

Incorporating Oral Health Collaborative Practice into Primary Medical Care in Ireland

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DECLARATION

I hereby declare that this thesis has not been submitted for a degree at any other university, and that apart from where due acknowledgement has been made in the text, it is entirely my own work.

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SUMMARY

Background: In 2007, the World Health Organisation (WHO) recommended that the prevention of oral disease be integrated with that of chronic systemic disease prevention, on the basis of the “common risk factor approach”, because most oral and systemic diseases share the same risk factors, such as smoking, alcohol, poor diet and other non-health promoting behaviours. It was also recommended that oral health workforce capacity be developed among medical professionals, especially those who work in primary health care. In addition to the general barriers to and facilitators of the integration of oral health into primary health care, there are region-specific barriers and facilitators, that mostly pertain to policy, guidelines and the availability of public health care services.

Aim: The aim of this study was to explore the opportunities for, and the barriers to, the integration of oral health into primary health care in Ireland, and to propose recommendations to support the development of sustainable collaborative practice relationships between primary care medical and dental professionals.

Methods used: This thesis consists of both qualitative and quantitative methodologies. There were three parts to this study. The first part was a qualitative, semi-structured interview study, that explored the views of dentists on the relative importance of oral health to systemic health, oral health education for medical professionals and the perceived opportunities for, and barriers to, collaborative practice between medical and dental professionals in Ireland. The results of this study informed the remaining objectives. From this first study, two specific areas of opportunity for the integration of oral health into primary health care in Ireland were identified; (i) the integration of oral health into diabetes care and (ii) an oral cancer prevention strategy in primary health care. The second part of this

study was a quantitative study, which included a cross-sectional survey of general practitioners (GPs) through an online questionnaire, to determine the confidence and willingness of GPs to incorporate oral health as part of routine diabetes care in Ireland, by examining their current oral health knowledge, interest and practices, in addition to their experience of and attitudes towards oral health training. In addition, this part of the study also examined the evidence for the inclusion of an oral health assessment by a dentist, as part of the Health Service Executive (HSE)-supported integrated care guidelines for patients with diabetes in Ireland. The third part of this study was a retrospective analysis of the clinical notes of patients diagnosed with malignant and potentially malignant oral lesions from one diagnostic oral pathology service in Ireland, in order to examine the way in which these oral lesions are first detected in the primary care setting. In addition, this part of the study also proposed a model of care that would support an oral cancer prevention strategy in primary health care in Ireland.

Main findings: In the first study (Part A), the semi-structured interviews showed that dentists perceived a lack of interest in oral health among medical professionals and suggested a paucity of oral health education as the main reason for this perception. However, results from the second study (Part B), the cross-sectional survey, showed that the majority of GPs were interested in oral health. However, GPs did report a paucity of oral health education at both the undergraduate and postgraduate levels. In the first study, dentists also believed that patients preferentially attend their GP for oral health problems, especially relating to the oral soft tissues. This was also confirmed in the second study, as GPs reported that patients often consult them about oral health symptoms, especially regarding the oral soft tissues. Indeed, in the retrospective analysis study (Part C), the vast

majority of oral cancers self-presented to GPs at an advanced stage, whereas, a statistically significant amount of early, asymptomatic, potentially malignant oral lesions was detected opportunistically by dentists (OR 7.82; 95% CI (2.67,22.94)). In Part A, dentists believed that GPs could play a major role in oral disease prevention by identifying shared risk factors for oral disease, by promoting oral health and by facilitating referral to a dentist. However, both GPs and dentists reported poor communication with one another in Parts A and B of this study, with dentists highlighting a sense of isolation from the health care team during the qualitative study. For example, in Part B, the majority of GPs surveyed never (58%) or rarely (35%) refer their patients with diabetes to attend a dentist as part of overall diabetes care. However, the vast majority of GPs surveyed (82%) reported often referring their patients with diabetes to other health professionals as part of overall diabetes care. In Parts A and B of this study, the prevention of oral cancer was identified as the most important reason to integrate oral health into primary health care. As per the National Cancer Strategy 2017-2026, “GPs play an important role in the early detection of cancer”. However, in Part B of this study, GPs reported low levels of confidence when examining the oral cavity and in discussing oral health issues with their patients. Results from Part A suggested that dentists would generally have better knowledge of referral pathways for oral mucosal disease, and thus should provide support to their GP colleagues in light of the aforementioned results from Part B. This type of collaborative practice would support an oral cancer prevention strategy in primary health care. Furthermore, the findings from Part C showed that dentists detected a statistically significant amount of early, asymptomatic, potentially malignant oral lesions during routine dental examinations (OR 5.29; 95% CI (2.08, 13.45)). As such, in Part C, a new model of care was proposed to support

collaborative practice between GPs and dentists, in order to improve the early detection of oral cancer in Ireland. The proposed model of care is based on a traditional hub and spoke model, where GPs would be designated as the spokes and dental surgeries would be designated as the hubs, or “oral health hubs” within primary health care. The model of care described focused solely on one of the two identified opportunities for oral health collaborative practice; an oral cancer prevention strategy in primary health care. However, this model of care could also be used to support the integration of oral health into diabetes care in Ireland.

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PEER-REVIEWED PUBLICATIONS

- 1) Ahern, J., McGeown, D. & Nunn, J. 2018. Dentist's views on incorporating oral health collaborative practice into primary medical care in Ireland. *Community Dental Health*, 35, 252-256.
- 2) Ahern, J., Hamnvik, O.P., Barrow, J. & Nunn, J. 2017. Incorporating oral health as part of routine diabetes care in Ireland (Research Correspondence). *Irish Medical Journal*, 110, 660-663.

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GLOSSARY OF ABBREVIATIONS

CI: Confidence Interval

COPD: Chronic Obstructive Pulmonary Disease

CVD: Cardiovascular Disease

DDUH: Dublin Dental University Hospital

DEASP: Department of Employment Affairs and Social Protection

DTBS: Dental Treatment Benefits Scheme

DTSS: Dental Treat Services Scheme

FQHC: Federally Qualified Health Centres

GP: General Practitioner

HRSA: Health Resources and Services Administration

HSE: Health Service Executive

PMD: Potentially Malignant Disorder

SCC: Squamous Cell Carcinoma

WHO: World Health Organisation

CHAPTER 1

Introduction

The World Health Organization (WHO) defines oral health as: “A state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing” (Petersen, 2003). Traditionally, oral health has been defined as the absence of oral disease. However, a new definition has been proposed by the Fédération Dentaire Internationale (FDI). This new definition aims to highlight the complex nature of oral health, in addition to positioning oral health as integral to general health (Glick et al., 2017). As defined by the FDI, “oral health is multifaceted and includes the ability to speak, smile, smell, taste, touch, chew, swallow, and convey a range of emotions through facial expressions with confidence and without pain, discomfort, and disease of the craniofacial complex” (Glick et al., 2017). This new definition is intended to raise awareness of the different dimensions of oral health, whilst most crucially highlighting that oral health does not occur in isolation, but rather as an integrated component of overall health. The authors acknowledged that, whilst this definition is simply a modified version of the definition used by the WHO (Petersen, 2003), it succeeds in moving dentistry away from the idea of simply treating oral disease, and instead supporting oral health, through the use of language that will resonate better with health care professionals across other disciplines (Glick et al., 2017).

Irrespective of the definition used for oral health, it's relationship with general health has been well established on a global scale (Petersen, 2003, Petersen, 2008).

Oral diseases qualify as major public health problems owing to their high prevalence and incidence in all regions of the world (Petersen, 2003, Petersen, 2008). In 2000, a report issued by the United States (U.S.) Surgeon General's office highlighted what was called a "silent epidemic" of oral disease in the U.S. Furthermore, the report emphasised the importance of integrating oral health with overall general health when providing patient care, on the basis of associations between oral and systemic disease. For example, the report highlighted a number of associations between oral infections and diabetes, cardiovascular disease, respiratory disease and premature births (U.S. Department of Health and Human Services, 2000). In 2003, the U.S. Surgeon General's office issued a recommendation to review and update professional educational curricula in order to include oral health content in the training of other health professionals (U.S. Department of Health and Human Services, 2003).

In 2007, the WHO made the same recommendation at the World Health Assembly and called for the prevention of oral disease be integrated with that of chronic systemic disease prevention (Petersen, 2008), on the basis of the "common risk factor approach", suggested by Sheiham and Watt (Sheiham and Watt, 2000). The "common risk factor approach" rationalises the use of an integrated prevention strategy for both oral and chronic systemic disease, because most oral diseases and chronic systemic diseases share common risk factors, such as tobacco use, excessive consumption of alcohol or sugar and unhealthy behaviours (Sheiham and Watt, 2000). Oral health tends to remain separate from routine

medical care, in both practice and education (Lancet, 2009). Traditionally, oral health care delivery has been structured around reactive interventions carried out by dental professionals to treat moderate and advanced oral disease. However, a more proactive and collaborative approach has been suggested, whereby oral health practices are incorporated by other health care professionals across the broader health care team (Sheiham et al., 2015).

Collaborative practice is when multiple health workers from different professional backgrounds work together with patients to provide the highest quality of care (World Health Organisation, 2010). There are many examples of how collaborative practice between medical and dental professionals, especially by those who work in the primary care setting, could improve both the oral health and general health of patients. For example, patients who suffer from chronic obstructive pulmonary disease (COPD) are at an increased risk of developing periodontal disease (Shen et al., 2015) and the treatment of periodontal disease in COPD patients can lower their risk of developing adverse respiratory events (Shen et al. 2016). The risk of developing periodontal disease is approximately three times greater for diabetic patients than non-diabetic patients (Mealy and Campo, 2007) and there is evidence that treating periodontal disease is associated with a significant reduction in the hemoglobin A1c (HbA1c) of patients with diabetes at three months (Chapple and Genco, 2013).

In order to put collaborative practice into action, the WHO has recommended the development of oral health capacity for medical professionals, especially for those who work in primary health care (Petersen, 2008). The acquisition of knowledge and skills through interprofessional education is an important part of building capacity among health care workers and preparing them for collaborative practice within the broader health care team (World Health Organisation, 2010).

In 2011, the Institute of Medicine recommended that the U.S. Health Resources and Services Administration (HSRA) address the need for improved access to oral health care through the development of oral health core competencies for primary care medical professionals (Institute of Medicine, 2012). A report issued in 2014 by HRSA outlined what were considered to be the five domains of importance, each of which contained a core set of competencies in relation to oral health for medical professionals working in primary care. These five areas were (i) oral health risk assessment, (ii) oral health evaluation, (iii) preventive interventions, (iv) patient education and (v) interprofessional collaboration (U.S. Department of Health and Human Services, 2014). It was envisaged that medical professionals in the primary care setting would incorporate these oral health core competencies into their existing scope of clinical practice in an effort to promote oral health and prevent, diagnose and manage oral disease (Institute of Medicine, 2012).

As primary health care has been deemed the most suitable health care setting for the integration of oral health with general health (Petersen, 2008, U.S. Department of Health and Human Services, 2014), an oral health delivery framework has been described (Hummel et al., 2015). This framework is essentially aligned with how GP-led primary care teams manage other chronic systemic diseases across the patient's lifespan (Hummel et al., 2015). In the oral health delivery framework, cardiovascular disease (CVD) was used as an example to illustrate how this might work. Typically, GPs would routinely screen their patients for factors that may increase their CVD risk. This would involve an assessment to identify risk factors such as obesity, smoking, hypertension and diabetes. In order to reduce a patients' risk, GPs and/or other members of the primary health care team, would typically offer advice in relation to modifiable risk factors and treat underlying conditions that would otherwise increase their CVD risk. GPs are trained to screen for early signs of CVD such as chest pain on exertion, or breathlessness. In situations where signs and symptoms, or indeed a high-risk profile exists, GPs may seek further consultation from a specialist, such as a cardiologist, who may then pursue further special tests. The oral health delivery framework proposes that primary care teams could potentially emulate this approach when dealing with oral health. This would entail GPs engaging with patients in the promotion of oral health, the identification of risk factors for oral disease and the application of preventive strategies. In Ireland, GPs play a central role in the management and prevention of chronic systemic disease (O'Dowd et al., 2017), and are thus well positioned to integrate oral health practices as part of a chronic systemic disease prevention strategy (Petersen, 2008, U.S. Department of Health and Human Services, 2014).

The challenge to the integration of oral health, or indeed the integration of any new approach to practice and patient care, is to understand what barriers may exist to the successful implementation of integrative practice, and how might they be surmounted. It is unlikely that one single approach, or one single model for oral health integration will suit all situations at all times in the Irish health system. However, the way in which collaborative practice between medical and dental professionals in the primary care setting could occur, and thereby support the integration of oral health into primary health care in Ireland should be explored.

CHAPTER 2

Aim and Objectives

2.1 Aim

The aim of this study was to explore the opportunities for, and the barriers to, the integration of oral health into primary health care in Ireland, and to propose recommendations to support the development of sustainable collaborative practice relationships between primary care medical and dental professionals.

2.2 Objectives

There were four objectives in this thesis, the first of which informed the subsequent two objectives.

- 1) The first objective was to explore the views of dentists, through semi-structured qualitative interviews, on the relative importance of oral health to systemic health, the role of dentistry for the overall health care team, oral health education for medical professionals and the perceived opportunities for, and barriers to, collaborative practice between primary care medical and dental professionals in Ireland.
- 2) The second objective focused on the first of the identified opportunities for oral health integration into primary health care in Ireland, which was *to integrate oral health as part of diabetes care*. This objective was divided into two parts; (i) to examine the evidence for the inclusion of an oral health assessment by a dentist as part of the HSE-supported integrated care guidelines for patients with diabetes in Ireland; (ii) to determine the confidence and willingness of GPs, to incorporate oral health as part of routine diabetes care in Ireland, by examining, through the use of

an online survey, their current oral health knowledge, interest and practices, in addition to their experience of and attitudes towards oral health education.

- 3) The third objective focused on the second of the identified opportunities for oral health integration into primary health care in Ireland, which was *an oral cancer prevention strategy for primary health care*. This objective was divided into two parts; (i) to undertake a retrospective analysis of the clinical notes of patients diagnosed with malignant and potentially malignant oral lesions, in order to examine the way in which these oral lesions are first detected in the primary care setting in Ireland; (ii) to propose a model of care that would support an oral cancer prevention strategy in primary health care in Ireland.
- 4) To propose recommendations for the development of sustainable collaborative practice relationships between primary care medical and dental professionals, in order to support the integration of oral health into primary health care in Ireland.

CHAPTER 3

Literature Review

3.1 Introduction

The purpose of this chapter is to provide some additional background on the topic of integrating oral health with primary health care. This chapter is divided into four sections. The first section presents a narrative review of the literature on oral health integration with primary health care. The second section focuses on the first of the two major opportunities identified in Part A of this study, which was the integration of oral health as part of diabetes care in Ireland. The third section focuses on the second of the two major opportunities identified in Part A of this study, which was an oral cancer prevention strategy in primary health care. The fourth and final part of this chapter aims to contextualise this study within the Irish health care system, by exploring the future direction of health care services, in addition to the currently available public health care services in Ireland. Finally, aspects of the new oral health policy released in April 2019, *Smile agus Sláinte*, will be discussed as they relate to the work of this thesis.

3.1.1 Search strategy

The search strategy was different for each of the four described sections. For the first section, an electronic search of PubMed was carried out. The search terms used included ((“oral health” OR “oral disease” OR “dental care”) AND (“primary health care” OR “primary care”) AND (integrat* OR incorporat* OR collaborat*) AND ("oral health training" OR "oral health education" OR "oral health curricula" OR "oral health interprofessional education")). For the second section, an electronic search of PubMed was carried out. The search terms used included ("oral health" OR "oral disease" OR periodont* OR gingiv* OR "gum disease") AND (diabet* OR "diabetic health") AND

("integrated care" OR "model of care" OR "interdisciplinary care")). For the third section, an electronic search of PubMed was carried out. The search terms used included (("oral cancer" OR "mouth cancer" OR "oral dysplasia" OR PMD OR "potentially malignant disorder") AND (screening OR prevention OR "early detection") AND ("primary care" OR GP OR "general practitioner")). For each of the three searches, titles and abstracts were screened. The inclusion criteria were all types of articles published in English. The exclusion criteria were articles for which the full text was not available, and articles not published in English. From the articles retrieved from the search, additional references were identified by manual searches of reference lists. For the fourth and final part, Google and Google Scholar was used to source national documents pertaining to the Irish health care system, Irish health care services, policies and related guidelines. From articles, reports, policies and guidelines retrieved, additional references were identified by manual searches of reference lists.

