstract, heading word, drug trade name, original title, keyword)
10. ((charit* or volunt* or communit* or nonprofit) adj2 (agenc* or servic* or organisation*)).mp. (mp=title, abstract, heading word, keyword)
11. Exp community health services/
12. Exp voluntary health agencies/
13. Exp social welfare/
14. Exp link workers/

Grey Literature Search Strategy

Search Engine: Google Scholar / EThoS / TRiP

Link worker-

Navigating-

Signposting-

Referral-

Social prescribing-

Community support for family with young children-

Community Linking

Search Engine: Google

Targeted search for specific programmes:

Sure Start-

Healthier Wealthier Children-

NHS Health Scotland-

Public Health England-

ScotPh-

Parenting across Scotland-

Professional websites for Systematic overview

Public Health England

Public health Scotland

Kings Funds

NICE

Integrated health and social care

British Red Cross

British Medical Association

Royal College of General Practitioners

World Health Organisation

NHS England

Health Education England

10.7 Appendix 7: Table 1: Studies Characteristics

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
Bertotti et al; 2019 ScR1	Scoping review	n=69 Qualitative studies, Pre and post-test design, Randomised Control Trials, Longitudinal studies, Policy documents, discussion, and opinion papers	primary care (e.g., General Practitioner practices, pharmacies, dental, and optometry)	Disadvantaged people with long-term chronic physical and mental (mild to moderate) health conditions	Navigation (referral, signposting, care coordination) Connecting roles (e.g., link worker, health coach, health trainer)	Social advice such as employment, housing, legal, debt. Welfare advice social isolation/ loneliness navigation schemes	Cooper et al; 2019 **Low Risk of Bias**
Cordis Bright; 2019 ScR2	Scoping review	n=33 -	-	Socially isolated and Vulnerable, General Practitioner frequent attenders with mild to moderate mental health and long-term health problems.	Link worker model	-	Cooper et al; 2019 **High Risk of Bias**
De Marchis et al; 2019 SR1	Systematic Review	n=23 Randomised Control Trials, Quasi-experimental, matched cohort studies, single group pre/post studies, mixed methods, and qualitative studies	Healthcare	Carers / families / individuals with issues with food security or food access concerns	Active Linking through navigator / layperson or Passive Linking through information provision.	Food resource Food vouchers/food	AMSTAR II **High Risk of Bias**
Leavell et al; 2019 LR1	Literature review	n=7 Mixed methods, Cross sectional, Randomised Control Trials	-	Carers, underprivileged vulnerable adult/children	Outdoor nature-based activities as part of Social Prescribing programmes	Walking, community gardening, farmers' market vouchers	**High Risk of Bias**
Pescheny et al; 2019 SR2	Systematic Review with meta-analysis	n=16 Randomised Control Trials; Controlled before after study (non-Randomise Control Trials); Mixed methods studies; Uncontrolled before after study; Qualitative study	Primary care setting in the UK.	Socially isolated individuals with low mood, H/O of losses, complex long-term conditions, Primary care patients needing psychosocial support and carers	Navigators as part of the Social Prescribing program	Any activities or interventions, usually provided by community organisations, to which service users were referred as part of the Social Prescribing program by navigators	AMSTAR II **Low Risk of Bias**

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
Husk et al; 2019 RR1	Realist Review	n=109 Empirical and non-empirical, quantitative and qualitative studies	Primary care.	Primary care patients	Link workers	Exercise Arts on prescription Green prescription Generic Social Prescribing	RAMESES II **Low Risk of Bias**
Chatterjee et al; 2018 ScR3	Scoping review	n= 86 Quantitative: Randomised Control Trials, qualitative methods, and mixed methods studies	UK based Social Prescribing schemes from both primary and secondary services	Individuals with mental and physical health referred from healthcare facilities	General Practitioner practice staff referring directly to a suitable Social Prescribing scheme. Or Refer to link worker who, makes a referral (signpost or provide information)	Art on prescription Exercise referrals Healthy living initiatives Education on prescription Time banks	Cooper et al; 2019 **Moderate Risk of Bias**
Lohr et al, 2018 ScR4	Scoping review	n= 11 Quantitative: cross sectional, cohort, non-randomise community trial, Quasi-experimental, Qualitative studies	Healthcare system	Priority population with health risk issues	Community-Clinical linkage: Community Health Workers operating within the healthcare system	Recreational resource Community outreach resource Health education groups	Cooper et al; 2019 **Moderate Risk of Bias**
Pescheny et al; 2018 SR3	Systematic review (Narrative synthesis)	n=8 Conference report, Evaluation reports using mixed methodology	General Practitioner staff	Primary care patients with psychosocial needs, low moods and social disengagement.	Navigators, who refer or signpost to the third sector.	Not specified	AMSTAR II **Low Risk of Bias**
Wallace et al; 2018 ScR5	Scoping review	n= 30 Qualitative, Quantitative and mixed methodologies	Health organisation to community	Marginalised/ disadvantaged vulnerable individuals. Immigrants and ethnic minorities	Patient navigators / champion / health coach /community health worker / lay workers/peers	workshops/information on Weight loss, healthy lifestyle, health behaviour advises. Practical and emotional support	Cooper et al; 2019 **Low Risk of Bias**

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
Williams et al; 2018 SR4	Systematic review (Narrative synthesis)	n= 30 Qualitative and quantitative experimental and quasi-experimental	Not specified	Disadvantaged families	Playgroup facilitators	Supported Playgroups Mobile playgroups (outreach programme)	AMSTAR II **High Risk of Bias**
Bickerdike et al; 2017 SR5	Systematic review (Narrative synthesis)	n-=15 Randomised Control Trials and non-Randomised Control Trials, uncontrolled before and after, qualitative	Primary care setting	Not specified	Link worker Co-ordinator Facilitator	Exercise, other physical activities, housing, welfare and debt advice, Befriending, adult literacy counselling. Self-help support groups Luncheon clubs and art	AMSTAR II **Moderate Risk of Bias**
Burns et al; 2017 SR6	Systematic review (Narrative synthesis)	n=24 Randomised Control Trials, cohort studies, cross sectional, qualitative and mixed methods	Healthcare settings	Parents/caregivers / families of pre-school children aged 1-5 years.	Family link workers or coordinators	Sure start, Food insecurities, Specific risk groups programme e.g., obesity, domestic violence, young parents	AMSTAR II **Low Risk of Bias**
Gottlieb et al; 2017 SR7	Systematic review	n= 67 Qualitative and quantitative, descriptive, observational, Randomised Control Trials, Pre- and post-intervention studies. Quasi-experimental	Healthcare settings	Individuals with specific health issues and social / economic needs	Not mentioned	Employment, Housing Food, Education, Parenting practices, Personal safety, (Domestic violence) Childcare (Child protection) Legal	AMSTAR II **High Risk of Bias**
Polley et al; 2017 ScR6	Scoping review	n=14 Randomised Control Trials and matched controlled group	Primary healthcare setting	Not specified	Link worker	Not specified	Cooper et al, 2019 **High Risk of Bias**
Rempel et al; 2017 LR2	Literature review	n=41 Qualitative, quantitative and mixed methodologies.	Primary healthcare	Socially isolated with psychosocial, long-term medical conditions	Voluntary community referrer	Art on prescription, community-based leisure, social and cultural activities	Cooper et al; 2019 **Low Risk of Bias**