3.2 Oral health integration into primary health care

Primary health care has been defined by the WHO as "essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part both of the country's health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health

system, bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process” (World Health Organisation, 2017). The WHO has advocated for the integration of oral health into primary health care (Petersen, 2014). The integration of care has been defined as “bringing together inputs, delivery, management and organisation of services related to diagnosis, treatment, care, rehabilitation and health promotion” (World Health Organisation, 2008).

3.2.1 Rationale

The rationale behind the recommendation for oral health integration in primary health care is based on the “common risk factor approach” (Sheiham and Watt, 2000). Oral diseases and chronic systemic diseases share a number of common risk factors. For example, diet is a risk factor for dental caries, CVD and diabetes (Petersen, 2003, Petersen, 2008). Dental caries results when a microbial biofilm, alternatively known as “plaque”, forms on the tooth surface and converts the free dietary sugars into acids that demineralise, dissolve and destroy tooth structure over time. Globally, it is estimated that 2.4 billion people suffer from dental caries of permanent teeth and 486 million children suffer from dental caries of primary teeth (Global Burden of Disease, 2017). Another example is tobacco smoking/chewing, which is a risk factor for periodontal disease, cancer (including oral cancer), chronic obstructive pulmonary disease and CVD (Petersen, 2003). Periodontal disease is a bacterially induced, chronic inflammatory disorder, of the gums (gingivitis), which can, if left untreated, progress to involve the supporting structures (periodontitis), including periodontal ligaments and alveolar bone around the teeth, resulting in eventual tooth loss. Globally, severe periodontal disease, was the 11th most prevalent disease in

2016 (Global Burden of Disease, 2017). Based on this rationale, Sheiham and Watt recommended an integrated prevention strategy for oral diseases and chronic systemic diseases (Sheiham and Watt, 2000), and in order to introduce this type of integrated prevention strategy, oral health care delivery models must adapt and change (Sheiham et al., 2015).

3.2.2 Oral health care delivery models

Oral health care delivery models have typically focused on reactive surgical interventions for moderate to advanced oral disease. This focus has led to oral health delivery models that are usually structured around providing acute oral health care services, instead of an integrated preventive oral health care strategy (Sheiham et al., 2015). In addition, the dental profession has remained relatively siloed, with little horizontal integration of services across the broader primary health care team (Frenk, 2006). As a result, oral health interventions are often confined to the dental surgery or primary dental care, with little integration of oral health promotion or preventive oral health interventions from other non-dental health professionals in the primary health care setting, thus rendering efforts to improve population oral health relatively constrained, and limited to those offered by dental professionals (Frenk, 2006, Watt, 2012).

3.2.3 Conceptual frameworks

In 2018, Harnagea's group identified two conceptual frameworks for the integration of oral health with primary health care (Harnagea et al., 2018).

The first framework, which was introduced by HRSA, outlined what were considered to be the five domains of importance for oral health integration with primary health care. Each of these domains contained a core set of competencies in relation to the provision of oral health care by medical professionals who work in the primary care setting. These five domains were (i) oral health risk assessment, (ii) oral health evaluation, (iii) preventive interventions, (iv) patient education and (v) interprofessional collaboration. It was envisaged that medical professionals in the primary care setting would incorporate these oral health core competencies into their existing scope of clinical practice in an effort to promote oral health and prevent oral disease (U.S. Department of Health and Human Services, 2014). The second framework, which was developed in partnership with primary care medical and dental professionals, policy makers and other stakeholders, outlined an oral health delivery framework for the primary care setting. This framework proposed a proactive approach to oral health integration into primary health care by supporting medical professionals to incorporate some oral health practices such as: identifying risk factors for oral disease, screening patients for oral disease, offering patient education, applying fluoride varnish for paediatric patients and the development of a structured referral processes (Hummel et al., 2015). Both of these conceptual frameworks rely on the participation of non-dental health professionals to proactively integrate oral health into their existing scope of practice.

3.2.4 Collaborative practice and interprofessional education

The integration of oral health into primary health care is still a relatively new initiative globally (Barnett et al., 2014, Southerland et al., 2016). In 2016, the American Academy of

Family Physicians supported the integration of oral health into primary health care as outlined by a multidisciplinary collaborative practice approach (American Academy of Family Physicians, 2017). The multidisciplinary collaborative practice approach relies on successful collaborative practice between dental and non-dental health care professionals in the primary care setting (American Academy of Family Physicians, 2017, Harnagea et al., 2018). Collaborative practice and interprofessional education are inextricably linked. Indeed, the goals of collaborative practice should be reflected in the designated approach to interprofessional education (World Health Organisation, 2010). The WHO defines interprofessional education as “when two or more professions learn with, about and from each other to enable effective collaboration and improve health outcomes” (World Health Organisation, 2010). In 2017, Harnagea et al. conducted a scoping review on both the barriers to, and the facilitators of the integration of oral health into primary health care. The barriers to integration were summarised by discipline-orientated education that had not prepared non-dental health professionals for collaborative practice with dental professionals. The facilitators of integration were summarised by oral health interprofessional education and structures that supported sustainable collaborative practice relationships between professionals. Policy, guidelines and the availability of public health care services, had the potential to act as either a barrier to or a facilitator of integration, and this will be discussed later in this chapter in the context of the Irish health care system (Harnagea et al., 2017).

3.2.4.1 Barriers

Typically, discipline-orientated education has rendered non-dental health professionals unprepared to effectively collaborate with members of the dental profession in a meaningful way (U.S. Department of Health and Human Services, 2014, Hummel et al., 2015, Barnett et al., 2014, Southerland et al., 2016). A Swedish study that explored the perceptions of GPs on the oral health of their elderly patients, showed that participants expressed regret that medicine and dentistry were so separated in the educational institutions. Participants reported poor oral health knowledge, and thus felt inadequately prepared to engage with dental professionals, just as they might engage with other specialists in medicine (Andersson et al., 2007). In 2016, a study of Australian GPs showed that participants had low levels of confidence in their capacity to care for patients with oral health problems. In addition to recommending further training in the areas of “practical advice” and “trauma interventions”, participants in this study also expressed the need for a broader education in oral health for GPs (Barnett et al., 2016). A Norwegian study that surveyed 116 public health nurses working throughout Norway, showed that oral health was not considered a priority topic when public health nurses deliver health promotion advice in public paediatric health clinics. It was found that oral health was not a topic on which the study participants had received much, if any training, as only three of the eight public health nursing schools in Norway had oral health content in the curricula (Skeie et al., 2011). Although discipline-orientated education had resulted in low levels of oral health knowledge for groups of non-dental health professionals (Andersson et al., 2007, Barnett et al., 2016, Skeie et al., 2011), authors of the Norwegian study suggested that it would not be enough to simply teach oral health knowledge to public health nurses

and expect to see oral health integrated into their normal scope of clinical practice (Skeie et al., 2011). Indeed, results from a study carried out in the U.S. showed that based on a cross-sectional survey of 169 primary care medical professionals, those surveyed suggested that didactic efforts alone to improve oral health knowledge among non-dental health professionals is only one part of the strategy to successfully integrate oral health into primary health care. This study suggested that the referral environment is more important than the level of oral health knowledge among the individual health care providers (de la Cruz et al., 2004). GPs in both of the aforementioned Swedish and Australian studies also identified that a lack of clear referral pathways to primary dental care acted as a barrier to integrating oral health within their scope of clinical practice (Andersson et al., 2007, Barnett et al., 2016). In one of the conceptual frameworks, the development of a “primary care-dentistry referral network” was recommended. It was envisaged that the development of a network would enable medical professionals to facilitate easy access to dental professionals in primary health care. Developing a “primary care-dentistry referral network” could be as simple as identifying a local dentist or dental practice and establishing a professional relationship (Hummel et al., 2015).

3.2.4.2 Facilitators

The barriers to, and the facilitators of oral health integration into primary health care are inextricably linked, and thus it is unsurprising then that in addition to oral health interprofessional education, the facilitators were summarised as structures that support sustainable collaborative practice relationships between dental and non-dental professionals in the primary health care setting (Harnagea et al., 2017).

In both of the conceptual frameworks, it was recognised that one of the best approaches to support the integration of oral health into primary health care would be to ensure non-dental professionals can easily facilitate engagement with primary dental care services for their patients (Harnagea et al., 2018, U.S. Department of Health and Human Services, 2014, Hummel et al., 2015). Part of this approach would be the development of referral pathways (Hummel et al., 2015). However, Harnagea's group identified that the colocation of dental and medical professionals in the primary health care setting would enable non-dental health professionals to easily facilitate engagement with primary dental care services (Harnagea et al., 2017). Colocation was also identified as a facilitator of integrated care in case studies from Federally Qualified Health Centers (FQHC) in the U.S., which showed that efforts to integrate oral health into primary health care are more likely to achieve sustainable success if medical and dental professionals are colocated (Langelier et al., 2015). FQHC are community-based health care centers that receive funding from the HRSA to provide primary health care services in underserved areas in the U.S. However, among the FQHC that have implemented a tailored form of oral health integration into primary health care, it has been found that the colocation of services does not necessarily ensure successful oral health integration, but rather facilitates integrated health care service delivery. For example, in the state of California, pregnant women who qualify for Medicaid are eligible for free access to basic dental care. Medicaid is a federal and state programme that provides basic health care services for eligible individuals, typically those with low-income and limited resources. In FQHC in California, pregnant women who were referred by their antenatal care provider to a dental professional that was colocated, were more likely to attend than those referred to a dental professional who was not colocated.

(Wides et al., 2014). Wooten et al., showed that medical professionals, including nurses and midwives, were more likely to refer pregnant women to a dental professional if there was colocation of a dental clinic with the antenatal care clinic (Wooten et al., 2011). Other studies have shown that the likelihood of successful oral health integration into primary health care may be increased by “local champions” (Harnagea et al., 2017, Pronych et al., 2010, Stevens et al., 2007). For example, in New York, in the U.S., nurse practitioners were found to play a pivotal role in the coordination of referral to dental services for adolescent mothers enrolled in an adolescent maternity programme (Stevens et al., 2007). Similarly, in New Hampshire, in the U.S., another study showed that oral health coordinators, or patient navigators, were identified as the main facilitators of oral health integration between nursing and dental professionals (Pronych et al., 2010). Case studies from FQHC in the U.S. also identified a potential champion role for administrative staff by encouraging patients to include dental details in their new patient form questionnaires. It was suggested that new patient forms could be used to ask the patient if they had a dentist, and when was their last dental visit, so the topic of oral health and primary dental care attendance would be introduced prior to any consultation with a non-dental health professional (Langelier et al., 2015).

3.2.5 Oral health integration in practice: “Into the Mouths of Babes”

In their conceptual framework, Hummel’s group highlighted that in order to successfully integrate oral health into primary health care, there needs to be improved oral health interprofessional education, strengthened referral systems and efficient communication among health care workers, in addition task-shifting strategies (Hummel et al., 2015).

An example of a successful initiative to integrate oral health with primary health care is the “Into the Mouths of Babes” (IMB) programme in North Carolina, U.S. (Rozier et al., 2003). This programme was developed in response to the prevalence of untreated early childhood caries in young children seen by medical professionals for well-child visits. The IMB programme trains medical professionals to deliver preventive oral health services to children covered by the North Carolina Medicaid programme. As part of the IMB programme, medical professionals are trained to deliver an “oral preventive procedure”. This procedure consists of three parts; (i) an oral health evaluation, (ii) counseling with primary caregivers and (iii) the application of topical fluoride varnish. The “oral preventive procedure” is recommended every three to six months from the eruption of the first tooth (usually from the age of 6-9 months) until the child has reached the age of 42 months. In order for medical professionals to be reimbursed by Medicaid for carrying out this preventive procedure, it is required that they undergo formal training, which consists of a live 1-hour educational session that is approved for continuing medical education (CME) purposes (Rozier et al., 2003).

The IMB was introduced in 2001, and since its introduction, it has shown some promising results over the years (Achembong et al., 2014, Stearns et al., 2012, Kranz et al., 2015). Since 2004, there has been a statewide decline in early childhood caries in North Carolina. Furthermore, the gap in the prevalence of early childhood caries between children from low income and other income families has lessened (Achembong et al., 2014). For children who received four or more “oral preventive procedures” as part of the IMB programme before the age of 36 months, there was a 21% reduction in the hospitalisations for the

treatment of early childhood caries (Stearns et al., 2012). Furthermore, children who received four or more “oral preventive procedures” before the age of 36 months showed a 17.7% reduction in early childhood caries (Kranz et al., 2015).

3.3 Integration of oral health into diabetes care

During Part A of this study, the first major opportunity identified by participants for the integration of oral health into primary health care in Ireland was the potential to integrate oral health into diabetes care.

3.3.1 Diabetes mellitus and periodontal disease

Globally, diabetes mellitus affects 415 million people, and by 2040, this number is expected to rise to 642 million (International Diabetes Federation, 2015). In Ireland, there are approximately 190,000 people living with diabetes, 90% of whom have type 2 diabetes. Indeed, the prevalence of type 2 diabetes among adults in Ireland who are aged 50 years and over is 8.5%, and this figure is expected to increase (International Diabetes Federation, 2015, Tracey et al., 2016). People with diabetes are at an increased risk of periodontal disease because they have raised levels of inflammatory mediators and proinflammatory cytokines in their periodontal tissues (Taylor, 2001). Periodontal disease, which is a bacterially induced, chronic inflammatory disorder that affects the supporting structures of the teeth, including the gingiva (gums) and alveolar bone, is a particularly significant oral complication mellitus of diabetes (Lalla and Papapanou, 2011). It begins as an inflammatory process of the gums, which if left untreated, may progress to involve the supporting structures around the teeth. The resultant periodontal pocket, that forms around

the tooth after loss of supporting structures like periodontal ligaments and alveolar bone, presents the ideal environment for the growth of mostly anaerobic microorganisms, and a nidus from which their toxins can spread systemically, while also causing local tissue destruction and alveolar bone loss. Typical signs and symptoms of periodontal disease include gingival bleeding, gingival erythema, halitosis, tooth mobility, gingival suppuration and resultant tooth loss (Preshaw et al., 2012). The loss of intra-oral hard and soft tissues negatively impacts on masticatory function, thus compromising nutrition as well as affecting both speech and appearance. Tooth loss also increases the functional stress on the remaining dentition, and patients may often require an oral prosthesis, such as a denture, to aid function. Meta-analyses have shown diabetic patients to have an increased susceptibility to the development of periodontal disease (Chavarry et al., 2009, Khader et al., 2006). In addition to increasing the risk of developing periodontal disease, diabetes can also contribute to the periodontal disease process. Patients with poorly controlled diabetes are three times more likely to develop periodontal disease at the severe end of the spectrum when compared with patients who do not have diabetes (Tsai et al., 2002, Mealy and Campo, 2007). Periodontal disease has also been shown to influence diabetic control. Severe active periodontal disease adversely affects blood glucose levels in patients with diabetes. Randomised controlled trials have consistently demonstrated that mechanical periodontal therapy is associated with a reduction in the HbA1c by 0.4 percentage points at three months, a clinical impact equivalent to adding an additional medication to a patient's pharmacological regime (Chapple and Genco, 2013).

3.3.2 Guidelines for the integration of oral health into diabetes care

Consensus guidelines recommend that the bidirectional relationship between diabetes mellitus and periodontal disease should be reflected in the guidelines for routine diabetes care internationally (International Dental Federation, 2009). The Royal Australian College of General Practitioners (RACGP) recommends that all health professionals providing routine diabetes care in the primary care setting should ensure that patients with diabetes have had a comprehensive oral health review by a dentist, and referral should be expedited if oral disease is identified or suspected (Royal Australian College of General Practitioners, 2016). The American Diabetes Association's "Standards of Medical Care in Diabetes" recommends referral of a patient to a dental professional for a comprehensive oral health examination, as part of the initial management of a patient with diabetes (American Diabetes Association, 2016). In Ireland, the National Clinical Programme for Diabetes, which aims to reduce the morbidity and mortality associated with diabetes, supported the development and dissemination of integrated care guidelines for patients with diabetes in Ireland (Harkins et al., 2016). In 2016, a "Practical Guide to Integrated Type 2 Diabetes Care" was released for dissemination among health professionals (Harkins et al., 2016). As this national guideline was designed to support an integrated model of care for patients with type 2 diabetes, there was a list of members of the integrated care team, which included, the patient, the GP, the practice nurse, the diabetologist, the clinical nurse specialist in diabetes, the dietitian, the ophthalmologist and the podiatrist (Harkins et al., 2016). A dental professional was an unfortunate omission from this guideline. It would seem reasonable to suggest that by incorporating oral health as part of routine diabetes care, it may be possible to reduce the morbidity and mortality associated with diabetes-

related oral health complications, and may also, by controlling a patient's periodontal disease, actually improve overall diabetes control (Lalla and Papapanou, 2011, Preshaw et al., 2012).

3.3.2.1 Capacity for the integration of oral health into diabetes care

There are very few studies that have examined knowledge, attitudes and practices in relation to the incorporation of oral health as a part of routine diabetes among non-dental health professionals. In 2008, a Jordan-based study surveyed 164 medical doctors and found that almost three quarters of participants were aware of the link between periodontal disease and diabetes, however only half of the participants reported advising dental attendance as part of routine diabetes care (Al-habashneh et al., 2008). There have been similar studies in the U.S. carried out in 2010 (Yuen et al., 2010) and 2012 (Lopes et al., 2012), which focused on certified diabetes educators (DE). DEs undergo formal training in order to provide comprehensive patient education for diabetes management (Burke et al., 2014). In 2010, of the 130 DEs that were surveyed, over 90% reported that their training did not include an oral health component (Yuen et al., 2010). In 2012, of the 298 DEs that were surveyed, just under 80% reported an absence of any oral health content in their training material (Lopes et al., 2012). In the 2012 study, just under 90% of participants expressed an interest in learning more about oral health (Lopes et al., 2012). Indeed, DEs and other non-dental health care professionals are well positioned to play a role in the promotion of oral health as part of routine diabetes care (Lalla and Papapanou, 2011).

3.3.3 Oral health model of care for patients with diabetes

In 2018, an Australia-based focus group study was carried out to explore the perceptions and practices of DEs on the integration of oral health as part of routine diabetes care.

Participants in this study identified three key areas (education, resources and referral pathways) that would be integral to the design of an oral health model for patients with diabetes (Poudel et al., 2018).

3.3.3.1 Education

Participants suggested that there is a need for focused oral health interprofessional education, in order to develop the capacity among DEs to provide patient education, assess oral health and provide the onward referral of patients to a dentist if the need is identified (Poudel et al., 2018). Although not specific to diabetes, there are a number of studies that have incorporated focused oral health training to support non-dental health professionals to promote oral health (Reigle and Holm, 2016, George et al., 2016). In 2015, in the U.S., a study evaluated the effect of an oral health education programme for nurses on oral health knowledge. There was a pre-programme test of knowledge, followed by a post-programme test of knowledge. The post-programme test results were higher overall, and the effect was statistically significant ($p < 0.001$) (Reigle and Holm, 2016). Similarly, in 2016, George et al. conducted a Midwifery Initiated Oral Health education programme among 50 midwives in Australia. There was a pre- and post-programme test. Results of the post-programme test showed a significant improvement in the oral health knowledge, which was statistically significant ($p < 0.001$) (George et al., 2016). Participants of the focus group study suggested that a combination of online education and classroom-based education would be the best

approach, and that there should be some form of assessment to ensure that the training standard had been reached (Poudel et al., 2018). It was also suggested that this training should be accredited in a way that would earn participants professional development points, thus acting as an incentive for participants who require a certain amount of continuing professional education credits each year (Poudel et al., 2018).

3.3.3.2 Resources

In order to successfully integrate oral health as part of diabetes care, DEs have suggested that an oral health assessment tool should be developed (Poudel et al., 2018). Although not specific to diabetes, there are a number of studies that have shown the effectiveness of an oral health assessment tool for non-dental health professionals (Jeganathan et al., 2010, George et al., 2016). In 2010, a three-item oral health assessment tool was developed for use by dietitians in an ambulatory care setting in Australia. The tool was designed to screen human immunodeficiency virus (HIV)-infected patients at risk of oral diseases to facilitate dental referral. Sensitivity for the screening tool was found to be 84%. Specificity for the screening tool was found to be 55%. Authors concluded that the three-item oral health assessment was a valid and sensitive tool to “trigger” for further oral health assessment and referral to a dental professional (Jeganathan et al., 2010). In 2016, a two-item oral health assessment tool was developed for use by midwives in the antenatal care setting in Australia. The tool was designed to identify pregnant women who were at risk of oral disease and to facilitate dental referral. Sensitivity for the screening tool was found to be 93%. Authors concluded that the two-item screening tool was reliable, valid and easy to

use by midwives, and potentially also by other antenatal care providers, including GPs (George et al., 2016).

3.3.3.3 Referral pathways

Finally, all participants identified a need for clear referral pathways. The absence of clear referral pathways was also highlighted in other studies noted earlier in this review (Andersson et al., 2007, Barnett et al., 2016, Skeie et al., 2011, de la Cruz et al., 2004).

3.4 An oral cancer prevention strategy in primary health care

During Part A of this study, the second major opportunity identified by participants for the integration of oral health into primary health care in Ireland was an oral cancer prevention strategy in the primary care setting.

3.4.1 Oral cancer incidence

Oral cancer is the commonest cancer of the head and neck region (Jemal et al., 2011). In Ireland, there are just over 200 cases of oral cancer diagnosed each year, approximately 90% of which is diagnosed as squamous cell carcinoma (SCC) (Ali et al., 2013). However, incidence rates for oral cancer vary in different countries. For example, in South Central Asia, oral cancer is one of the three most common cancers for men (Petersen, 2003). In Asia, the age standardized incidence rate of oral cancer per 100,000 population ranges from 0.7 in China, to 4.6 in Thailand, to 12.6 in India. The high incidence rates in this part of the world relate directly to risk behaviours such as smoking, the use of smokeless tobacco (e.g. betel nut) and alcohol consumption (Petersen, 2003). In recent years, there has been an increase in the incidence of oral cancer generally throughout Europe, North America and Australia (Chaturvedi et al., 2013, Simard et al., 2014).

3.4.2 Oral cancer detection

In Ireland, between the years 2003-2011, oral cancer was mostly detected as stage IV disease (38%) (Ali et al., 2013). In other countries, oral cancer is also mostly detected at a late stage, which usually correlates with a poor 5- year survival rate, (Warnakulasuriya, 2009, Rogers et al., 2011b). The detection of oral cancer at an earlier stage vastly improves

survival rates. The 5-year survival rates for patients with oral cancer are approximately 80% for oral cancers detected at stage I compared to survival rates of approximately 20% for those detected at stage III/IV (Van der Waal, 2013).

3.4.3 Potentially malignant disorders

Although oral cancer may occur without any pre-cancerous signs, there are a number of potentially malignant disorders (PMDs) that can occur in the oral cavity. PMDs are usually described clinically as white, red/white or red mucosal lesions affecting the oral cavity. These oral lesions, which are histologically characterised by epithelial dysplasia of varying severity, are at risk of progressing to oral cancer in an unpredictable manner (Thompson, 2017). However, not all PMDs progress to oral cancer, and not all oral cancers are preceded by PMDs (Walsh et al., 2013). There are figures from a recent systematic review that suggest a 12% rate of progression to oral cancer over a mean transformation time of 4.3 years (Mehanna et al., 2009).

The goal of detecting oral cancer at the earliest stage not only implies detecting oral cancer, but also implies detecting PMDs at the earliest stage. Although it is difficult to predict whether or not these lesions will progress to an invasive cancer, PMDs should receive specialist management in a specialist-based unit where the appropriate diagnostic tests can be carried out (Warnakulasuriya et al., 2011). Furthermore, if a PMD is diagnosed, there are other considerations concerning field change, which may further complicate their management (Brocklehurst and Speight, 2018). Holmstrup showed that even after the surgical removal of a PMD, the risk of malignant change may remain, as the

surgically removed lesion may only represent a small area of the mucosa that suffered from carcinogen-related field damage

(Holmstrup, 2007, Holmstrup, 2009). The lack of clarity surrounding the natural history of PMDs, and the absence of histological or molecular markers to assist clinicians in their management strategies, means that the long-term follow-up of patients who have had PMDs surgically removed remains controversial (Brocklehurst and Speight, 2018, Speight and Warnakulasuriya, 2017).

3.4.4 Oral cancer prevention strategies

In keeping with the goal of early detection, the WHO has suggested that oral cancer prevention strategies be integral to that of any national cancer control programmes (Petersen, 2008). Prevention strategies for oral cancer can be classified as primary, secondary or tertiary. Primary prevention aims to reduce the incidence of oral cancer disease through oral health promotion. In the absence of effective primary prevention, secondary prevention focuses on detection of disease at the earliest stage in an asymptomatic population, through screening examinations or tests. Finally, tertiary prevention seeks to lower the morbidity from established disease and to improve quality of life (Speight et al., 2006).

3.4.4.1 National cancer strategy in Ireland

In Ireland, the National Cancer Strategy 2017-2026 does not specifically mention oral cancer. However, it does mention the important role that other health professionals can play in alerting patients to early warning signs of a developing cancer. Dentists were

included in a list of health and social care professionals that may have an important role to play in the prevention and early detection of oral cancer. The rationale used in the National Cancer Strategy 2017-2026, was that dentists see many patients on a regular basis for routine dental check-ups, where the oral cavity is fully examined, thus allowing for the opportunity to identify oral cancer at an early stage (Department of Health, 2017a).

3.4.5 Oral cancer screening

Oral cancer screening, which is a secondary prevention strategy, is defined as “the process by which a practitioner evaluates an asymptomatic patient to determine if he or she is likely or unlikely to have a potentially malignant or malignant lesion” (Rethman et al., 2010). Oral cancer screening may occur as “population-based screening” when a population is assessed specifically for the purpose of detecting oral cancer, as “opportunistic screening” when patients who are attending a health care provider for another purpose are examined for signs of oral cancer or PMD, or as “targeted screening” when high risk individuals are selected for screening (Brocklehurst et al., 2013).

Population-based screening programmes for oral cancer have not been recommended because the prevalence of oral cancer is too low, and the natural history is not fully understood (Speight and Warnakulasuriya, 2017). However, opportunistic screening of high-risk individuals, based on their risk factors, has been recommended (Shuman et al., 2010), and this would occur when high-risk patients attending a health professional for another purpose are examined for signs of malignant or PMDs (Brocklehurst et al., 2010a). It is generally agreed that patients should be opportunistically screened as part of routine dental care (Epstein and Huber, 2015), and there is indeed an expectation that opportunistic

screening of the oral mucosa forms part of any routine dental examination (Walsh et al., 2013). A Cochrane review, which looked at the effectiveness of different methods for detecting PMDs and early oral cancers found that the conventional oral examination, which forms part of any routine dental examination, had sensitivities and specificities similar to those reported for breast cancer screening programmes (Walsh et al., 2013). Unfortunately, the most high-risk patients are often more likely to see a GP more regularly than a dentist (Netuveli et al., 2006), and thus may not benefit from opportunistic screening as GPs do not routinely examine the mouth (Wade et al., 2009). GPs are not usually trained to examine the oral cavity, and thus tend not to integrate an oral examination into their scope of clinical practice (Carter and Ogden, 2007, Wade et al., 2009).

3.4.6 Oral cancer presentation

Although GPs tend not to examine the oral cavity by convention, (Wade et al., 2009, Carter and Ogden, 2007), it has been suggested that patients tend to present to their GP rather than to their dentist for symptoms related to oral cancer (Eadie et al., 2009). One study suggested that patients may prefer to speak with a medical professional instead of a dental professional if their concern is in relation to cancer (Zohoori et al., 2012). In a study based in the U.K., researchers examined the case notes of 473 patients, 49% of patients diagnosed with oral cancer first presented to a GP, while 43% first presented to a dentist (Rogers et al., 2007). Similarly, in a recent Australian study of 101 patients who were diagnosed with oral cancer, 52% first presented to a GP, while 43% first presented to a dentist (Kaing et al., 2016). This tendency among patients to first consult a GP first was also noted in studies based in Denmark and Finland (Wildt et al., 1995, Kantola et al.,

2001). In Denmark, a study of 167 patients diagnosed with oral cancer showed that 45% of patients first presented to a GP, while 35% first presented to a dentist (Wildt et al., 1995). In Finland, a study of 75 patients diagnosed with oral cancer showed that 81% of patients first presented to a GP, while 19% of patients first presented to a dentist (Kantola et al., 2001). In the U.K., an interview study where 535 participants were asked what they might do if they had a mouth ulcer that had persisted for greater than three weeks, showed that 61% of participants would consult a GP initially, and 27% would consult a dentist. The remaining 12% of participants in this study would consult a pharmacist (4%), self-prescribe (4%) or do nothing (4%). This interview study showed that there was also poor awareness of oral cancer when compared with other cancers (Rogers et al., 2011a).

3.4.7 Oral cancer awareness

Public awareness of oral cancer is poor when compared to other types of cancer (Rogers et al., 2011b), and late detection of oral cancer is often associated with a poor public awareness of the disease (Scott et al., 2005, Scott et al., 2006). In 2012, a cross-sectional survey study that was carried out in Germany investigated the knowledge of oral cancer among the general population living in a northern state. Results showed that the study population was not-well informed about the signs, symptoms and risk factors for oral cancer. There were also a number of “risk factors” identified for poor knowledge in relation to oral cancer, which included increasing age (over 60 years of age) and those of a lower socioeconomic status (Hertrampf et al., 2012). In 2015, an interview study that was carried out to assess the awareness and knowledge of oral cancer among the general population in Oporto, the second largest city in Portugal, showed a general lack of

awareness of oral cancer, especially regarding the early signs and symptoms of oral cancer, in addition to the main risk factors (Monteiro et al., 2016). In general, the best way of improving patient oral health knowledge is by increasing dental attendance, where oral health education and best practices can be instilled (Taniguchi-Tabata et al., 2017). However, as previously mentioned, the most high-risk oral cancer patients are often more likely to attend a GP more regularly than a dentist (Netuveli et al., 2006). As stated earlier, GPs are usually the first health professional consulted by patients with oral cancer, thus, in addition to being the first point of contact for the majority of oral cancer diagnoses (Rogers et al., 2007, Kaing et al., 2016, Wildt et al., 1995, Kantola et al., 2001, Rogers et al., 2011a), GPs may also have a role to play by raising oral cancer awareness among high-risk patients, and by encouraging dental attendance (Crossman, 2015). It has been shown that personalised advice from a health professional, based on the individual's risk factors, is more effective in promoting the uptake of screening than generalised advice (Edwards et al., 2013). In 2012, a randomised controlled trial of a pilot intervention, which was conducted in a GP practice setting, demonstrated the effectiveness of providing a patient with an information leaflet and/or one-to-one advice in the general practice setting, with the goal of improving patients' awareness of oral cancer and encouraging earlier presentation for potentially malignant oral signs or symptoms in a cohort of high-risk patients. (Scott et al., 2012).

In 2018, Brocklehurst and Speight recommended that more research is needed in order to improve understanding of the diagnostic journey, including the patient pathway to secondary care services from the primary care setting. In addition, the “nature of contact” with health care professionals in the primary care setting needs to be examined in order to understand how the diagnostic journey begins for these patients (Brocklehurst and Speight, 2018).

3.5 Irish context: Study setting

As noted earlier, Harnagea's group found that policies, guidelines and the availability of public health care services have the potential to act as either a barrier to, or a facilitator of oral health integration in primary health care (Harnagea et al., 2017). The final part of the literature review aims to contextualise this study in the Irish health care system.

3.5.1 Health care services in Ireland

Previously, health care services in Ireland were delivered through ten regional health boards. However, in recognition of a need for a more integrated approach to health care service delivery, the 2004 Health Act formally restructured the health service through a centralised body, the HSE. The HSE is responsible for the provision of health care and personal social services for all people resident in Ireland, through the use of public funds. (Higgins, 2013). The provision of health care services in Ireland is largely funded through taxation, with some contributions from social insurance. However, when the economic crisis occurred in 2008, public health care service funding decreased, and there was a subsequent increase in out of pocket payments for health care, including private health insurance (Burke et al., 2018).

3.5.2 Sláintecare

In 2016, a committee on the future of health care in Ireland was established in order to achieve political agreement on the direction of health care service reform for the country. This committee devised a 10-year plan for health care service reform in Ireland called Sláintecare, the report on which was published in 2017. A central component of

Sláintecare is a commitment to achieving a universal, single tier health service, where patients are treated on the basis of health need, rather than an ability to pay (Department of Health, 2017b). Thus far, accessing primary health care services in Ireland has not been straight forward. According to the WHO, Ireland is “unique” among other European Union (EU) countries due to the absence of universal coverage for primary health care services (Evetovits et al., 2012).

3.5.3 Eligibility for public health care services in Ireland

In Ireland, all residents are eligible for public health care services. However, there are variations in cost, coverage and access depending on one’s income, geographic location, in addition to the varying length of time it may take to receive care (Burke et al., 2018). The 1970 Health Act divides all those who are resident in Ireland into two categories. Category 1, which includes residents with a medical card, who have full eligibility to public health care services (36% of the population). Category 2, which includes residents without a medical card, who have limited eligibility for public health care services (64% of the population) (Department of Health, 2017b).