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
Vareilles et al ; 2017 RR2	Realist Review	n=23 Qualitative, Randomised Control Trial, Cluster Randomised Control Trial, cross sectional, case control and cohort studies	Not specified	Underprivileged communities, unmet health needs, physical, financial and educational barriers to health.	Community health volunteer	Home nursing, social support, problem solving, and practical skills and techniques for quitting smoking, home-based care, food security and education	RAMESIS II Low Risk of Bias
Ballard et al; 2017 SR8	Systematic review (Narrative synthesis)	n= 14 Randomised Control Trials, Cluster-randomised, cross-over and factorial trials	Community Health care	Mothers/families/ Parents, adults. Children with health needs	Community health worker	Advice on Vaccination, diarrhoea education, TB Family planning, HIV care and recruitment	AMSTAR II Low Risk of Bias
Munns et al; 2016 SR9	Systematic review (Narrative synthesis)	n=4 Qualitative studies, Randomised Control Trials	Not specified	mothers/families/ parents	Peer support home visitors	Parent's support	AMSTAR II Low Risk of Bias
Byrne et al; 2016 ScR7	Scoping review	n=45 Randomised Control Trials, Non-randomised control trials, Pre and Post testing, Comparative and Qualitative studies	Not specified	Families / carers /mothers of children from antenatal to primary school age	Volunteer home visitors	Emotional support, parenting advice or helping them to make contacts. Instrumental support such as helping with a specific task	Cooper et al; 2019 Low Risk of Bias
McCollum et al; 2016 SR10	Systematic review	n=34 Quantitative (cross sectional, cluster randomised control trial, controlled before and after, longitudinal design-prospective cohort and retrospective), quasi-experimental, qualitative	Community healthcare	Marginalised vulnerable group	Not specified	Family health programmes Maternal and neonatal	AMSTAR II Moderate Risk of Bias

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
		and mixed methodology studies					
Kilgarriff et al 2015 ScR8	Scoping review	n=24 Randomised Control Trials, before & after Discussion articles, qualitative studies	General Practitioner primary care	Socially isolated with low mood	Facilitator	Volunteering Befriending Hobbies	Cooper et al; 2019 **High Risk of Bias**
Ginny Brunton 2015 SR11	Systematic Review	n=28 Quasi-experimental and Randomised Control Trials	Community Healthcare	Low-income disadvantaged population	Not specified	Healthy eating, physical exercise, depression, social phobia. Alcohol consumption & abuse. Antenatal (prenatal) care, breastfeeding, drug use, immunisation, safety (e.g. seat belts), parenting, smoking cessation, building self-efficacy, self-esteem advice.	AMSTAR II **Low Risk of Bias**
Mossabir et al; 2015 ScR9	Scoping Review	n=7 Randomised Control Trials, Intervention studies, Cohort studies and reports on Social Prescribing schemes	Healthcare settings such as General Practice and social care	Individuals with Psychosocial problems. Frequent general practice service users.	Social worker, lay community worker, facilitators, health trainers	Social support and Social services visits. Outings, Home help. Meals and wheels, Financial benefits and pensions. Housing-safety, Gardening Decorating	Cooper et al; 2019 **Low Risk of Bias**
Thomson et al; 2015 ScR10	Scoping review	n=35 Quantitative, Qualitative, Mixed methods	Primary care	Individuals with non-medical psycho-social symptoms	link worker referral agent, social facilitator, navigator	Exercise / health activities, Family support, Social isolation support, Time bank Museums, Art	Copper et al; 2019 **Low Risk of Bias**

ID	Review type	Studies	Setting/ delivery	Target population	Social Prescribing/ Community Link Worker function	Community assets	Tool; rating (Quality)
Iacovou et al; 2013 SR12	Systematic review	n=10 Quantitative (Cross-sectional), Qualitative Mixed methods	Not specified	Low-income families	Facilitators	Community kitchen	AMSTAR II **High Risk of Bias**
Giugliani et al; 2011 SR13	Systematic review (Descriptive synthesis)	n=23 Quantitative (Randomised Control Trials, Cross-sectional, Before and after comparative studies, ecological/Secondary data trends analysis, cohort non-randomized interventions)	Community Healthcare	Vulnerable population	Community health agents, Community Health Workers, Lay volunteer workers	Mother and child health, Cancer screening, Blood pressure home monitoring, Breast feeding, Immunization, sexually transmitted diseases and Oral health advise	AMSTAR II **Moderate Risk of Bias**
Kane et al; 2010 RR3	Realist review	n=10 Randomised Control Trials, Cluster Randomised Control Trials	Community Healthcare	High risk marginalised, Mother and child with health needs	Community health worker	Home visits for child health	RAMESIS II **Low Risk of Bias**
Bhutta et al; 2010 SR14	Systematic review	n=326 Randomised Control Trials Quasi-Randomised Control Trials Prospective pre/post, Cross sectional Descriptive studies	Primary care / basic health unit	General population	Community health workers Community mobilisers Peer counsellor Traditional birth attendant	Mother and child health, nutrition, Healthcare promotion, Mental health, Malaria/ Tuberculosis/ HIV prevention and control, Non-communicable disease prevention	AMSTAR II **Moderate Risk of Bias**
Randomised Control Trial (RCT), General Practitioner (GP), History Of (H/O), Social Prescribing (SP), Risk of Bias (RoB)							