Medical cards are typically allocated based on a means assessment, with those who fall below a certain means threshold becoming eligible. Currently, this threshold is 184 euro for a single person under 66 years living alone and 266.50 euro for a married couple (Keane, 2014). Residents with a medical card are eligible for a range of health care and social services free of charge, which includes free GP care. These residents are also

eligible for free inpatient and outpatient health care in public hospitals, including an exemption from emergency department charges.

Residents without a medical card have to pay the full cost of GP care out of pocket, which is approximately 52 euro on average per visit. Category 2 residents are also subject to emergency department charges of 100 euro, unless they have been referred by a GP, which as previously mentioned, incurs a cost of 52 euro on average. Category 2 residents are also subject to statutory inpatient charges in public hospitals of 80 euro per day, up to a maximum of 800 euro per year. Public outpatient appointments in public hospitals are free of charge (Department of Health, 2017b).

3.5.4 Primary health care services: General Practitioners (GPs)

Although primary health care services may involve a diverse range of health professionals, the main focus of this study involves the integration of oral health into primary health care by GPs, as GPs are typically the leaders of primary care teams in Ireland (O'Dowd et al., 2017). GPs have various areas of responsibility in the primary care setting including, but not limited to, health promotion, first contact advice for patients, disease diagnosis, care of common diseases, coordination of care and referral for specialist assessment (O'Dowd et al., 2017). As noted earlier, category 1 residents, those with a medical card, are eligible for free GP care. In 2005, a GP visit card was introduced which provides free access to GP care for those who fall below a certain income threshold, but who are above the aforementioned medical card eligibility threshold. The introduction of a GP visit card for this portion of the population extended population coverage for free GP care. In 2015, this

coverage was extended further, with the introduction of GP visit cards for all children resident in Ireland under the age of 6 years and for all adults' resident in Ireland who are over the age of 70 years. Currently, 46% of the population have free access to GP care in Ireland, with the remaining 54% of the population required to pay an average of 52 euro per visit (Department of Health, 2017b).

As the demands placed on GPs have increased in recent years with the expansion of population coverage through state-funded schemes, a new GP contract has been under negotiation for some time. Although not yet released, the principles governing this new contract are alleged to focus on incentivising GPs to carry out more health promotion activities, which would include a greater emphasis on the primary and the secondary prevention of disease in the general practice setting, in addition to the provision of increased support in the management of chronic diseases. (O'Dowd et al., 2017, Department of Health, 2017b).

As GPs are often the first point of contact for patients within the health care system, their responsibilities usually include the provision of advice, the prescription of medications, the organisation of treatment and the facilitation of specialist referrals (Goodwin et al., 2011). In Ireland, GPs play an important role in chronic systemic disease prevention (IPSOS MRBI, 2015), and 80% of all patients who visit a GP suffer from a chronic systemic disease (Jennings, 2014). Indeed, it is estimated that approximately one million people in Ireland are affected by at least one of the four main categories of chronic systemic diseases, which include: CVD, cancer, COPD and diabetes (Jennings, 2014). As noted in

the foregoing, oral diseases and chronic systemic diseases share a number of common risk factors, thus recommendations to incorporate oral disease prevention with that of chronic disease prevention are well founded (Sheiham and Watts, 2000). Indeed, the recommendations to develop oral health workforce capacity among other non-dental health professionals in the primary care setting have typically focused on the integration of oral health practices by GPs into their existing scope of clinical care (Petersen, 2008, Hummel et al., 2015, U.S. Department of Health and Human Services, 2014).

3.5.5 Dental health care services

As previously noted, accessing primary health care services in Ireland is not straightforward, and the aforementioned system of eligibility for state-funded public health care services is complicated, thus barriers to care tend to manifest for those who do not have a medical card (Evetovits et al., 2012). This can be especially problematic for dental health care services because there is often little horizontal integration of dental services with other health care services (Sheiham et al., 2015).

3.5.5.1 Adult dental health care services

For adults' resident in Ireland, dental services are accessible privately, or through state-funded schemes such as the Dental Treatment Services Scheme (DTSS), or the Dental Treatment Benefit Scheme (DTBS).

3.5.5.1.1 Dental Treatment Services Scheme (DTSS)

The DTSS, which is run by the HSE, covers the cost of an annual oral examination with a dentist. It also covers the cost of two dental restorations (fillings) and extractions, as required, each calendar year. Eligibility for the DTSS is for adult patients (over the age of 16 years) with a medical card, thus, all category 1 residents are eligible. In addition to the previously listed treatments, patients who have certain medical conditions (e.g. diabetes) may be eligible for additional dental treatments, under the DTSS, subject to prior approval from the principal dental surgeon in that region. For example: if a patient with diabetes needs periodontal treatment to treat active periodontal disease, a dentist may write a letter to the principal dental surgeon seeking payment for the proposed treatment. It is possible to access dental services through the DTSS from dentists nationwide who have entered into a contract with the HSE (Health Service Executive, 2019).

However, during the years of the financial crisis, access to dental health care through the DTSS was significantly curtailed, and this may have changed the type of care patients elected to undertake. Although the number of people seeking dental health care through the DTSS between December 2009 and December 2015 increased by 35%, the number of preventive/restorative procedures carried out decreased (Primary Care Reimbursement Service, 2009, Primary Care Reimbursement Service, 2015). For example, basic periodontal treatments (scale and polish) decreased by 97% and basic dental caries treatments (fillings) fell by 33% between December 2009 and December 2015. By contrast, over the exact same time period, routine dental extractions and surgical dental extractions increased by 14% and 53%, respectively (Primary Care Reimbursement Service, 2009, Primary Care Reimbursement Service, 2015). The average cost to the state

of the DTSS per person in December 2015 was 160 euro, which is 69 million euro divided across 436,000 residents (Primary Care Reimbursement Service, 2015). In 2009, before budget restrictions were enforced, the average cost to the state of DTSS per person was 252 euro, which is 86 million euro divided across 343,067 residents (Primary Care Reimbursement Service, 2009). Indeed, less money was spent in the provision of dental services to a greater number of people in 2015, when compared with figures from 2009, and this may be explained by both the increased number of dental extractions and the decreased number of preventive/restorative treatments carried out over this time period. Tooth loss that results from an extraction can lead to a number of functional challenges for patients, many of which may incur further oral health care costs for the patient. Thus, although in theory extracting a tooth may be an expedient solution to an oral health problem, there are numerous sequelae to consider, which may affect the future form and function of the oral cavity, as well as a person's quality of life (Petersen, 2003).

3.5.5.1.2 Dental Treatment Benefits Scheme (DTBS)

The second state-funded scheme is the DTBS, which is run by the Department of Employment Affairs & Social Protection (DEASP). The DTBS pays the cost of an oral examination, and since October 2017, it also contributes a payment to cover the cost of periodontal treatment once per calendar year. Access to dental health care under the DTBS is available to insured workers, the self-employed and retired people who have the required number of social insurance contributions. It is possible to access dental services through the DTBS from the majority of dentists nationwide who are registered on a panel with the DEASP (Department of Employment and Social Protection, 2019). Between the years

2010 and 2015, the public allocation of funds to the DTBS was reduced from 62 million euro to 10 million euro per year (Department of Health, 2017b).

3.5.5.2 Child dental health care services

In Ireland, dental caries and dental trauma, are the two most common reasons that require children to access dental health care services in Ireland (Whelton et al., 2002). For example, 40% of children in their first year of primary school may have experienced dental caries in their primary teeth, with one in twenty having had at least one primary tooth extracted because of dental caries (Whelton et al., 2002). By the time children leave primary school, over half of them have experienced dental caries in their permanent teeth, and by age 15 years, this will have increased to 75% of children (Whelton et al., 2002). Dental trauma is an impact injury to the teeth and/or other hard or soft tissues within and around the oral cavity. Globally, the prevalence of traumatic injuries to the teeth, in either dentition (primary or permanent), is approximately 20% (Lam, 2016). In Ireland, approximately one in 11 children will have suffered trauma to one or more of their permanent teeth before they reach the age of 15 years (Whelton et al., 2002).

3.5.5.2.1 HSE dental health care services

In Ireland, all children up to their 16th birthday are entitled to dental health care through the state-funded HSE dental health care services. However, pre-school children, typically those under 5 years of age, receive what amounts to an “advisory service” with emergency dental health care available if required (Guideline Development Group, 2012). Each year, the school dental programme targets schoolchildren in certain classes, usually first and

sixth classes. These children receive preventive oral health advice and “screening” for oral disease (Guideline Development Group, 2012). Unfortunately, there is no shared understanding of the term “screening” within the HSE dental services. Indeed, these screening examinations essentially identify children with established, and often advanced oral disease, which by definition, is contrary to the principles of screening for the purpose of detecting disease at an early stage (Guideline Development Group, 2012). The target class approach was considered to be the most equitable way of making children “dentally fit” before they pass from the school dental programme (Department of Health, 1988). The aim of the state-funded HSE dental health care services for children in Ireland is to reduce the level of oral disease and provide treatment as required (Department of Health, 1994). As the school dental programme is the only state-funded dental service for schoolchildren, the uptake is generally quite high with reports of 80% (Widstrom and Eaton, 2004) to 91% (Parnell et al., 2003) of the schoolchildren in the target classes availing of the service. In fact, a survey of 3,310 children in the North East of Ireland, all of whom were aged 5-years old, which is an age group typically not targeted by the school dental programme, reported that the majority of children (69%) had never attended a dentist (Parnell et al., 2002). In the U.K., a similar study reported that of children aged 5-years old, only 6% had never attended a dentist (Morris et al., 2006). These figures suggest that the majority of parents in Ireland may indeed rely on state-funded dental health care services to meet their child’s oral health needs. Unfortunately, the delivery of the school dental programme is not standardised throughout the length and breadth of the country. For example, some children may be offered an oral health assessment at school entry (typically when aged 5 years old), whilst others may not be offered until first or second class (typically aged 7 or 8 years old)

(Guideline Development Group, 2012). Finally, unlike the state-funded dental health care services for adults, schoolchildren are not guaranteed of having their oral health assessment conducted in a dental clinic setting, but may instead be assessed in the school setting, but again, this is not standardised and is very much dependent on local factors (Guideline Development Group, 2012).

3.5.6 Universal package of dental health care

Dental health care for both adults and children, especially preventive dental health care, is a crucial component of overall general health (Petersen, 2003). Currently, given the varying eligibility for different levels of state-funded dental health care services in Ireland for adults, out of pocket payments are required by the majority of the population in order to access dental health care (Department of Health, 2017b). Furthermore, data suggest that the majority of parents rely on state-funded child dental health care services (Guideline Development Group, 2012). Thus, if for whatever reason these state-funded services are inaccessible, out of pocket payments may be required to meet the oral health needs of children. As a consequence, a goal listed in the Sláintecare report is the introduction of a “universal package of dental health care” for all residents in Ireland. It remains unclear how this would be implemented, although the report suggests that dental health care services will be available to all those ordinarily resident in Ireland through the new Carta Sláinte (health card) system. Sláintecare has proposed the introduction of a Carta Sláinte to all those who are resident in Ireland within 5 years of commencement of the 10-year reform plan, which will ensure access to all publicly funded health and social services, including dental health care services (Department of Health, 2017b).

3.5.7 Health policy

Irrespective of the goals of Sláintecare, or indeed how it will be implemented throughout the 10-year period, it will take place alongside Ireland's national framework for health, "Healthy Ireland" (HI). HI is the national framework for action to improve the health and wellbeing of the people of Ireland. The main focus of HI is on health promotion, the prevention of disease and maintaining health among the population of Ireland for longer. Unfortunately, HI specifically omits mention of oral health (Department of Health, 2013). This is regrettable as Sheiham's group recommended that at the policy level, the main focus should be on incorporating oral health into the health in all policy agenda. Sheiham's group believed that acknowledged that adopting an oral health in all policies approach would require a significant reorientation of the medical care infrastructure. However, it was felt that by improving collaborative practice, or "building bridges" between dental and non-dental health professionals, that oral health could be integrated with the health promotion aspects of health in all policies (Sheiham et al., 2015).

Although HI omitted oral health, the Department of Health worked on a new national oral health policy under the leadership of the Chief Dental Officer between 2014 and 2017. The new national oral health policy, *Smile agus Sláinte*, which was released in April 2019.

3.5.7.1 Smile agus Sláinte

Smile agus Sláinte has two key goals. Firstly, "to provide the supports to enable every individual to achieve their personal best oral health". Secondly, "to reduce oral health inequalities across the population by enabling vulnerable groups to access oral health care services". *Smile agus Sláinte* is aligned with the same vision as Sláintecare, to "transform

primary health care services”, with an emphasis on three ideals, “primary care, integrated oral and general health, and prevention”. These ideals focus on ensuring local access to the appropriate oral health care, and the continuity of that care within the primary care setting (Department of Health, 2019). In order to achieve the goals defined by Smile agus Sláinte, the policy features three strategic strands; oral health promotion programmes, oral health care service provision and an evaluation of population oral health.

The first strategic strand, oral health promotion programmes, “necessitates” dental and non-dental health professionals “to work together”.

The second strategic strand, oral health care service provision, stipulates that the local dentist will be the “first point of contact for all oral health care services”. It also suggests that if “advanced oral health care services” are required, then they should be provided in “advanced oral health care centres” such as hospitals, dental hospitals and “other appropriate settings”. The third strategic strand, an evaluation of population oral health, outlines that in order to assess both the oral health care needs of the population and the impact of Smile agus Sláinte, an oral health clinical surveillance programme should be established (Department of Health, 2019). Over the next eight years, the policy identified forty-one actions that need to be addressed to meet the designated goals. Several actions are listed below as they relate specifically to the work of this study.

Action 8: To develop health promotion programmes focused on improving oral health.

Action 9: To support oral health care professionals to work with other health care professionals to improve oral health and general health.

Action 13: To develop routine oral health care services for eligible adults.

Action 18: To develop clinical care pathways that originate in primary care to access oral health care in advanced oral health care centres.

Action 24: To evaluate graduate dental education and put postgraduate mentoring and supervisory networks in place for dentists to support their professional career.

Action 27: To undertake an undergraduate review of dental education placing primary care at its centre.

There are thirty-five other actions listed in the policy, but the six actions noted above are pertinent to the overall aim of this study. As such, one of the areas that is integral to the successful completion of these actions, and indeed several other actions listed in *Smile agus Sláinte*, is the importance of interprofessional education (Department of Health, 2019)

The acquisition of knowledge and skills through interprofessional education is an important part of building capacity among health professionals and preparing them to integrate oral health within their existing scope of clinical practice and to engage in collaborative practice within the broader health care team (World Health Organisation, 2010). Medical education in Ireland can be divided into medical school education, be that as an undergraduate or postgraduate student, and postgraduate medical education for medical doctors.

3.5.7.1.1 Medical school education in Ireland

In Ireland, there are six medical schools, which include University College Cork (UCC); University College Dublin (UCD); the National University of Ireland, Galway (NUIG); University College Dublin (UCD); the University of Dublin, Trinity College (TCD); the

Royal College of Surgeons, Ireland, (RCSI) and the University of Limerick (UL) (Medical Council, 2007). In Ireland, medical degree programmes are typically organised into two phases. The first phase, a pre-clinical phase, is usually spent predominantly on campus and comprises taught courses on the basic sciences such as physiology, biochemistry and anatomy. The second phase, a clinical phase, is usually spent predominantly in the hospital setting and comprises rotations or placements with different hospital teams (Medical Council, 2007). The medical degree programme may present an opportune time for interprofessional education and for the inclusion of oral health content, because by the time medical students have graduated and are engaged in active patient care, it may be more challenging to introduce new material (Douglas et al. 2007). Unfortunately, no published data exists on the oral health content of the aforementioned medical school curricula in Ireland.

In 2005, Mouradian's group identified five major oral health topics that should be addressed in medical degree programmes. These topics were (i) the prevention of oral disease, (ii) dental caries, (iii) periodontal disease, (iv) oral cancer and (v) oral-systemic health interactions (Mouradian et al., 2005). By incorporating education on the link between oral health and general systemic health in the medical degree programme, future collaboration among medical and dental professionals in practice may be encouraged and promoted, thereby improving patient outcomes and population health (Pacquette, 2015).

In 2014, the Harvard School of Dental Medicine (HSDM) and the Harvard Medical School (HMS) introduced an oral health curriculum/module for medical students in their second pre-clinical year of training. The curriculum had five learning objectives;

1. Dental Caries: an introduction to causes, signs and prevention
2. Periodontal Disease: an introduction to causes, signs and prevention
3. Understand the normal head and neck, intraoral and extraoral anatomy.
4. Learn to perform a head and neck, intraoral, and extraoral examination.
5. Understand the link between oral health and general systemic health.

The students who took the module completed a survey before and after, the results of which showed an increase in student awareness and understanding of oral health after completion of the module. It was also noted that students expressed an interest in understanding the link between oral health and general systemic health (Park et al., 2017).

3.5.7.1.2 Postgraduate education for medical doctors in Ireland

This study focuses on the integration of oral health into primary health care, which means that an understanding of the current postgraduate education for medical doctors pursuing a career in general practice is important. In Ireland, the Irish College of General Practitioners (ICGP) is the professional body for education, training, research and standards in general practice. GP training in Ireland is usually for a period of four years, with the final two years spent exclusively in the primary health care setting. The aim of general practice training is to produce practitioners who can provide care to the entire community. In Ireland, there are a total of 14 separate GP training programmes throughout the country (Irish College of General Practitioners, 2019).

This 2018 GP training curriculum outlines the educational objectives for the specialty training in general practice and defines the areas of competence required to practice as a GP in Ireland (Irish College of General Practitioners, 2018). The curriculum is based on the original framework for the specialty of general practice that was developed by WONCA Europe (World Organisation of National Colleges and Academies of General Practice/Family Medicine), which was formally launched in 2002, with further revisions in 2005 and again in 2011. The WONCA framework describes the fundamental characteristics of general practice and the various competencies required, which formed the basis for general practice curriculum development in Ireland. Each of the 14 training programmes have adapted their own timetable to be in line with the 2018 curriculum, which is an updated version of the initial 2006 GP curriculum (Irish College of General Practitioners, 2018). Unfortunately, no published data exists on the oral health content of the aforementioned GP training schemes in Ireland. However, in the existing curriculum, there are a number of educational objectives that pertain to oral health, such as; knowing the epidemiology of head and neck cancers, including the various risk factors and clinical presentations; understanding the oral symptomatology of systemic diseases (e.g. glossitis caused by iron-deficiency anaemia) and knowing what oral health services are available in the community (e.g. dentists), in addition to facilitating appropriate referrals to oral medicine and oral and maxillofacial surgery departments. The oral health content in the curriculum is not limited to the aforementioned examples, and additional educational objectives included understanding the normal anatomy; recognising different types of oral mucosal disease and distinguishing the various different types of orofacial pain and the

potential causes (Irish College of General Practitioners, 2018). Unfortunately, as noted in the foregoing, each of the 14 training programmes have adapted their own timetable to be in line with the 2006 curriculum on general practice training in Ireland, so there is no guarantee of oral health education for GPs in training just because it is listed in the national curriculum (Irish College of General Practitioners, 2019).

In order to successfully integrate oral health with general health, the WHO has recommended the development of oral health workforce capacity among medical professionals, especially those who work in the primary care setting (Petersen, 2008). Indeed, Sheiham's group also suggested that in order to change the current landscape, educational institutions that train non-dental health professionals must acknowledge that oral health is an integral component of general health, and adapt their curricula to be in line with the WHO recommendations on transforming and scaling up health professionals' education and training (World Health Organisation, 2013).

Unfortunately, current figures suggest that it might be challenging to incorporate additional responsibilities within the existing scope of clinical practice for GPs in Ireland. In 2015, the allocation of GPs in Ireland was 76 per 100,000 population, which is quite low when compared with other countries like Canada and Australia, where the number of GPs is usually in excess of 100 per 100,000 (Organisation for Economic Cooperation and Development, 2017). Furthermore, a report issued in 2015 noted that almost 17% of GPs in Ireland are over 60 years of age and are therefore close to the retirement age (Collins and O'Riordan, 2015). Indeed, there is also a significant number of newly qualified GPs who

work abroad (16.5%) or who plan to emigrate abroad in the near future (24.5%) (Mansfield et al., 2015). Indeed, in recognition of an existing shortage of GPs in Ireland, it also appears that this trend is likely to continue into the near future, thus raising questions on the appropriateness of introducing further responsibilities into the scope of clinical practice for GPs in Ireland (Collins and O’Riordan, 2015, Mansfield et al., 2015).

In the U.S., the Centre for Integration of Primary Care and Oral Health (CIPCOH), which is a joint endeavour of the Harvard Medical School (HMS), Harvard School of Dental Medicine (HSDM) and the HMS Centre for Primary Care, serves as a national resource to consolidate the evidence base for systems-level oral health integration into primary care training. This centre was established in 2016 and is directly related to the HRSA-framework noted earlier (U.S. Department of Health and Human Services, 2014). In 2018, as part of this centre, a study collected data on the oral health content in the curricula of family medicine residency programmes, which are three years in duration (family medicine residency programmes would be the equivalent to GP training programmes in Ireland). The study contacts the programme directors of 520 programmes across the US. Of the 195 respondents that completed the online survey, just under 20% of programmes report 0 hours of oral health training, with approximately half of the programmes reporting 1-3 hours of oral health training, with the remaining 30% reporting 4 or more hours on the topic of oral health. The survey assessed which were the most prevalent topics covered under the following headings; risk assessment, oral health evaluation, preventive interventions, communication and education and interprofessional collaborative practice. The most prevalent topics covered were: medical conditions that impact oral health (76%)

(risk assessment), fluoride risks, benefits and promotion (75%) (preventive interventions), paediatric/infant oral screening examination (71%) (oral health evaluation), oral disease prevention/anticipatory advice (68%) (communication), oral cancer (67%) (risk assessment) and emergency oral health issues (66%) (risk assessment) (Silk et al., 2018).

3.6 Summary

The literature review demonstrates that the integration of oral health into primary health care is a complex task. There are a number of general barriers and facilitators to the successful integration of oral health into primary health care, many of which will vary depending on the specific health system (Harnagea et al., 2017).

In Ireland, currently, there is a complex system of eligibility for state-funded dental health care services. This may serve as a barrier to oral health service integration. In addition, throughout much of the preceding decade, significant cuts have been made to the budget for state-funded dental health care services (Primary Care Reimbursement Service, 2009, Primary Care Reimbursement Service, 2015).

Globally, in an effort to expand access to dental health care, the WHO also recommended the development of oral health workforce capacity among medical professionals, especially those who work in the primary care setting (Petersen, 2008). This approach would be applicable in an Irish context too, and participants in Part A of this study identified two areas in particular where greater oral health capacity could be built among medical professionals in primary health care; (i) integrating oral health into diabetes care and (ii) an oral cancer prevention strategy for primary health care.

However, recent figures suggest that it might be challenging to build oral health workforce capacity within the existing scope of clinical practice for GPs in Ireland. A report issued in 2015 noted that almost 17% of GPs in Ireland are over 60 years of age and are therefore close to the retirement age (Collins and O’Riordan, 2015). Furthermore, there are a significant number of newly qualified GPs who work abroad (16.5%) or who plan to emigrate abroad in the near future (24.5%) (Mansfield et al., 2015). In addition to this, increased demands have been placed on GPs over the past several years with the expansion of population coverage through state-funded schemes, thus raising questions on the appropriateness of introducing further responsibilities to the scope of clinical practice for GPs in Ireland.

It is worth noting that health care services in Ireland, especially those in the primary care setting, are due for major reform as part of Sláintecare’s commitment to achieving a universal, single tier health service by 2027, where patients will be treated on the basis of health need, rather than an ability to pay (Department of Health, 2017b). Part of this reform will include the introduction of a “universal package of dental health care” for all residents in Ireland (Department of Health, 2017b). In addition, a new GP contract is also under negotiation, which is alleged to focus on incentivising GPs to carry out more health promotion activities, which is set to include a greater emphasis on the primary and secondary prevention of disease in the general practice setting, in addition to the provision of increased support in the management of chronic diseases (O’Dowd et al., 2017, Department of Health, 2017b).

A new national oral health policy, Smile agus Sláinte, was published in April 2019. The goals set out in this policy will be achieved through the designated 41 actions to be undertaken over the eight-year lifespan of the policy. This PhD aims to propose recommendations to augment the potential impact of the new national oral health policy, and to contribute to achieving its stated goals.

CHAPTER 4

Materials and Methods

4.1 Introduction

This chapter presents the materials and methods for this study. The materials and methods incorporate both qualitative and quantitative research methodologies. Qualitative research is generally a form of exploratory research. It is typically used to gain a deeper understanding of topics. The analysis of qualitative data can be useful to inform the design of quantitative research (Bowers et al., 2013, Creswell et al., 2011). Quantitative research is a form of research that generates numerical data or data that can be transformed into statistics. By adopting qualitative and quantitative methodologies within the same study, it is possible to address specific research objectives within a broader research aim (Bowers et al., 2013, Creswell et al., 2011).

4.1.1 Mixed methods

“Mixed methods research” is an approach that essentially involves the collection and analysis of both qualitative and quantitative data within the same study (Bowers et al., 2013, Creswell et al., 2011). More often, health care researchers are using mixed methodologies to address the complex, layered and multifactorial research questions that arise in health care research (Greene et al., 1989). A mixed methods approach is ideally chosen to answer a research question that is neither qualitative nor quantitative in and of itself (Ivankova, 2006, Wisdom & Creswell, 2013). By adopting a mixed methods approach, researchers are able to gain a better understanding of the connections between qualitative and quantitative data sets (Wisdom & Creswell, 2013). Mixed methods research consists of different types of research designs, which include explanatory sequential, exploratory sequential, parallel and nested designs (Creswell et al., 2011) (Table 4.1).

Table 4.1.1: Types of mixed methods design (Shorten and Smith, 2017)

Mixed Methods Design	Research Approach
Exploratory Sequential	Quantitative data are collected and analysed first, then qualitative data are collected and analysed to help explain quantitative data QUANTITATIVE → QUALITATIVE
Explanatory Sequential	Qualitative data are collected and analysed first, then quantitative data are collected and used to test findings QUALITATIVE → QUANTITATIVE
Parallel	Qualitative and quantitative data collected and analysed concurrently QUALITATIVE + QUANTITATIVE
Nested	Can be either qualitative or quantitative in its main design, with the alternative design embedded within the study to answer a complementary question QUALITATIVE + quantitative or QUANTITATIVE + qualitative

In this study, an explanatory sequential design was used, which consisted of a qualitative study to begin with, the results of which were then used to inform the design of the subsequent quantitative studies as part of an overall study.

4.1.2 Overall structure of study

This thesis is structured in three main parts, each of which is a stand-alone study, but when combined together form a cohesive body of research (Table 4.1.2).

Table 4.1.2 Overall structure of study

Part A: Qualitative semi-structured interview study	To explore the views of dentists on incorporating oral health collaborative practice into primary medical care in Ireland.
Part B: Quantitative cross-sectional survey study	To determine the confidence and willingness of GPs to incorporate oral health as part of routine diabetes care, by examining their current oral health knowledge, interest and practices, in addition to their experience of an attitudes towards oral health training.
Part C: Quantitative retrospective analysis study	To review the clinical notes relating to oral biopsies that were diagnosed as malignant or potentially malignant oral lesions, in order to determine the way in which these oral lesions are first detected in the primary care setting in Ireland.

4.1.3 Training

For Part A, formal qualitative research methodology training was undertaken by the candidate (JA) at the Nuffield Department of Primary Care Health Sciences in the University of Oxford. “Introduction to Qualitative Research Methods” was an intensive, one-week long course. This training course provided practical experience of different qualitative methodologies, including in-depth semi-structured interviewing. In addition, this course provided training in the analysis of qualitative data using a thematic approach.

For Part B, formal quantitative methodology training was undertaken with the Social Research Association in London, United Kingdom. “Questionnaire design and testing” was an intensive one-day course. This training course provided training on the general principles of designing questions, overall questionnaire design and piloting, exercises in questionnaire critique and approaches to quantitative data collection and analysis.

4.1.4 Ethical approval

For Part A, ethical approval was granted from the School of Dental Science Research Ethics Committee at Trinity College Dublin. For Part B, ethical approval was granted from the School of Medicine Research Ethics Committee at Trinity College Dublin. For Part C, a waiver of ethical approval was granted by the St. James’s Hospital Research Ethics Committee.

4.1.5 Data protection and confidentiality

All data were collected and stored in compliance with the Data Protection Act (2003 amendment). Soft copy data was stored on an encrypted laptop computer. The computer

was password protected, as was each file containing data. Hard copies of data were stored in a locked cabinet. All data will be stored securely for 5 years, after which time it will be destroyed. For Part A, all data transcripts were pseudonymised to remove identifiers for individual participants. For Part B, the questionnaire was completely anonymous. For Part C, all data were collected anonymously, and only the hospital number was used to locate the patient record.

4.2 Materials and methods: Part A

4.2.1 Background

In 2007, a World Health Assembly called for oral health to be integrated into chronic systemic disease prevention strategies, because of the many shared common risk factors between oral and systemic disease (Petersen, 2008). Oral disease is largely preventable, and despite its prevalence and many shared common risk factors, it has remained separated from routine medical care, in both practice and education (Lancet, 2009). It is recognised that in order to address the burden of oral disease, the dental profession must engage in collaborative practice with medical professionals (Sheiham et al., 2015) which is an effective way of incorporating the skill set of each member of the health care team to provide the highest quality of patient care (World Health Organisation, 2010)

Collaborative practice between medical and dental professionals is generally lacking across health systems (Barnett et al., 2014, Southerland et al., 2016), and also, there is a need to build oral health capacity among medical professionals (World Health Organisation, 2008). The acquisition of knowledge and skills through interprofessional education is an important part of building capacity among health workers and preparing them for

collaborative practice within the broader health care team (World Health Organisation, 2010). In 2014, the U.S. Health Resources and Services Administration developed a “starter set” of oral health core skills for primary care medical professionals to support and enhance interprofessional collaborative practice. These “core skills” focused on five domains of importance; (i) oral health risk assessment, (ii) oral health evaluation, (iii) oral health preventive interventions, (iv) oral health patient education and (v) oral health interprofessional collaboration (U.S. Department of Health and Human Services, 2014). The aim of Part A was to explore the views of dentists on incorporating oral health collaborative practice into primary medical care in Ireland with the objective of determining their beliefs, attitudes and opinions through semi-structured interviews.

4.2.2 Design

This was a qualitative study, which involved semi-structured interviews with dentists to explore their views on incorporating oral health collaborative practice into primary medical care in Ireland. This study was conducted in the Dublin Dental University Hospital (DDUH).

4.2.3 Sampling

Purposive sampling was used to recruit participants from dentists working in the DDUH, which is the largest university dental hospital in Ireland. This sample selection method was chosen because both as a national centre for specialty referral, and as a busy dental accident and emergency centre, the clinical and teaching staff are exposed to a variety of dental and medical professional referrals and are thus well positioned to offer an insight into the relationship between oral health and systemic health. Participants had to be dentists who were currently working in, or had worked in the Dublin Dental University Hospital, for a minimum of 6 months full-time equivalent within the previous 5 years. A gatekeeper was identified from the hospital administrative staff. The gatekeeper was asked to contact a list of eligible participants (N = 42) via a standardised email, which contained information about the study. The recruitment email was an invitation to participate in the study, and a consent form (Appendix A) and a patient information leaflet (PIL) (Appendix B) were attached. The gatekeeper put each interested participant in touch with the lead researcher who was available to answer further questions about the study and arrange a time and a date for the interview. The gatekeeper sent out one reminder email to all those who had not responded to the initial recruitment email after 10 days. The recruitment period was closed after 3 weeks. At this point, the lead researcher arranged interview dates and times to suit all those who had agreed to participate. This part of the study was quite challenging as most of the interviews had to be arranged in the evenings and over the weekends as all those who had agreed to participate were in full-time employment in the Dublin region. The lead researcher was also in full-time employment in another part of Ireland. It was for this reason that the lead researcher chose to do batches of three

interviews at a time (between Friday evening and Sunday afternoon). This meant that the lead researcher took a half day on Friday, traveled to Dublin for an interview on Friday evening, and then conducted one interview on both Saturday and Sunday afternoons.