10.8 Appendix 8: Table 2: Systematic and Non-systematic Reviews Quality Appraisal and Risk of Bias Table

AMSTAR II for systematic reviews

ID	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Score & Risk of Bias
SR1 (De Marchis et al., 2019)	−	−	−	−	+	−	−	−	−	−	?	−	−	−	−	+	2 High
SR2 (Pescheny et al., 2019)	+	?	+	+	+	+	−	+	+	−	N/A	N/A	−	+	N/A	+	9 Low
SR3 (Pescheny et al., 2018)	+	+	+	+	+	+	−	+	+	−	N/A	N/A	−	−	N/A	+	9 Low
SR4 (Williams et al., 2018)	−	−	−	−	?	?	−	?	−	−	N/A	N/A	−	−	N/A	+	1 High
SR5 (Bickerdike et al., 2017)	+	?	−	−	?	?	−	−	+	−	N/A	N/A	+	?	N/A	+	4 Moderate
SR6 (Burns et al., 2021)	+	+	+	+	+	+	+	+	+	−	N/A	N/A	+	+	N/A	?	11 Low
SR7 (Gottlieb et al., 2017)	−	−	−	−	?	−	−	−	−	−	N/A	N/A	+	−	N/A	+	2 High
SR8 (Ballard and Montgomery, 2017)	+	+	+	+	+	?	?	+	+	+	N/A	N/A	+	+	N/A	+	11 Low
SR9 (Munns et al., 2016)	+	+	+	−	?	+	+	+	+	−	N/A	N/A	−	+	N/A	+	8 Low
SR10 (McCollum et al., 2016)	+	+	−	+	+	+	−	−	?	−	N/A	N/A	−	−	N/A	+	6 Moderate
SR11 (Brunton et al., 2015)	+	+	+	+	+	+	+	?	+	−	N/A	N/A	+	+	N/A	+	11 Low
SR12 (Iacovou et al., 2013)	−	−	−	−	−	−	−	−	−	−	N/A	N/A	−	−	N/A	+	1 High
SR13 (Giugliani et al., 2011)	−	−	−	−	+	+	−	+	?	−	N/A	N/A	?	?	N/A	+	4 Moderate
SR14 (Bhutta et al., 2010)	−	−	+	+	+	+	−	+	−	−	N/A	N/A	−	−	N/A	−	5 Moderate

No (0 point), Yes (1 point), Partial yes (Unclear), N/A Not relevant/Not applicable to that specific review).
For yes, all the items present in the checklist should be provided by the authors. Good quality 8-11 points (Low risk of bias), Moderate quality 4-7 points, Low quality 0-3 points (High risk of bias).

Cooper et al. checklist for Scoping and literature reviews

ID	1. Study aim, purpose, and research question				2. Relevant studies		3. Study selection				4. Charting the data				5. Collating, summarizing, and reporting the results						6. Optional stage		Overall Score
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	RoB
ScR1 (Bertotti et al., 2019)	+	+	+	?	+	+	+	?	+	+	+	+	+	−	+	+	+	−	+	+	+	−	**17** Low
ScR2 (CordisBright, 2019)	+	?	?	−	−	−	−	−	?	−	?	?	?	−	−	+	−	−	+	−	−	−	**3** High
LR1 (Leavell et al., 2019)	+	?	−	?	?	−	?	−	−	−	−	?	+	−	−	+	+	−	+	?	N/A	N/A	**5** High
ScR3 (Chatterjee et al., 2018)	+	+	−	?	−	+	+	−	−	+	−	+	+	−	+	+	+	−	+	+	−	−	**12** Moderate
ScR4 (Lohr et al., 2018)	+	−	+	−	−	+	−	−	+	+	+	+	−	−	+	+	+	−	+	−	N/A	N/A	**11** Moderate
ScR5 (Wallace et al., 2018)	+	+	−	+	−	+	+	+	−	+	+	+	+	−	+	+	+	−	+	+	N/A	N/A	**15** Low
ScR6 (Polley and Pilkington, 2017)	+	−	−	−	−	−	−	−	−	−	−	−	+	−	−	+	?	−	?	?	N/A	N/A	**3** High
LR2 (Rempel et al., 2017)	+	+	+	−	+	+	+	+	+	+	+	+	+	−	+	+	+	−	+	+	N/A	N/A	**17** Low
ScR7 (Byrne et al., 2016)	+	+	+	+	+	−	+	−	−	−	+	+	+	+	+	+	+	−	+	+	−	−	15 Low

ID	1. Study aim, purpose, and research question				2. Relevant studies		3. Study selection				4. Charting the data				5. Collating, summarizing, and reporting the results						6. Optional stage		Overall Score
ScR8 (Kilgarriff-Foster and O'Cathain, 2015)	⊕	⊖	⊖	⊖	⊖	⊕	⊖	⊖	⊖	⊕	⊖	⊕	⊖	⊖	⊕	⊕	⊕	⊖	⊕	⊕	N/A	N/A	9 High
ScR9 (Mossabir et al., 2015)	⊕	⊕	⊕	⊕	⊖	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊖	⊕	⊕	⊕	⊖	⊕	⊕	N/A	N/A	17 Low
ScR10 (Thomson et al., 2015)	⊕	⊖	⊕	⊖	?	⊕	⊖	⊖	⊖	⊖	⊖	⊕	⊕	⊖	⊕	⊕	⊕	⊖	⊕	⊕	N/A	N/A	10 Moderate

One point for each item, ⊕ (Yes), ⊖ (No), ? (Unclear), N/A (Not Applicable/relevant). 1-7 (High risk of bias), 8-14 (Moderate risk of bias), 15-22 (Low risk of bias)

Rameses II for Realist review

ID	1. The research problem		2. Understanding & applying the underpinning principles of realist reviews	3. Focussing the review	4. Constructing and refining a realist programme theory	5. Developing a search strategy	6. Selection and appraisal of documents	7. Data extraction	8. Reporting	Overall quality & RoB
	1.The Research topic is appropriate	2.The Research question is constructed								
RR1 (Husk et al., 2019)	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	Excellent Low

ID	1. The research problem		2. Understanding & applying the underpinning principles of realist reviews	3. Focussing the review	4. Constructing and refining a realist programme theory	5. Developing a search strategy	6. Selection and appraisal of documents	7. Data extraction	8. Reporting	Overall quality & RoB
RR2 (Vareilles et al., 2017)	+	+	+	+	+	+	+	+	+	Excellent Low
RR3 (Kane et al., 2010)	+	?	+	+	−	−	?	+	−	Adequate Moderate

Good/Excellent (Low risk of bias), Inadequate (High risk of bias), Adequate (but not clear) (Unclear). + (Yes), − (No), ? (Unclear).