4.2.4 Data collection

The interviews took place over a three-month period between April 2016 and June 2016. All interviews, which were face to face, took place in a seminar room in the DDUH. This served as a neutral venue for both the interviewer and the participant. Informed consent was obtained prior to the commencement of each interview. Some participants had brought a signed copy of the consent form to the interview, which had been out in the initial recruitment email. For those that had not brought a consent form, the lead researcher asked them to sign a consent form before the interview commenced. An interview guide was developed using the published literature (Appendix C). The interview guide, which focused on the five domains of “core skills” outlined earlier (U.S. Department of Health and Human Services, 2014), was piloted on one dentist, the data from which were excluded from this study. The interview guide was used for all interviews, with various prompts used to supplement the process throughout, which allowed the interviews to be more flexible and enabled the researcher to explore themes in greater detail (Barriball and While, 1994). The average interview duration was 47 minutes. Each interview was recorded on two separate devices, one that was used for the purpose of transcription, and the other that was used as a back-up. As noted above, for logistical reasons, the interviews were conducted in phases. This allowed for interim analysis; three participants in phases 1 to 4 and two participants in phase 5. The interim analysis was beneficial to assess the

quality of the sound, the ability to transcribe from the recorded dialogue and the amount of time the lead researcher spoke during the interview. There was no change to the research approach in any of the subsequent phases. However, monitoring the amount of time the interviewer spoke during the interviews was one of the key areas noted during the qualitative research methodology training in the U.K., and the lead researcher made a more concerted effort to reduce the amount of interviewer dialogue during the interview. There was no relationship between the length of interview and the professional seniority of the interviewee.

4.2.5 Data analysis

Thematic data analysis was performed, as described by Braun and Clarke (2006) (Braun and Clarke, 2006). Thematic analysis involves “identifying, analysing and reporting patterns (themes) within the data. It minimally organises and describes your data set in (rich) detail. However, it also often goes further than this, and interprets various aspects of research topics (Braun and Clarke, 2006). Data analyses were carried out using a qualitative data analysis software package (MAXQDA; a product of Verbi GmbH). The following phases of analysis were carried out (Braun and Clarke, 2006):

1. Familiarisation with the data: This involved immersion in the data, actively re-reading the transcripts in order to search for meaning and patterns.
2. Generation of initial codes This involved the identification of any parts of the data that appeared interesting and tagging them as codes.
3. Identification of key themes: This involved sorting codes into

broader themes. As this qualitative research was via a semi-structured interview format, it was apparent that many of the themes were closely linked to the thematic framework used in the interview guide. However, data were coded without attempting to fit into a pre-existing framework, in order to capture additional emerging themes.

4. Review of identified themes: This involved refinement of themes at the level of the coded data extracts, and at a broader level, to ensure that they appear to form a coherent pattern, and fully represent the data.

5. Definition of themes: This involved a detailed narrative of what each theme represented and division into subthemes.

6. Production of a descriptive and analytical report: This presented the thematic patterns, relevant overlaps and facilitated attainment of the specific objective (Braun and Clarke, 2006).

In order to ensure rigour and consistency in the data analysis, multiple coding was introduced. A second researcher with qualitative research training and experience separately coded 4 of the interview transcripts, which facilitated the comparison of codes and the discussion of emerging themes. The need for transcript validation was considered, and because of logistical challenges, it was decided that participants would not be offered their transcripts to validate after the interview had been transcribed. Transcript validation occurs when the interviewer invites the interviewees to examine their transcript to identify and/or correct any errors or omissions, and in some cases, to clarify or provide additional information and insights directly related to the interview response (Hagens et al., 2009). Instead, participants were told at the outset that they would not be given a transcript of their interview to validate and would be asked to elaborate on points made during the

interview in order to clarify their intended meaning, if there was significant ambiguity. However, given the semi-structured nature of the interviews, most points made by participants were relatively clear, so there was generally little need to ask for clarification during the interviews. The process of reflexivity was considered throughout the study. This meant that the researcher aimed to avoid systematic bias in the collection, interpretation and reporting of the data (Ritchie and Lewis, 2003). The interviewer (JA) is a dual-qualified clinician in both dentistry and medicine, which helped to reduce reflexive bias.

4.3 Materials and methods: Part B

4.3.1 Background

In Part A of this study, the integration of oral health into diabetes care in Ireland, was one of the opportunities identified, whereby the quality of patient care could be improved through collaborative practice between GPs and dentists. Meta-analyses have shown that patients with diabetes have an increased susceptibility to the development of periodontal (gum) disease (Chavarry et al., 2009, Khader et al., 2006). Severe active periodontal disease can adversely affect blood glucose levels in patients with diabetes, and randomized controlled trials have demonstrated that treating periodontal disease is associated with a reduction in the HbA1c by 0.4 percentage points at three months, a clinical impact equivalent to adding an additional medication to a patient's pharmacological regime (Chapple and Genco, 2013). In Part A of this study, the dentists interviewed suggested that GPs may not be interested in oral health, and that this may be due to a paucity of oral health education and training. The overall aim of this study was to determine the confidence and willingness of GPs to incorporate oral health as part of routine diabetes

care, with the objective of examining current oral health knowledge, interest and practices, in addition to their experience of, and attitudes towards, oral health training through the use of an online questionnaire. The results from Part A, some of which were noted above, were used to inform the design of the online questionnaire.

4.3.2 Design

This was a cross-sectional survey study designed to assess the confidence and willingness of GPs to incorporate oral health as part of routine diabetes care, by examining their current oral health knowledge, interest and practices, in addition to their experience of attitudes towards oral health training using a 24-item online questionnaire (Appendix D).

4.3.3 Sampling

Both purposive and convenience sampling was used in this study. The study plan included one recruitment phase, which entailed the recruitment of GPs who had completed an online distance learning course entitled “Diabetes in Primary Care” through two academic centres in Ireland; University College Cork (UCC) and the National University of Ireland Galway (NUIG). Both centres committed to participating in the recruitment process, and a designated person (gatekeeper) at both recruitment sites was identified for the recruitment process. The gatekeeper process was set up in both centres in the same way. The lead researcher made contact with the Department Chief, who then facilitated contact with the coordinator of the online “Diabetes in Primary Care” programme. In UCC, this person was a nurse. She was responsible for sending out all of the various emails to the course participants and therefore liaised quite closely with all those currently enrolled, and alumni

from prior years. In NUIG, the gatekeeper was a GP, who fulfilled essentially the same role as that described above for the UCC gatekeeper. The recruitment process entailed sending an initial “recruitment email” to course participants (past and present) by the gatekeeper, which included the questionnaire link, information about the study, why it was being carried out and what participation in the study would entail. However, at the beginning of the recruitment process (November 2017), the designated person at NUIG, who had previously agreed to send the “recruitment email” as part of the centre’s commitment to the recruitment process, did not confirm receipt of the “recruitment email”. Subsequent efforts were made to contact the gatekeeper at NUIG, however, all attempts were unsuccessful. At this point, a second recruitment phase was added to the study plan (January 2018). The first recruitment phase used purposive sampling and focused on the aforementioned UCC cohort. This cohort of 132 GPs had completed additional education in the provision of diabetes care. Of this cohort, 58 GPs were recruited from a potential 132 GPs. The second recruitment phase used convenience sampling and focused on GPs and GP registrars from a Leinster-based GP training program, of which, 34 participants were recruited from 35 GPs and 66 GP registrars. This cohort was chosen partly for logistical reasons as previous efforts to engage remote sites had failed. Similarly, to the first recruitment phase, the gatekeeper (a GP affiliated with a University academic department of primary care, and a trainer for a GP-training programme in Ireland, sent the recruitment email to the mailing list of potential participants. For both recruitment phases, in order to maximise the response rate, two reminder emails were sent by the gatekeeper after the first and second weeks, with recruitment phase closing at the end of the third week.

4.3.4 Data collection

Data were collected through use of a questionnaire, which was circulated via an online platform, Survey Monkey ©. Participants were advised that by completing the questionnaire, their consent to participating in the study was implied. The questionnaire was designed by the lead researcher. The participant questionnaire, which consisted of 24 questions, focused on the participant's oral health knowledge, interest and related practices, in addition to their experience of, and attitudes towards oral health training. The questionnaire concluded with one open-ended question that afforded participants the opportunity to make comments (Appendix D). To ensure content validity, the questionnaire was piloted on eight GPs from the department in UCC, the data from which was excluded from the results. Based on this feedback, some minor adjustments were made to improve the clarity of some questions so that it was clear to participants what they were being asked. For example, one question asked, "how often do patients consult your opinion on problems affecting the mouth". This question was changed into two questions, which asked, "how often do patients consult your opinion on problems affecting the oral hard tissues (i.e. teeth)" and "how often do patients consult your opinion on problems affecting the oral soft tissues (i.e. oral mucosa and gums)". Some questions were removed from the questionnaire. For example, one question asked, "Is there a dentist working in your primary care practice". This question was removed because it was considered a leading question by those who participated in the pilot phase. Some questions were added to the questionnaire (e.g. measuring confidence in ability to facilitate access to dental services). The 8 GPs who assisted with the pilot phase were not included in the study recruitment

email, because they were considered to have been involved in shaping the study design and therefore may have been biased.

4.3.5 Data analysis

In addition to study demographics, frequencies and percentages were used to summarise details on oral health knowledge, interest and practices, in addition to the experience of, and attitudes towards oral health training. The responses to the open-ended question were organised into themes. Outcome variables and selected explanatory variables, which were originally categorical variables, were reduced to binary variables for the purposes of analysis.

4.5 Materials and methods: Part C

4.5.1 Background

Oral soft tissue disease can present to clinicians from a variety of medical and dental professionals, especially those who work in the primary care setting (Carter and Ogden, 2007, Hollows et al., 2000). In Part A of this study, dentists felt that patients tend to self-present to their GP if they have symptoms related to the oral soft tissues.

The primary aim of this study was to examine the way in which malignant and potentially malignant oral lesions are first detected in the primary care setting in Ireland, with the objective of reviewing clinical notes to gather data on which health professional first detected the oral lesion, and whether the lesion was a presenting complaint or an opportunistic finding.

Dentists also felt that the best way to for GPs to improve oral cancer detection would be to promote oral health, create a great awareness of oral cancer to patients who have known risk factors and to refer to the dentist for an oral examination. The rationale behind this general point of view in Part A was that at least these high-risk patients would be then be screened opportunistically and may yield positive findings in the form of early cancers or PMDs. Therefore, a secondary aim was to determine how many diagnoses were found opportunistically during routine dental examinations.

4.5.2 Design

This was a retrospective observational study to examine the way in which malignant and potentially malignant oral lesions are first detected in the primary care setting in Ireland. This study was conducted between February 2017 and April 2017 in the Central Pathology Lab, based in St. James's Hospital Dublin. The DDUH diagnostic pathology service is located in the Central Pathology Lab at St. James's Hospital, Dublin. This is a diagnostic oral and maxillofacial pathology service, which provides histology reports for biopsies submitted from a diverse range of head and neck anatomic sites.

4.5.3 Sampling

Purposive sampling was used to examine all oral tissue biopsies submitted to the aforementioned diagnostic pathology service from June 2015 to December 2015. All tissue biopsies submitted to the Central Pathology Lab are entered on the Telepath Laboratory Information Management System ©. For each biopsy, the Telepath system utilizes the internationally recognized Systematised Nomenclature of Medicine (SNOMED) codes: a T

code to denote the anatomical site and an M code to denote the diagnosis. The inclusion criteria for this study was for an oral biopsy with one of the following T codes: maxilla, mandible, gingiva, tongue, palate, buccal mucosa, floor of mouth, oral mucosa, alveolar ridge, salivary gland and tooth. Biopsies from extra-oral head and neck sites such as lip, skin, ear, nasopharynx, oropharynx, hypopharynx, larynx, lymph nodes, paranasal sinuses and nasal cavity were excluded. It is important to note that head and neck cancers are a heterogenous grouping, and depending on the study, database or registry, “malignant and potentially malignant oral lesions” may include the lip (Ali et al., 2013). The lip was deliberately omitted from this study as a biopsy site, as the rationale behind this part of the study was to determine how intra-oral lesions are first detected in the primary care setting. The inclusion criteria also required a new diagnosis of SCC, carcinoma in situ or epithelial dysplasia. As noted earlier, epithelial dysplasia is histologically characteristic of PMDs (Thompson, 2017). Patients who already had a diagnosis from a previous biopsy at the same intra-oral site were also excluded. From data collected for a separate study, which is not included in this thesis, all oral biopsies submitted to the diagnostic pathology service were from three different source categories; a dental hospital, general hospitals or practitioners in private clinics. For this study, inclusion criteria included a biopsy submission from a hospital-based specialist unit between June 2015-December 2015. Finally, all areas of the data collection tool (Table 4.4.4) needed to be satisfied, so if any details were unclear in relation to how the lesion was first detected, or by whom, then the case was excluded from the study.

4.4.4 Data collection

A retrospective review of the clinical notes of each patient diagnosed with SCC, carcinoma in situ or epithelial dysplasia (mild, moderate or severe) from an oral biopsy, submitted by hospital-based specialist units to an oral and maxillofacial pathology service, was carried out between June 2015 and December 2015. Although severe dysplasia and carcinoma in situ are essentially indistinguishable, both terms are used in histological reports, and thus were counted separately.

For each biopsy submitted, a data collection tool was used which recorded the following data: (i) patient demographic data including sex, age and smoking status, (ii) histological data including the diagnosis, the site of the oral lesion and the diagnosis type organised into two categories: SCC and PMD (mild, moderate, severe dysplasia and carcinoma in situ). Although alcohol is also a risk factor for oral cancer, it was omitted from this study because the primary aim was to determine how these patients were first detected in the primary care setting. People with a positive smoking history (current or ex-smoker) and increasing age are considered to be “high-risk” for oral cancer, thus for this study explanatory variables were confined to these two variables, along with sex (Conway et al., 2008). The data collection tool also collected details relating to the way in which the lesion was detected including: a) whether the oral lesion was detected through opportunistic screening or whether the lesion was detected as a presenting complaint; (b) whether the lesion was first detected by a dentist or a GP. Although the time from first detection to biopsy was not measured, details of the referral pathway for each case were reviewed to determine if the patient was referred directly to the hospital-based specialist unit upon first

detection, or whether it was via indirect referral. Electronic patient records, scanned documents and paper charts were reviewed to gather the aforementioned details.

Table 4.4.4: Part C- Data Collection Tool.

Sex	Male			Female		
Age group	<50 years		50-70 years		>70 years	
Smoking	Current		Ex		Never	
Diagnosis						
Category	SCC			PMD		
Site	Lateral Tongue	Floor of Mouth	Buccal Mucosa	Alveolar Ridge	Ventral Tongue	Palate
How	Opportunistic Finding			Presenting Complaint		
Who	GP		Dentist		Other	
Notes						

4.4.5 Data analysis

Descriptive statistics were used to summarise population demographics. Relationships between explanatory variables were explored using chi-squared tests. Fisher's exact test was used when expected counts were low. Logistic regression models were used to identify variables that affected the following outcomes of interest: the lesion was detected by opportunistic screening (model 1), the lesion was detected by a GDP (model 2) and the lesion detected was diagnosed as a PMD (model 3). In model 1, if the lesion was not the patient's presenting complaint, it was considered to have been detected through opportunistic screening, and all others were not. In model 2, if the lesion was detected by a GDP regardless of whether it was as an opportunistic finding or presenting complaint, and all others were not. In all models the explanatory variables included were the following: sex (female=0, male =1), age (less than 50 years of age = 0, 50 years of age or older = 1) and smoking status (never smoker = 0, current or ex-smoker= 1). In models 1 and 2 the explanatory variable of diagnosis was also used (invasive SCC = 0, PMD = 1). In model 1 the explanatory variable of which health professional first detected the lesion was used (GMP = 0, GDP = 1). The measure of association between explanatory variables and outcomes was represented as odds ratios (OR) and corresponding 95% confidence intervals (CI).

CHAPTER 5

Results

The results for this study are reported according to the five main parts; **Part A:** dentist's views on incorporating oral health collaborative practice into primary medical care in Ireland, **Part B:** confidence and willingness of GPs to incorporate oral health as part of routine diabetes care, by reporting their current oral health knowledge, interest and practices, in addition to their experience of an attitudes towards oral health training, **Part C:** the way in which malignant and potentially malignant oral lesions are first detected in the primary care setting in Ireland

5.1 Results: Part A

A total of 17 participants were recruited, representing a 40% response rate. The sample was predominantly female (76%) and there was a broad range in years of experience. The profile was diverse, with participants coming from backgrounds in oral surgery, oral medicine, paediatric dentistry, special care dentistry, prosthodontics, primary care dentistry, hospital dentistry and public dental health. After 14 interviews, no new themes were emerging, and data saturation was achieved (Kvale and Brinkmann, 2009). A sample of this size is both practical and efficient and allows the researcher to gain an in-depth understanding of the data (Crouch and McKenzie, 2006). The thematic analysis produced a coding frame of 11 codes, organized into four themes.