10.9 Appendix 9: Table 3: Guidelines Aims/Objectives, Expected and Main Outcomes

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
Fulfilling the promise: how social Prescribing can most effectively tackle loneliness, 2019 G1	British Red Cross & Co-op	National policymakers, Local health and care systems and Voluntary and community sector organisations	The aim is to reduce loneliness and provide person-centred resources to assist people in developing self-confidence and resilience so that they can continue to form social connections after the short-term assistance ends.	Community connectors/volunteers reintroduce lonely, isolated people to their communities by providing emotional and practical support.	**For national policymakers:** Community Link Workers to better understand loneliness and how to support others through training. Develop a mechanism to connect Community Link Work to networks and establish strong cross-sector relationships. Standardised and consistent tools use to assess the impact of Social Prescribing on loneliness **For the local health and care system**: Improved understanding and assisting referrers in identifying and reaching out to lonely people. Employ link workers with the time, experience, and knowledge to help. A diverse range of community assets and services is to be created. **For the Voluntary and community sector:** Increased understanding and collaboration with local National Health Service partners.	AGREE II **Moderate Risk of Bias**
Quality Assurance for Social Prescribing: A guide to support Social Prescribing programmes in England 2019 G2	The National Lottery Community Funds	Voluntary, community and social enterprise (VCSE) providers and Primary Care Networks that support Social Prescribing	The quality assurance document should be freely accessible to all partners. It should be recognised as a best practice. And it is up to local governments and their partners to investigate its implementation.	The National Quality Framework, together with the Quality Assurance for Social Prescribing document, will aid in the development of a synchronised and efficient system for ensuring the quality of Social Prescribing.	Protect the person Protect the provider Protect the referrer Data protection (GDPR) Safeguarding Health and Safety Insurance in related to its provision Financial spending is appropriate	AGREE II **High Risk of Bias**

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
					Ensure equality Process/pathway are clear to all parties and rigorous Skill and experience are aligned according to workforce development First aid and mental health training Capturing user experience and ensuring that person remains the centre of the process Codesigning and making improvements to the local Social Prescribing model	
Universal personalised care Implementing the comprehensive model 2019 G3	National Health Service (NHS) England UK	Primary Care Networks, Voluntary Community and Social Enterprise (VCSE) partners	To ensure that the comprehensive model is widely adopted through Integrated Care System (ICS) and Sustainability and Transformation Partnerships (STPs) And co-produce, outline the intended measurable difference in people's outcomes and experiences, the experience and well-being of the workforce.	Joint decisions on assessments, medications, and support options lead to more realistic expectations, a better fit between individuals' values and care decisions, and less unnecessary procedures.	**1. Shared decision making** Design Principles for Collaborative Decision Making among Participants and Clinicians Standard Model to Follow. **2. Personalised care and support planning** **3. Enabling choice, including legal rights to choose** **4. Social Prescribing and community-based support:** Design principles on assisting local partners (primary care networks and commissioners) and sufficient funds. Accept referrals from all departments. The Social Prescribing service based in primary care, and link workers are recruited to provide individualised support and connect with the community. Create an operational procedure based on priority groups, projected referral numbers, referral costs, and workforce efficacy.	AGGREE II **Moderate Risk of Bias**

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
					A diverse range of community-based programmes should be available. Use the standard model. Each primary care network employs up to five link workers, who serve up to 3% of the local population. Link workers typically have 6-12 contacts per person and a caseload of 200-250 people per year. 5. Supported self-management 6. Personal health budgets (PHB) and integrated personal budgets (IPB)	
WHO guidelines on health policy and system support to optimize community health worker programmes 2018 G4	1.World Health Organisation. 2.Global Fund to Fight AIDS, Tuberculosis and Malaria. 3.The Federal Ministry of Health of Germany – BMG. 4.The United States Agency for International Development 5.The Norwegian Agency for Development Cooperation.	National and local levels planners, Policymakers, and managers. Development partners, funding agencies, global health initiatives, donor contractors, researchers, Community Health Worker organisations, Community Health Workers themselves, civil society organisations and community stakeholders.	To help national governments and national and international partners improve the design, implementation, efficiency, and monitoring of Community Health Workers programmes that contribute to universal health care.	Increased awareness, proper and harmonised preparation, improved integration into the health system and society, and better jobs and working circumstances for community health workers. Assist communities in reducing inequities by enhancing Community Health Worker's competencies, encouragement, efficiency, management, and programme sustainability, which could lead to better coverage of essential health activities.	1. Selection 2. Duration of pre-service training 3. Competencies in the curriculum for pre-service training 4. Modalities of pre-service training 5. Competency-based certification 6. Supportive supervision 7. Remuneration 8. Contracting agreements 9. Career ladder 10. Target population size 11. Data collection and use 12. Types of Community Health Workers	AGREE II **Low Risk of Bias**

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
	6.The Alliance for Health Policy and Systems Research. 7.The UNICEF				13. Community engagement 14. Mobilization of community resources 15. Availability of supplies	
Polley et al; 2017 Making sense of Social Prescribing G5	University of Westminster Commissioned by National Health Service (NHS) England. UK Funded by Wellcome Trust	Commissioners	To aid in integrating primary care with other healthcare systems; ease the load of General Medical Practice.	Physical and emotional well-being. Resilience, self-confidence, self-esteem, mental health, and overall quality of life improve. Cost-effectiveness & sustainability. Save across care. Prevent and lessen the number of visits and treatment of primary care. Builds up local community. Community assets are being developed, and people are becoming more aware of the resources that are accessible. Stronger ties between the voluntary and health sectors an increased community resilience. Behaviour Change.	Funding commitment Funds must be stable for the partnership to continue. Collaborative working between sectors: Quarterly meeting of the Steering group Buy-in of referring healthcare professionals: Providing healthcare professionals with the understanding of Social Prescribing to manage and control referrals to community organisations. Communication between sectors: Stakeholders must be able to communicate clearly about the outcome of services. Using skilled link workers within the Social Prescribing schemes: Link workers must have the attributes and skills to connect with referring practitioners, individuals, and the local charitable, community, and social entrepreneurship sectors. The ability to deal with a huge caseload while keeping accurate records. Good organisational, writing and IT abilities include word processing and database management. Possibility of obtaining primary data for monitoring reason. Information governance knowledge and the capacity to always maintain confidentiality while adhering to any legal protecting rules. Excellent communication	AGREE II **Moderate Risk of Bias**

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
				Consistent changes in lifestyle in terms of autonomy, willingness to self-care, and willingness to learn new skills. Capacity to build up the Voluntary Community and Social Enterprise (VCSE) More people are encouraged to volunteer. People unmet needs are met, and social care infrastructure is improved Social determinants of ill-health. Improvement in skills and job prospects. Social isolation is reduced and outreach to marginalized people, social welfare, and legal advice is provided.	and listening skills. Be understanding of others' needs, non-judgmental, and genuinely honest. Person-centred service: A service offered based on the needs of the individual. A link worker may be sent to patients' homes to reach out to those who are unwilling to return to their doctors or individuals who may lack confidence, in which case link workers may be required to accompany them. <u>Checklist for establishing Social Prescribing</u>: Clarity about the aim of the Social Prescribing project? Effective partnerships and Strategic fit. Appropriate and reliable resourcing. Infrastructure and capacity of the local voluntary, community and social enterprise sector. Non-financial contributions from commissioners	
Community engagement: improving health and well-being and reducing health inequalities (NG44) 2016	NICE National Institute for health and Care Excellence	1. Commissioners 2. Health and well-being boards 3. Directors of public health 4. Community and voluntary sector organisations	To encourage local community participation in programme planning, design, implementation, delivery, and evaluation in order to improve health and well-being and reduce health disparities. In addition, we help local governments and health	Increased self-esteem, social networks, and social support are the expected outcomes of Community engagement	Principles of good practise Creating partnerships and cooperation to fulfil local needs. People in peer and lay roles are being engaged to reflect local needs and objectives. A local method to incorporating community engagement into health and wellness activities.	AGREE II **Low Risk of Bias**

ID	Organisation / Funding	Population / Target user of the guideline	Aims and Objectives	Expected outcomes	Main Outcomes	Quality tool & Risk of Bias
G6		5. Members of Public 6. Healthcare providers and local authorities	care institutions satisfy their legal obligations.		Making it as simple as possible for individuals to get involved **Recommendations for research** 1 Effectiveness and cost effectiveness 2 Evaluation frameworks and logic models 3 Collaborations and partnerships 4 Social media	

10.10 Appendix 10: Table 4 Clinical Guidelines Quality Assessment and the Risk of Bias

AGREE II

ID	Domain D1 Scope & purpose			Domain D2 Stakeholder involvement			Domain D3 Rigour of development								Domain D4 Clarity of presentation			Domain D5 Applicability				Domain D6 Editorial Independence		Overall quality /RoB	Recommendation
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23		Yes/No
G 1 (British Red Cross, 2019)	+	+	+	+	?	+	−	−	−	−	?	−	−	−	+	+	+	+	+	+	−	−	−	**3** RoB Moderate	No
G 2 (Lister, 2019)	+	?	+	+	+	+	−	−	−	−	−	−	+	−	?	?	+	−	−	−	−	?	−	**2** RoB High	No
G 3 (NHS England, 2019)	+	+	+	+	+	+	−	−	−	−	?	−	+	+	+	+	+	+	+	+	+	?	−	**4** RoB Moderate	Yes, with Modification
G 4 (World Health Organization, 2018)	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	**6** RoB Low	Yes
G 5 (Polley et al., 2017)	+	+	+	+	?	+	−	−	−	−	+	−	−	+	+	+	+	+	+	+	+	−	−	**4** RoB Moderate	Yes, with Modification
G 6 (NICE guideline, 2016)	+	−	+	+	+	+	+	+	+	+	?	+	+	+	+	+	+	+	+	+	+	?	+	**6** RoB Low	Yes

Score 1,2 (High risk of bias), Score 6,7 (Low risk of bias), Score 3,4 (Unclear). + (Yes), − (No), ? (Unclear), ROB (Risk Of Bias)

10.11 Appendix 11: Participant's Information Sheet

University of Glasgow | College of Medical, Veterinary & Life Sciences

PARTICIPANT INFORMATION SHEET FOR SURVEY

1. Study title:

Community Linking in Childsmile (CLINCH) study

Name of Researcher(s):

Aalia Karamat, Dr Alastair Ross, Dr Andrea Sherriff, Prof Lorna Macpherson

2. Invitation paragraph

You are invited to take part in our research study on Community Linking in Childsmile (CLINCH). It is important for you to understand the reason why this research is being conducted and what it will involve before you decide to participate. Please read this information carefully and if you have any question do not hesitate to contact us.

You can keep this copy of the Information Sheet.

3. What is the purpose of the study?

Background

Over the years there has been an improvement in child oral health in Scotland, however, inequalities still exist. Dental Health Support Workers are part of Childsmile, Scotland's child oral health improvement programme, and provide home based oral health support to targeted families and link these families with dental practices and wider community initiatives where appropriate. The **CLINCH** study aims to support the ability of Scotland's national *Childsmile* programme to address child oral health inequalities through developing and testing a "roadmap" for enhancing the community linking element of the Dental Health Support Worker (DHSW) role as part of the Practice programme.

4. Why have I been invited to participate?

You are invited to participate because you are a Dental Health Support Worker within the Childsmile programme and your views and experiences can help us in the development of this 'roadmap'. You are being invited to take part in the research via a confidential online survey, which will ask about your current practice with regards community linking, your experiences of this aspect of your role, and your views on how best to support/enhance this role into the future. The link to the survey is at the end of the invitation email, and there is a tick box at the start of the survey for your consent.

5. Do I have to take part?

No, it is entirely your decision. Participation is voluntary. If you decide to take part, you are still free to withdraw at any time from the study without giving a reason. In this case your data will also be withdrawn, up until the point that the data are anonymised for analysis.