5.1.1 The relative importance of oral health to systemic health:

5.1.1.1 Dentist opinion

All dentists interviewed felt that oral health was an important part of systemic health:-

“Oral health is integral to general health” I4.2

Most dentists felt that oral health should be incorporated into the overall systemic health management of a patient, especially among patients with chronic systemic disease:-

“I think one of the most exciting developments recently has been the evidence showing the bidirectional link between oral health and diabetes” I3.1

Oral cancer was acknowledged as the most significant disease affecting the oral cavity:

“Oral cancer is the main thing really isn’t it” I5.2

5.1.1.2 Perception of medical professional opinion

Dentists perceived a lack of interest in oral health among medical professionals:-

“It seems to me that most doctors have relatively low interest in oral health and really just see it as something that is the responsibility of the dentist” I2.1

Most dentists felt that it was related to a lack of knowledge about oral health:-

“I don’t think they have any idea about oral health, and I think it is an education issue” I5.1

It was also perceived that medical professionals may be used to dealing with more serious systemic health conditions than oral health, and that their perceived lack of interest in oral health might be due to competing systemic health priorities:-

“I’m sure the doctor has so many things to be thinking about that the mouth sometimes gets overlooked” I5.2

5.1.1.3 Perception of patient opinion

Participants thought that the relevance of oral health only became apparent for the majority of patients when they were suffering from the symptoms of oral disease:-

“I think the issue of oral health doesn’t really hit home until you have a problem”

I3.2

5.1.2 The role of dentistry in the overall health care team

5.1.2.1 Dentist opinion

Most dentists thought that the dental profession had moved further away from the health care team, and that generally, dentists did not communicate well with other health professionals:-

“I think in dentistry we have become very isolated” I3.1

“I think dentists and doctors need to have a lot more communication” I1.1

Dentists perceived an important need for oral health advocacy among other health professionals:-

“It’s been far too easy to ignore dentistry in this country...the dilemma is how to reintegrate dentistry into health care” I3.1

5.1.2.2 Perception of medical professional opinion

Participants felt that medical professionals should receive more information about the range of services provided by dental professionals for their patients:-

“The problem is they think it’s just teeth, that dentists can only look at teeth...dentists can diagnose a lot more than just dental caries...the dentist has a much greater awareness of referral pathways for mucosal disease or for other things affecting oral health as opposed to just teeth” I5.1

5.1.2.3 Perception of patient opinion

The majority of patients were thought to be unaware of what diagnostic skills dentists have, and that many patients tended to consult medical professionals for oral health problems, especially those affecting the oral soft tissues:-

“I think there are quite a few patients that go to their GP first, if it’s a lump or bump in the mouth” I4.3

5.1.3 Oral health interprofessional education and training

5.1.3.1 When, What and Who?

Dentists thought that some basic oral health training should be incorporated at the undergraduate level for medical students:-

“I would like to see a basic oral health component that looked at assessing the risk factors for common oral diseases like caries and periodontal disease, and also for oral cancer” I2.1

“I think they need to be made aware of how oral disease, be it mucosal, be it dental...how it can impact systemic health” I5.1

In addition to the aforementioned undergraduate students, participants felt strongly that postgraduate training would be important for medical professionals who work in primary care:-

“I mean if they don’t know anything about oral health, we need to do something about it...I definitely think they should know something, and I suspect some know more than others know...but they need to be made more aware of this stuff during their training...I think doctors in the primary care setting can be hugely influential” I1.1

5.1.3.2 Training goals and expectations

Participants felt that training medical professionals to diagnose oral disease was an unrealistic goal and that it would be impractical to expect them to reliably diagnose oral disease without the appropriate dental equipment in the primary medical care setting:-

“I think it’s a bit much to ask them to be able to diagnose oral disease... they don’t have a dental chair with lights and instruments, so I think feasibility wise it’s impossible” I5.1

Dentists also expressed concerns about expecting medical professionals to perform screening examinations of the oral cavity, especially for potentially malignant disorders or malignant oral lesions:-

“I don’t think it’s a good idea to be coaxing people along and looking in people’s mouths when they’re not trained for it...because if they miss something, there would be serious implications for the patient” I4.3

5.1.4 Opportunities for oral health collaborative practice

5.1.4.1 Oral health promotion and risk factor identification

Dentists felt that the best way to incorporate oral health collaborative practice would be to educate medical professionals on how to identify significant risk factors for oral disease and how to promote oral health:-

“I think it would be much more effective to do a risk factor approach because I don’t think it’s fair to expect medical professionals to be making decisions about diagnosis and treatment in the mouth” I3.3

In addition to educating their patients on their relevant risk factors for oral disease, participants believed the most effective way for medical professionals to promote oral health would be to facilitate engagement with primary dental care through an appropriate referral process, just as they would for any other specialist branch of medicine.

“I think getting the patient to engage with a dentist is the best approach” I4.3

“They should have enough awareness to be able to refer to a dentist, just like they have for other medical specialties” I3.2

5.1.4.2 Screening high-risk oral cancer patients

Participants thought that oral health collaborative practice was especially important for high-risk oral cancer patients:-

“The doctors probably have more exposure to the ‘at risk’ oral cancer patients, in the sense that they are very often smokers and drinkers, and more likely to be attending a doctor than a dentist” I2.3

Dentists believed that medical doctors in primary care were in an optimal position to contribute to the early diagnosis of potentially malignant disorders or malignant oral lesions by using the aforementioned approach:-

“If they have a patient who is a smoker, they should inform them on the link between smoking and oral cancer, and then say look, I am not in a position to check your mouth accurately, so it is advisable to go to your dentist, and I can write you a letter for that” I4.1

5.1.4.3 Chronic systemic disease co-management

Participants felt that medical professionals should incorporate oral health as part of their chronic systemic disease management, especially for patients with diabetes:-

“As a general rule of thumb, patients with diabetes should be advised to see their dentist” I1.3

5.2 Results: Part B

5.2.1 Characteristics of the study population

The online questionnaire was sent to 233 GPs and GP registrars, 92 of whom completed it during the study period, giving an overall response rate of 40%. There were more female (62%) than male (38%) participants, and the majority (69%) had worked in primary care for less than 20 years. Almost half of the study population work more than 40 hours per week, and 52% stated that more than half of their patients have a medical card.

Characteristics of the study population are displayed in Table 5.2.1.

Table 5.2.1: Characteristics of the study population- Part B

	N	%
Sex		
Female	57	62
Male	35	38
Years worked in primary care		
<10	34	37
10-19	29	32
20-29	17	18
>29	12	13
Hours worked per week		
<20	5	6
21-30	16	17
31-40	26	28
>40	45	49
Proportion of patients with a medical card		
<25%	9	10
26-50%	35	38
51-75%	35	38
>75%	13	14

5.2.2 Oral health: Education and training

Table 5.2.2 shows the education and training received during both undergraduate and postgraduate years. It shows that 97% and 88% of participants received none/very little oral health education during medical school and GP training respectively

Table 5.2.2: Oral health: Education and training received

	Oral health education received during medical school		Oral health education received during GP training	
	N	%	N	%
None	28	30	50	54
Very Little	61	66	31	34
Some	3	4	11	12
A Lot	0	0	0	0

5.2.3 Oral health: Self-rated confidence level

Table 5.2.3 shows the level of self-rated confidence among participants when discussing oral health issues, examining the oral hard or soft tissues, in addition to facilitating access to dental services. A greater proportion of GPs were confident examining the oral soft tissues (49%) than the oral hard tissues (20%). The majority of GPs (84%) were not confident discussing oral health issues with their patients. Only 32% of respondents felt confident facilitating access to dental services for their patients.

Table 5.2.3: Oral health: Self-rated confidence level

	Confident discussing oral health issues		Confident examining the oral hard tissues (i.e. teeth)		Confident examining the oral soft tissues (i.e. oral mucosa, gums)		Confident facilitating access to dental services	
	N	%	N	%	N	%	N	%
Strongly Disagree	19	21	18	20	12	13	12	13
Disagree	58	63	56	61	35	38	51	55
Agree	13	14	16	17	43	47	28	31
Strongly Agree	2	2	2	2	2	2	1	1

5.2.4 Oral health: Related experiences in primary medical care

Table 5.2.4 summarises participants' oral health-related experiences in the primary medical care setting. Participants reported that patients sometimes/often ask for their professional opinion about problems affecting the oral soft tissues (90%) and the oral hard tissues (75%).

Table 5.2.4: Oral health: Related experiences in primary medical care

	Patients consult my opinion for symptoms affecting oral hard tissues		Patients consult my opinion for symptoms affecting oral soft tissues		I send patient referrals to a dentist		I receive patient referrals from a dentist	
	N	%	N	%	N	%	N	%
Never	1	1	0	0	0	0	16	17
Rarely	22	24	9	10	14	15	52	57
Sometimes	53	58	50	54	54	59	24	26
Often	16	17	33	36	24	26	0	0

5.2.5 Oral health: Diabetes-specific knowledge

Table 5.2.5 shows that 39% of GPs did not know if periodontal disease could have a negative impact on glycaemic control and 24% did not know if poor glycaemic control could negatively impact periodontal health.

Table 5.2.5: Oral health: Diabetes-specific knowledge

	Periodontal (gum) disease can have a negative impact on glycaemic control		Poor glycaemic control can negatively impact periodontal (gum) health	
	N	%	N	%
True	56	61	70	76
False	0	0	0	0
Don't Know	36	39	22	24

5.2.6 Oral health: Diabetes-specific practices

Table 5.2.6 shows that the majority of GPs never (53%) or rarely (34%) ask their patients with diabetes if they attend a dentist as part of overall diabetes care. In addition, the majority of GPs never (58%) or rarely (35%) refer their patients with diabetes to attend a dentist as part of overall diabetes care. However, the vast majority of participants (82%) report often referring their patients with diabetes to other health professionals as part of overall diabetes care.

Table 5.2.6: Oral health: Diabetes-specific practices

	Do you ask your patients with diabetes if they attend a dentist as part of their overall diabetes management?		Do you refer your patients with diabetes to attend a dentist as part of their overall diabetes management?		Do you refer your patients with diabetes to attend other health professionals as part of their overall diabetes management?	
	N	%	N	%	N	%
Never	49	53	53	58	0	0
Rarely	31	34	32	35	0	0
Sometimes	8	9	6	6	17	18
Often	4	4	1	1	75	82

5.2.7 Oral health education and training: interest, feasibility and most important topic

Table 5.2.7 shows that the majority of GPs (81%) responding to the survey were interested in learning more about key topics in oral health and about how best to facilitate access to primary dental care. In fact, the training goal considered to be most feasible by GPs, was to learn how to promote oral health and primary dental care attendance to patients (74%), as shown in Table 5.2.8. In Table 5.2.9, the vast majority of GPs (79%) considered oral cancer and potentially malignant oral lesions to be the most important oral health topic for GPs.

Table 5.2.7: Oral health education and training: Interest

	N	%
I am interested in learning more about key topics in oral health and in learning how best to facilitate access to primary dental care in Ireland	74	81
I am only interested in learning more about key topics in oral health	10	11
I am only interested in learning how best to facilitate access to primary dental care in Ireland	4	4
I am not interested in learning about key topics in oral health or how best to facilitate access to primary dental care in Ireland	4	4

Table 5.2.8: Oral health education and training: Feasibility

<i>“Which of the following training goals do you consider feasible”</i>		
	N	%
To identify the risk factors which put patients at an increased risk of oral health complications	64	70
To promote oral health and primary dental care attendance to patients who, based on their risk factors are at an increased risk of oral health complications	68	74
To facilitate access to primary dental care through the referral of patients who, based on their risk factors are at an increased risk of oral health complications	65	71
To examine the oral hard and soft tissues (e.g. teeth, gums and oral mucosa) and offer a provisional diagnosis in patients who, based on their risk factors are at an increased risk of oral health complications	61	66
None of these options are feasible education and training goals.	1	1

Table 5.2.9: Oral health education and training: Most important oral health topic

	N	%
Oral cancer and potentially malignant oral lesions	72	78
Periodontal (gum) disease	11	12
Dental caries (tooth decay)	5	6
Dental trauma	4	4

5.2.8 Sample of comments in response to open-ended question

Table 5.2.10 presents a sample of comments in response to the open-ended question. The three most common themes identified were a lack of oral health education for GPs, an expression of interest in learning how to deal with dental emergencies and reported difficulty in facilitating access to dental services for their patients.

Table 5.2.10: Sample of comments in response to open-ended question

<u>Oral Health Education:</u> “We get no education on oral health” “Very little teaching on oral health, would like to learn more” <u>Dental Emergencies:</u> “We are consulted very often about dental problems on call. Would be great to know a bit more about emergency presentations” “Most dental presentations to us are acute problems in out of hours and would like to see this addressed in terms of being more equipped to deal with acute problems” <u>Accessing Dental Services:</u> “Dental services are hugely inadequate in our area” “Impossible to access out of hours and therefore becomes part of GP workload” “I find the access to dental care for medical card patients extremely difficult”

5.3 Results: Part C

5.3.1 Patient characteristics of cases diagnosed

Between June 2015 and December 2015, there were 135 oral biopsies diagnosed as SCC, carcinoma in situ or epithelial dysplasia. Of the 135 oral biopsies, 118 were submitted from hospital- based specialist units. Of these 118 cases, 112 were eligible for final inclusion, as six cases were not new diagnoses. Of the 112 cases eligible for inclusion, it was only possible to obtain a complete history of detection for 100 cases (85%). There was an equal number of 50 male and female patients. The majority of patients were aged between 50 and 70 years of age (61%). 81% of patients had a positive smoking history and over half of the patients were current smokers (53%) (Table 5.3.1).

Table 5.3.1: Patient characteristics of cases diagnosed

Characteristic	N	%
Sex		
Female	50	50
Male	50	50
Age Group		
<50 years	21	21
50-70 years	61	61
>70 years	18	18
Smoking Status		
Current Smoker	53	53
Ex-Smoker	28	28
Never smoked	19	19

5.3.2 Site of oral lesion and histological diagnosis

There were 29 cases of SCC, five cases of carcinoma in-situ and 66 cases of epithelial dysplasia diagnosed as part of this review. The lateral border of the tongue was the most commonly affected site accounting for 30% of the diagnoses. The floor of mouth and buccal mucosa were also common sites representing 25% and 24% of the diagnoses respectively. The majority of SCC was diagnosed from the floor of the mouth. Almost 92% of biopsies from the buccal mucosa were diagnosed as either mild or moderate dysplasia.

5.3.3 Opportunistic finding or presenting complaint

There were 49 lesions detected as opportunistic findings, of which dentists detected 47 (94%). Two cases (6%) of opportunistic findings were detected by GPs. The first case was a patient who presented with a lump on the palate, who, on examination, was found to have a lesion on the floor of the mouth. The second case was a patient who presented with a wart-like lesion on the tongue, who, on examination, was found to have a lesion on the buccal mucosa. All dentists who first detected the lesion, whether as an opportunistic finding or as a presenting complaint, referred the lesion directly to the hospital-based specialist unit in order for a biopsy to be carried out. There were 51 cases detected as presenting complaints, 30 (60%) of which were detected by GPs. Of the 32 cases detected by GPs, nine cases (28%) were referred to another health professional, who then referred the case to a hospital-based specialist unit. Of these cases, three were referred to dentists, two to ear, nose and throat (ENT) surgeons, two to dermatologists and two to emergency

departments in general hospitals. The three cases referred to dentists were subsequently diagnosed as SCC, whilst the other six cases were diagnosed as PMDs.

5.3.4 Factors affecting the outcomes of interest

Tables 5.3.4.1, 5.3.4.2 and 5.3.4.3 show the factors associated with whether the lesion was (i) detected as a presenting complaint (PC) or as an opportunistic finding (OF) (Table 5.3.4.1), (ii) detected by a GP or a dentist (Table 5.3.4.2) and (iii) diagnosed as SCC or a PMD (Table 5.3.4.3). The following factors were considered; sex (male or female), age (< 50 years or 50 years +), smoking history (never or current/ex), diagnosis (SCC or PMD) and first detection (GP or dentist). In Table 5.3.4.1, model 1 considered the factors associated with a lesion being detected as an opportunistic finding. The factors found to differ with statistical significance were the sex of the patient ($\chi^2=4.84$, $p=0.03$), first detection ($\chi^2=34.41$, $p<0.005$) and diagnosis ($\chi^2=16.49$, $p<0.005$). In Table 5.3.4.2, model 2 considered factors associated with the detection of a lesion by a dentist. The only factor with a statistically significant difference in proportions was diagnosis ($\chi^2=13.30$, $p<0.005$). In Table 5.3.4.3, model 3 considered factors associated with the diagnosis of a PMD. The only factor with a statistically significant difference in proportions was the sex of the patient ($\chi^2=3.93$, $p<0.05$). Table 5.3.4.4 displays the odds ratios for the factors affecting the outcomes of interest. The odds of a dentist detecting a lesion as an opportunistic finding were greater than those of a GP (OR 33.57; 95% CI (7.34, 153.65)). The odds of detecting a lesion as an opportunistic finding were greater if the lesion was a PMD (OR 7.82; 95% CI (2.67, 22.94)). The odds of a lesion being detected by a dentist were higher if the lesion was diagnosed as a PMD (OR 5.29; 95% CI (2.08, 13.45)).