6. What will happen to me if I take part?

You simply click on the link to the online survey which is available in your invitation email. You can complete the survey in your own time. Questions are not deemed to be highly sensitive and refer to a) current practice linking families to community help and b) the feasibility and acceptability of enhancing this service.

7. What do I have to do?

You have to complete the survey. There are no right or wrong answers. We are just interested in your views. It should take no more than 20 minutes to complete. You can stop at any time and have your responses withdrawn, up until we anonymise the data.

8. What are the possible disadvantages and risks of taking part?

There are no risks in taking part. We appreciate your time is valuable and the survey will take up to 20 minutes to complete.

9. What are the possible benefits of taking part?

You will not benefit personally from taking part in this study, however you will help inform the enhancement of the programme to improve child oral health and support wider family development. We envisage important national benefit through findings being directly used to improve the Childsmile programme, and international benefits from dissemination, for other countries where Childsmile is already being implemented. Those taking part will get a chance to give their opinion on the best way to target needs, support families through community resources, and achieve key outcomes.

10. Will my taking part in this study be kept confidential?

All data gathered will be treated as confidential and stored on a password-protected secure university server in full compliance with the General Data Protection Regulation (2018). The obtained data will be stored, analysed and maintained in compliance with our Data Security Protocol. Your personal data (e.g. name, role) will only be used for administrative purposes (to send one email reminder and to log your consent) and once your survey responses are received (if you choose to participate) your name will be replaced by a unique numerical ID so that going forward your responses will be anonymised. All identifying data (such as names) will be deleted.
No one outside of the research team will be able to find out your name, or any other information which could identify you.

15. Contact for Further Information

Please contact our research team with any questions at all you may have:

Aalia Karamat BDS MSc PhD Student a.karamat.1@research.gla.ac.uk

Dr Al Ross (PhD; C.Psychol) Senior Lecturer alastair.ross@gla.ac.uk

Thank you for reading the Information Sheet

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10.12 Appendix 12: DHSW Survey CLINCH Study

This short national survey is designed to gather the views of Scotland's Dental Health Support Workers on 'Community Linking': the signposting or linking of families to community resources and services.

The survey is part of ongoing research and evaluation of the Childsmile programme at the University of Glasgow.

The aim is to gather views that can help inform improvements to this aspect of the Childsmile Programme.

There are no 'right' or 'wrong' answers, nor is previous experience of Community Linking necessary.

It should take no more than 20 minutes to complete.

Please ensure you have read the Participant Information Sheet and Privacy Notice we sent you before consenting to take part.

If you have any questions at all, please feel free to contact our research team:

Aalia Karamat (BDS, MSc) PhD Research Student

a.karamat.1@research.gla.ac.uk

Dr Al Ross (C.Psychol) Senior Lecturer

alastair.ross@gla.ac.uk

Please consent to take part by writing your name and today's date in the box below.

I confirm that I have read and understood the Participant Information Sheet Version V:01 dated 16/12/2020. I confirm that I have read and understood the Privacy Notice version V20:01 dated 16/12/2020 (see at end of survey).

I have had the opportunity to think about the information and ask questions and understand the answers I have been given.

I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected.

I confirm that I agree to the way my data will be collected and processed and that data will be stored for up to 10 years in University archiving facilities in accordance with relevant Data Protection policies and regulations.

I understand that all data and information I provide will be kept confidential and will be seen only by study researchers and regulators whose job it is to check the work of researchers.

I consent to the University processing my personal data for the purposes detailed above. I agree that my name, contact details and data described in the information sheet will be kept for the purposes of this research project.

I understand that if I withdraw from the study, my data collected up to that point will be retained and used for the remainder of the study.

I agree to take part in the study.

1. Please give your name and today's date to indicate that you consent to the above

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Thinking about Community Linking: the linking of families to community resources and services...

This part of the survey uses a table of questions, view as separate questions instead?

2. Please say how much you agree with the following statements on a scale of 1-5, where 1= Strongly Disagree and 5= Strongly Agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I am aware of support/link workers linking families to resources and services in the community in general	○	○	○	○	○
I am aware of DHSWs linking families to resources and services in the community as part of Childsmile	○	○	○	○	○

3. Have you had any direct experience of this within your role as a DHSW- i.e. signposting/linking families you work with to community resources and/or services, other than dental services?

○ Yes ○ No

If you selected No, please go to Question 4

a. If you selected **Yes**, please indicate resources or services you have linked to (please tick all that apply):

- ☐ Nutrition e.g. breastfeeding support, weaning support
- ☐ Local parent and baby support groups
- ☐ Parenting classes
- ☐ Financial support e.g. debt, money matters, food banks
- ☐ Smoking cessation
- ☐ Language support
- ☐ Statutory e.g. health visitor, social services, nurse
- ☐ Other

i. If you selected Other, please specify:

ii. When you have linked/signposted families to services, have you been able to gather feedback from families about their experience? *Optional*

- ○ Yes, always
- ○ Sometimes
- ○ No, never
- ○ Don't Know

a. If you selected Yes or Sometimes, please briefly describe the feedback from families:

iii. When you have linked/signposted families to services, have you been able to gather feedback from services about their experience with the families? *Optional*

- ○ Yes, always
- ○ Sometimes
- ○ No, never
- ○ Don't Know

a. If you selected Yes or Sometimes, please briefly describe the feedback from services:

4. Please say how much you agree with the following statement on a scale of 1-5, where 1= Strongly Disagree and 5= Strongly Agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Community linking is a good way to improve the ORAL health of the children I work with	○	○	○	○	○

a. Please briefly explain your answer to Question 4, i.e. why you think this is or isn't a good way to improve children's oral health

This part of the survey uses a table of questions, view as separate questions instead?

5. Please say how much you agree with the following statement on a scale of 1-5, where 1= Strongly Disagree and 5= Strongly Agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Community linking is a good way to improve the GENERAL health of the children I work with	○	○	○	○	○

a. Please briefly explain your answer to Question 5, i.e. why you think this is or isn't a good way to improve children's general health:

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Thinking about your skills and experience in your role...

This part of the survey uses a table of questions, view as separate questions instead?

6. Please say how much you agree with the following statements on a scale of 1-5, where 1= Strongly Disagree and 5= Strongly Agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I can (or would be able to) identify appropriate community organisations and services for local linking (signposting)	○	○	○	○	○
I can (or would be able to) identify families that could benefit from this type of community support	○	○	○	○	○
I can (or would be able to) signpost families to this type of community support (e.g. give information)	○	○	○	○	○

I can (or would be able to) actively link families to services where necessary (i.e. directly escort families to facilitate attendance)	○	○	○	○	○
I can (or would be able to) follow up signposting/linking to help families with sustaining support links when needed	○	○	○	○	○
I consider linking families to community services to be a key part of my role as a DHSW	○	○	○	○	○
I have had appropriate training to do this to the best of my ability	○	○	○	○	○

a. Thinking about yourself and your skills and experience, please use this space to tell us anything else you think we should know about your role in community linking as part of Childsmile:

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Thinking about families and/or communities you work with as a DHSW...

This part of the survey uses a table of questions, view as separate questions instead?

7. Please read the following statements and say how much you agree with each on a scale of 1-5, where 1= Strongly disagree and 5= Strongly agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I could speak easily with the families I work with about linking to community resources and services	○	○	○	○	○
Most families I work with would benefit from community linking	○	○	○	○	○
The families I work with would be able to attend community support services on their own if referred	○	○	○	○	○

The families I work with would need additional support to get them to community services	○	○	○	○	○
The families I work with would be likely to sustain links with community services if supported to do so	○	○	○	○	○
The families I work with would need financial support/ incentives to access services	○	○	○	○	○

a. Please use this space to tell us anything else about the families and/or communities you have worked with as DHSW that you think is important for linking them to community resources or services:

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Thinking about your job at present during COVID-19...

8. Please briefly describe how your job has been impacted by COVID-19 and/or about your experience during pandemic:

Thinking about your job and the way it was organised before COVID-19 and returning to routine DHSW contacts with families...

This part of the survey uses a table of questions, view as separate questions instead?

9. Please read the following statements and say how much you agree with each on a scale of 1-5, where 1 = Strongly disagree and 5 = Strongly agree:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
I would have sufficient time to identify families that would benefit from community linking	○	○	○	○	○
It is already part of my role/job description to signpost or link families to community resources or services when needed	○	○	○	○	○
My line management are/ would be supportive in helping me employ community linking	○	○	○	○	○

This part of the survey uses a table of questions, view as separate questions instead?

10. Please answer the following question

	Yes	No	Don't Know
Would community services in your area be ready to accept referrals as part of an enhanced community linking pathway within Childsmile?	☐	☐	☐

a. If you answered No for Question 9, please briefly outline why here:

This part of the survey uses a table of questions, view as separate questions instead?

11. Please answer the following question

	Yes	No	Don't Know
Would there be any re-organisation of your local DHSW service required to implement an enhanced community linking pathway?	☐	☐	☐

a. If you answered Yes for Question 10, please briefly outline why here:

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Thinking of your answers to this survey as a whole...

This part of the survey uses a table of questions, view as separate questions instead?

12. Please say whether the following aspects are major or minor barriers to success in optimising the community linking programme within Childsmile (or present no barrier at all):

	No barrier at all	A minor barrier	A major barrier
Lack of training for DHSWs	☐	☐	☐
Lack of DHSW confidence/ capability	☐	☐	☐
Time pressure during family contact	☐	☐	☐
High caseload	☐	☐	☐
Staff turnover	☐	☐	☐
Lack of DHSW knowledge of community services	☐	☐	☐
Communication with families	☐	☐	☐
Parent/ carer disengagement	☐	☐	☐
Transport/geography in reaching families	☐	☐	☐
Lack of community services/ provision	☐	☐	☐
Family problems accessing services	☐	☐	☐
Lack of feedback/ follow up	☐	☐	☐

a. Please use this space if you think there are any other barriers to success in optimising community linking programme:

b. Thinking of any barriers you identified- what if anything in your opinion would help overcome these to improve/enhance the Community Linking programme in Childsmile?

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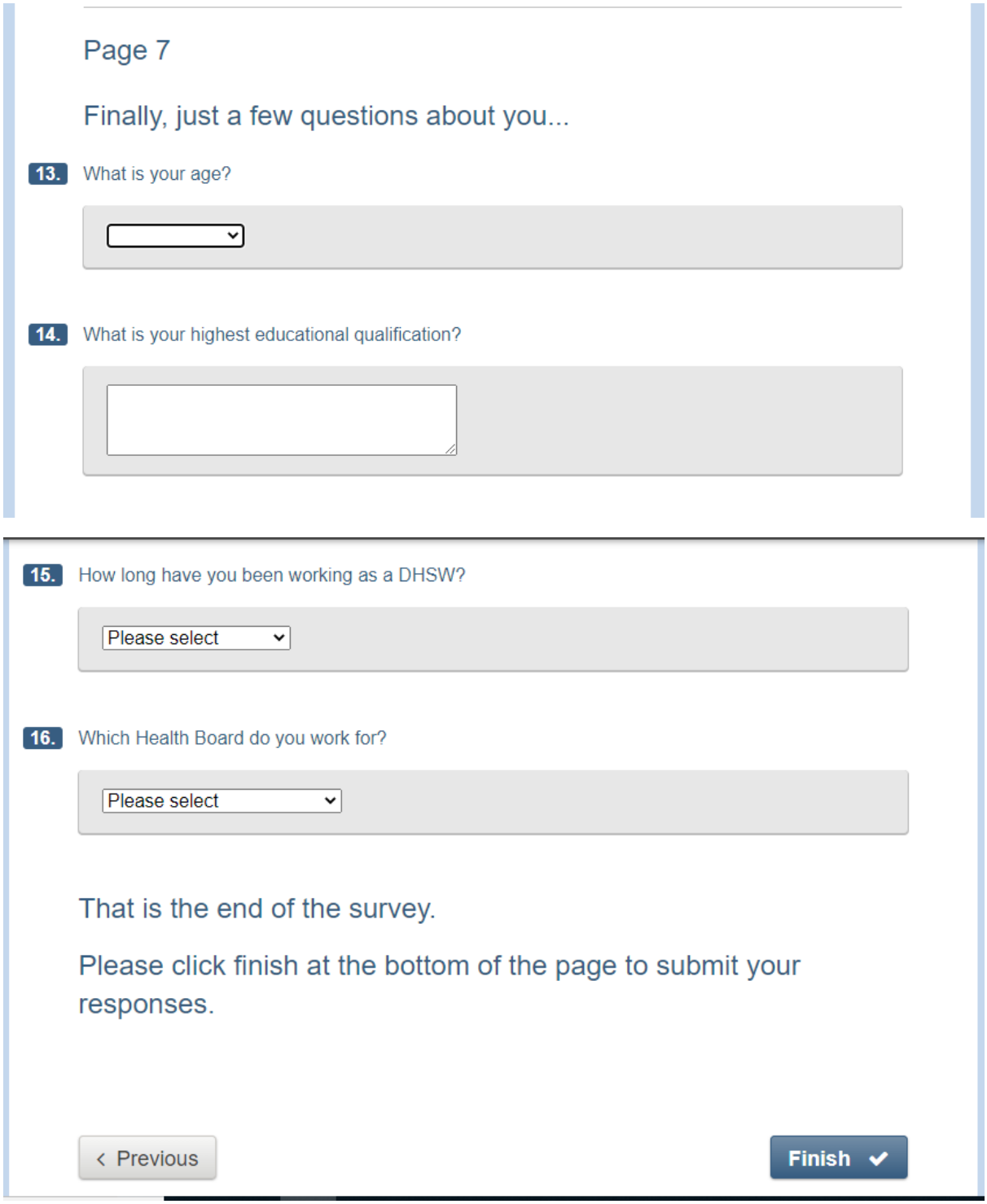
Page 7
Finally, just a few questions about you...
13. What is your age?
14. What is your highest educational qualification?
15. How long have you been working as a DHSW?
Please select
16. Which Health Board do you work for?
Please select
That is the end of the survey.
Please click finish at the bottom of the page to submit your responses.
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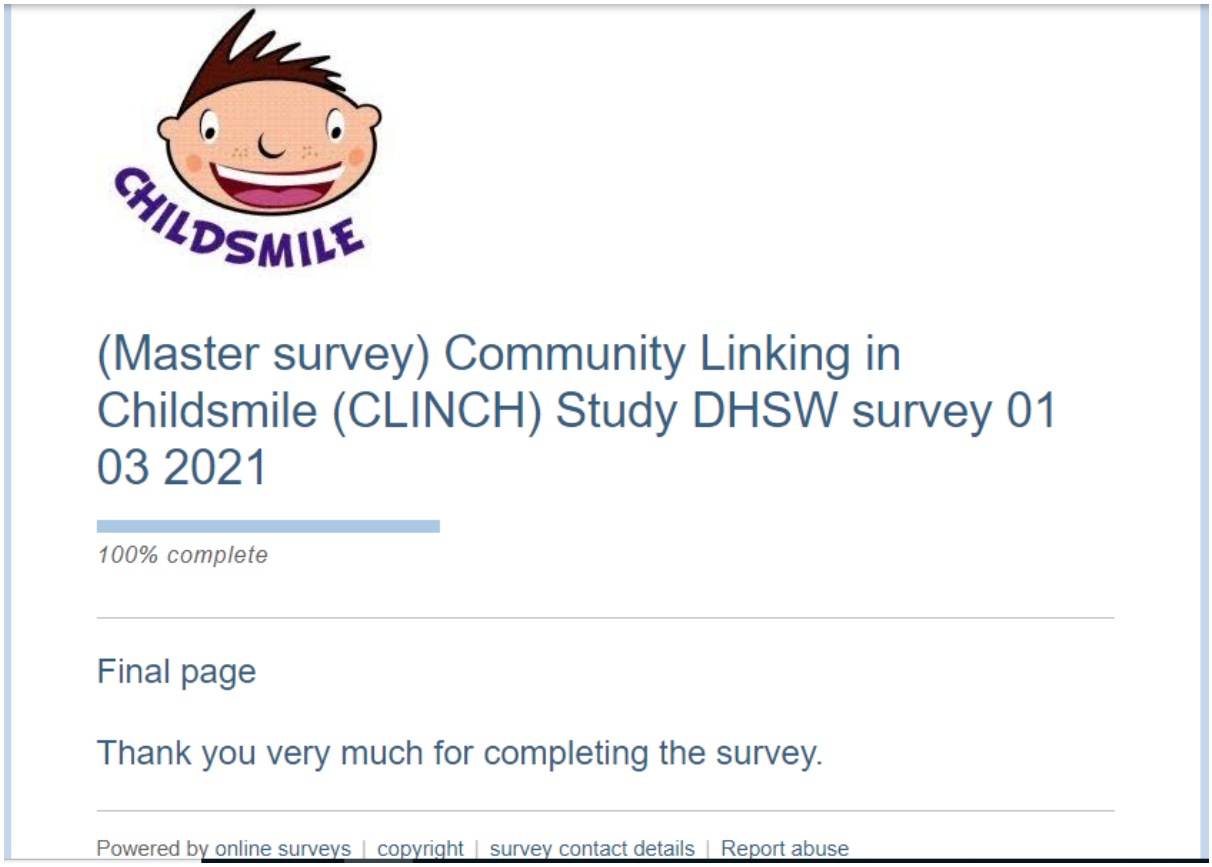
Finish


CHILDSMILE
(Master survey) Community Linking in Childsmile (CLINCH) Study DHSW survey 01 03 2021
100% complete
Final page
Thank you very much for completing the survey.
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10.13 Appendix 13: Email Invitation for Dental Health Support Workers Participation

Dear……..

As part of our ongoing 'Childsmile' evaluation and improvement programme at Glasgow Dental School, we are aiming to enhance the Community Linking elements of the Childsmile programme, as we seek to address the social determinants of oral health issues for families.

We have worked together with DHSWs and other programme staff to prepare a short online survey to gather views on the feasibility and acceptability of enhancing the Community Linking potential of DHSW home visits and family interactions. The survey should take no more than 20 minutes to complete.

A participant information sheet is attached with this email which gives brief details of the project together with data security and confidentiality arrangements, and hopefully answers some of the other questions you may have.

The link to the survey is below, where you can consent electronically if you wish to proceed.

We very much hope you can find the time to take part so that your views are included.

If you have any further questions or would just like some more information about the CLINCH study, please feel free to contact either myself (contact details below) or the Project Lead Dr Al Ross (Alastair.ross@glasgow.ac.uk).

Regards

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