Table 5.3.4.1: Model 1: Lesion detected as an opportunistic finding

	PC	OF
Sex		
Female	20(40.0%)	30(60.0%)
Male	31(62.0%)	19(38.0%)
	$\chi^2 = 4.84$ p=0.03	
Age:		
<50 years	9(42.9%)	12(57.1%)
50 years +	42(53.2%)	37(46.8%)
	$\chi^2 = 0.71$, p=0.40	
Smoking status:		
Never	10(52.6%)	9(47.4%)
Current/Ex	41(50.6%)	40(49.4%)
	$\chi^2 = 0.03$, p=0.87	
Diagnosis:		
SCC	24(82.8%)	5(17.2%)
PMD	27(38.0%)	44(62.0%)
	$\chi^2 = 16.49$, p<0.005	
First detection:		
GP	30(93.8%)	2(06.3%)
Dentist	21(30.9%)	47(69.1%)
	$\chi^2 = 34.41$, p<0.005	

Table 5.3.4.2 Model 2: Lesion detected by a dentist

	GP	Dentist
Sex:		
Female	14(28.0%)	39(72.0%)
Male	18(36.0%)	32(64.0%)
	$\chi^2 = 0.73, p=0.39$	
Age:		
<50 years	5(23.8%)	16(76.2%)
50 years +	27(34.2%)	52(65.8%)
	$\chi^2 = 0.82, p=0.37$	
Smoking status:		
Never	6(31.6%)	13(68.4%)
Current/Ex	26(32.0%)	55(68.0%)
	$\chi^2 = 0.00, p=0.97$	
Diagnosis:		
SCC	17(58.6%)	12(41.4%)
PMD	15(21.1%)	56(78.9%)
	$\chi^2 = 13.30, p<0.005$	

Table 5.3.4.3: Model 3: Lesion diagnosed as a PMD

	SCC	PMD
Sex:		
Female	10(20.0%)	40(80.0%)
Male	19(38.0%)	31(62.0%)
	$\chi^2 = 3.93, p < 0.05$	
Age:		
<50 years	4(19.0%)	17(81.0%)
50 years +	25(31.6%)	54(68.4%)
	$\chi^2 = 1.28, p = 0.26$	
Smoking status:		
Never	4(21.1%)	15(78.9%)
Current/Ex	25(30.9%)	56(69.1%)
	$\chi^2 = 0.72, p = 0.40$	

Table 5.3.4.4 Odds ratios for factors affecting outcomes of interest

	“Odds the lesion is detected as an opportunistic finding given that ”;	“Odds the lesion is detected by a dentist given that ”;	“Odds the lesion is diagnosed as a PMD given that ”;
<i>Gender</i> : “the patient is male”	0.41 (0.18, 0.91)	0.69 (0.30, 1.61)	0.41 (0.17, 1.00)
<i>Age</i> : “the patient is 50 years or older”	0.66 (0.22, 1.94)	0.60 (0.15, 1.97)	0.51 (0.11, 1.80)
<i>Smoking status</i> : “the patient is a current or ex-smoker”	1.08 (0.35, 3.36)	0.97 (0.27, 3.15)	0.60 (0.13, 2.15)
<i>Who detected the lesion</i> “the lesion is detected by a dentist”	33.57 (7.34, 153.65)		5.29 (2.08, 13.45)
<i>How the lesion was detected</i> “the lesion is detected as an opportunistic finding”		33.57 (7.34, 153.65)	7.82 (2.67, 22.94)
<i>What was the diagnosis</i> “the lesion is diagnosed as a PMD”	7.82 (2.67, 22.94)	5.29 (2.08, 13.45)	

CHAPTER 6

Discussion

In conjunction with the results described in chapter 5, this chapter discusses the three parts to this study as a cohesive body of research. In doing so, this chapter will show how the specific objectives have been met, in order to achieve the overall aim of the study.

6.1 Oral health integration into primary health care in Ireland

In Part A of this study, dentists emphasised that the best way to achieve oral health integration into primary health care would be to educate medical professionals, especially GPs, on how to identify the significant risk factors for oral disease, how to promote oral health and how to facilitate access to dental health care services for their patients. During this part of the study, dentists identified two specific areas of opportunity for collaborative practice between medical and dental professionals in primary health care in Ireland; (i) the integration of oral health into diabetes care and (ii) an oral cancer prevention strategy for primary health care. Both of these areas constitute the focus of the second and third parts of this discussion respectively.

6.1.1 Interprofessional education for oral health

In the semi-structured interview study, dentists perceived a lack of interest in oral health among GPs and suggested a paucity of oral health education as reasons for this perception. Although the 2018 curriculum for trainee GPs in Ireland contains ample oral health content (Irish College of General Practitioners, 2018), Part B of this study showed that GPs received very little postgraduate oral health training, or indeed undergraduate oral health training during their medical school years. This is similar to that found by other studies in Sweden and Australia, where GPs reported a paucity of oral health training during their

professional development, and also lamented their lack of capacity to integrate oral health practices within their existing scope of clinical practice (Andersson et al., 2007, Barnett et al., 2016). Oral health education has been shown to improve oral health knowledge, attitudes and practices among health professionals in training (Peker and Alkart, 2009). In this regard, it is important to acknowledge that oral health interprofessional education is an important part of preparing medical professionals for collaborative practice with dentists (World Health Organisation, 2010). It has been advised to expose students to interprofessional education at an early stage in their professional development (World Health Organisation, 2010). In Part A of this study, dentists recommended some basic oral health training for undergraduate medical students. Unfortunately, there is no published data on the oral health content among the six medical school curricula in Ireland.

Mouradian's group identified five major oral health topics that should be addressed in medical school curricula. Four out of the five topics relate directly to the content of this PhD study. These four topics were (i) the prevention of oral disease, (ii) periodontal disease, (iii) oral cancer and (iv) oral-systemic health interactions. The fifth topic was dental caries (Mouradian et al., 2005). In 2014, the Harvard School of Dental Medicine and the Harvard Medical School introduced an oral health curriculum for medical students. This curriculum also had five topics. Two out of the five topics relate directly to the work of this PhD study, and two relate indirectly. The two topics that relate directly are (i) periodontal disease and (ii) the link between oral health and general systemic health. The two topics that relate indirectly are (iii) understand the normal intraoral and extraoral anatomy and (iv) learn to perform intraoral and extraoral examination. The latter two topics indirectly relate to oral cancer or oral mucosal disease. The fifth topic was also

dental caries (Park et al., 2017). Dentists also recommended some postgraduate training for medical professionals, especially those who work in primary medical care, as they believed GPs would have the greatest potential to develop collaborative practice relationships with dental professionals, and therefore successfully integrate oral health as part of their scope of practice. This perspective is shared in other conceptual frameworks (U.S. Department of Health and Human Services, 2014, Hummel et al., 2015). In Part B, 81% of GPs surveyed reported that they would be interested in learning more about key topics in oral health. Currently, GP training is organised independently by 14 individual programmes in Ireland (Irish College of General Practitioners, 2019). Unfortunately, there has been no data collected on the oral health content of primary care training programmes in Ireland. In 2018, a U.S. study collected data on the oral health content in the curricula of family medicine residency programmes, which are three years in duration (family medicine residency programmes would be the equivalent to GP training programmes in Ireland). The study contacted the programme directors of 520 programmes across the U.S. Of the 195 directors that completed the online survey, just under 20% of programmes reported 0 hours of oral health training, with approximately half of the programmes reporting 1-3 hours of oral health training over the three-year programme. The remaining 30% reported 4 or more hours on the topic of oral health. The survey assessed which were the most prevalent topics covered under the following headings; risk assessment, oral health evaluation, preventive interventions, communication and education and interprofessional collaborative practice. These are the same headings used in the conceptual framework published by HRSA (U.S. Department of Health and Human Services, 2014). These same headings were used in Part A of this study to form the interview guide (Appendix C). In the 2018 study, the most

prevalent topics covered were: medical conditions that impact oral health (76%) (risk assessment), fluoride risks, benefits and promotion (75%) (preventive interventions), paediatric/infant oral screening examination (71%) (oral health evaluation), oral disease prevention/anticipatory advice (68%) (communication), oral cancer (67%) (risk assessment) and emergency oral health issues (66%) (risk assessment) (Silk et al., 2018). In Part B, GPs noted that they would like to learn more about emergency dental care, as they are frequently consulted for oral health presentations during out of hours. This was also noted by the Australian study that highlighted emergency knowledge as crucial, but only as part of a broader oral health training, thereby still focusing primarily on the proactive preventive approach (Barnett et al., 2016). In the 2018 curriculum published by the ICGP, the oral health content is relatively vague, and tends to traverse entire head and neck areas, as opposed to focusing on oral health specifically (Irish College of General Practitioners, 2018). For example:

- “Manage primary contact with patients who have a common/important ENT, oral or facial problem, e.g. vertigo or tinnitus”
- “Know the epidemiology of head and neck cancers, including the risk factors, and identify unhealthy behavior”
- “Identify symptoms that are within the range of normal and require no treatment such as small neck lymph nodes in healthy children and ‘geographic tongue’”
- “Understand how to recognise rarer but potentially serious conditions such as oral, head and neck cancer”
- “Know how community-specific aspects of oral mucosal disease may be

related to lifestyle (e.g. chewing tobacco, betel nut)”

- “Know that certain ENT, oral and facial symptoms may be manifestations of psychological distress, e.g. globus pharyngeus, atypical facial pain, burning mouth syndrome”
- “Understand the significant quality-of-life impairment that may arise from common ENT and oral complaints, e.g. snoring, rhinosinusitis, persistent oral ulceration and dry mouth”
- “Recognise that certain oral facial and neck symptoms can be in response to psychological distress” (Irish College of General Practitioners, 2018).

The bullets noted above are certainly not focused solely on oral health, but rather multiple areas in the head and neck. Dentists in Part A expressed a need for “focused” oral health training, something similar to that described by Mouradian’s group and Park’s group (Mouradian et al., 2005, Park et al., 2017). A more focused approach would typically lend itself better to interprofessional collaborative practice, as it would broaden the training experience of those who had a discipline-focused education (Harnagea et al., 2017). The bullets noted above from the 2018 ICGP curriculum do not appear to be focused or even organised into topics. Silk’s group found that the topics covered were relatively standardised across the residency programmes that had oral health content, and that these topics were aligned with HRSA’s framework to integrate oral health with primary health care (Silk et al., 2018, U.S. Department of Health and Human Services, 2014).

6.1.2 Referral pathways between medical and dental professionals

Although interprofessional education is acknowledged as a facilitator of oral health integration into primary health care (Harnagea et al., 2017), interviewees from the qualitative study felt that interprofessional education would only be one part of the strategy to integrate oral health with primary health care. Indeed, other authors have suggested that by simply teaching non-dental health professionals oral health content, it would be unrealistic to expect integrated care to follow (Skeie et al., 2011, de la Cruz et al., 2004). The development of clear referral pathways between medical and dental professionals would be an important facilitator for oral health integration to be achieved in any type of health system (Harnagea et al., 2018, Skeie et al., 2011, de la Cruz et al., 2004, Andersson et al., 2007, Barnett et al., 2016). In both of the conceptual frameworks, developing professional relationships was considered to be a high priority to enable oral health integration (Hummel et al., 2015, U.S. Department of Health and Human Services, 2014). Hummel's group suggested developing a "primary care-dentistry referral network" that would support efficient communication between medical and dental professionals in the primary care setting (Hummel et al., 2015). Participants in both Parts A and B also emphasised that communication between each other was poor. In Part A, dentists reported having poor communication with medical professionals, and that the development of referral pathways would be needed to support collaborative practice. In Part B, GPs reported finding it difficult to access dental health care services for their patients, and "never" receiving communications from a dentist. In Part C, results showed that there were very few lateral referrals between GPs and dentists in the primary care setting, with GPs electing to refer to other medical specialists twice as often as to dentists when their concern

was in relation to oral cancer. Admittedly only 9 cases were indirectly referred by GPs in Part C, 3 of which were to dentists. However, it represented almost 20% of cases first detected by GPs, therefore it is worthwhile noting, because a primary care referral is typically much easier to facilitate and more cost-effective than a secondary care referral (Hummel et al., U.S. Department of Health and Human Services, 2014). In that regard, lateral referrals to dentists should be used more often when GPs require a second opinion on an oral health condition. For collaborative practice relationships to develop, communication should be bidirectional (World Health Organisation, 2010), and as noted above, there was evidence in Parts A, B and C that dentists do not tend to refer patients to GPs either. However, with respect to Part C of this study, a more indirect referral pathway means a longer diagnostic interval, which may contribute to disease progression and thus may negatively impact prognosis (Allison et al., 1998). It has been suggested that dentists might be slower to refer suspicious looking oral lesions to hospital-based specialist units because they might utilise their operative dentistry skills in an attempt to treat a presumed underlying cause for the oral lesion detected, such as smoothening a denture or restoring a fractured tooth (Bruun, 1976). For example, in cases of frictional keratosis where the oral mucosa appears white, clinically indistinguishable for certain types of PMD (Thompson, 2017), a dentist may try and remove the irritant (restoring a fractured tooth or removing the sharp edges of a denture) in an effort to see if the frictional keratosis resolves. However, although the time taken to refer was not assessed, there were no indirect referrals from dentists to other health professionals prior to the patient undergoing the biopsy procedure at the hospital-based specialist unit in Part C of this study. This finding supports the results from Part A, where participants felt that dentists in general would be more likely to have a

better knowledge of how to screen the oral mucosa for malignant or potentially malignant oral disease competently, in addition to a greater capacity to navigate the referral pathways for oral mucosal disease, and thus facilitate a more expedient referral to hospital-based specialist units for suspicious-looking oral lesions.

6.2 Integrating oral health into diabetes care

In Parts A and B of this study, both dentists and GPs considered periodontal disease to be the second most important area for oral health integration.

Diabetes mellitus is a common disorder of glucose metabolism, which is strongly associated with the development of oral complications, including periodontal disease, xerostomia, oral candidiasis and neurosensory disorders such as burning mouth syndrome (Ship, 2003). In Ireland, there are approximately 190,000 people living with diabetes, 90% of whom have type 2 diabetes, the prevalence of which in adults aged older than 50 years is 8.5% and continuing to increase (Tracey et al., 2015). In Part A, dentists believed that GPs may have an important role to play by informing patients that the risk of periodontal disease is increased by diabetes, and that achieving proper glycaemic control in the presence of active periodontal disease may be more difficult. However, in Part B of this study, 39% of GPs did not know if periodontal disease could have a negative impact on glycaemic control and 24% did not know if poor glycaemic control could negatively impact periodontal health. In 2008, a Jordan-based study of 164 medical doctors found that almost three quarters of participants were aware of the link between periodontal disease and diabetes (Al-habashneh et al., 2008). The lack of awareness of the oral health-systemic health relationship noted in Part B among Irish GPs, potentially relates to the discipline-

orientated education, referred to by Harnagea's group, where health care professionals do not stray beyond their perceived boundaries of clinical practice (Harnagea et al., 2017). Ideally, GPs should encourage good oral health practices by asking simple questions such as "Do you have a dentist?" or "When was your last dental visit?" (Lalla and Papapanou, 2011). By bringing the topic of oral health into the GP surgery, GPs could play an important role in the promotion of oral health, the prevention of periodontal disease and thus the improvement in overall diabetic health (Lalla and Papapanou, 2011). In Part A, dentists suggested that this approach to patients with diabetes should be a "rule of thumb". It was felt that the bidirectional link between periodontal disease and diabetes would be sound justification to incorporate oral health as part of routine diabetes care. Unfortunately, in Part B, the majority of GPs reported never (53%) or rarely asking their patients with diabetes if they attend a dentist as part of overall diabetes care. In addition, the majority of GPs reported never (58%) or rarely (35%) referring their patients with diabetes to attend a dentist as part of overall diabetes care. However, the vast majority of GPs (82%) reported often referring their patients with diabetes to other health professionals as part of overall diabetes care. The paucity of referrals reported may relate to the aforementioned lack of awareness among GPs of the link between periodontal disease and diabetes. However, in the Jordanian study, despite almost three quarters of the study participants reporting an awareness of the bidirectional link, less than half of them reported advising primary dental care attendance as part of routine diabetes care (Al-habashneh et al., 2008). This would support the assertion of dentists in Part A of this study, and indeed the assertions of other authors (Skeie et al., 2011, de la Cruz et al., 2004), that improved oral health knowledge on its own is not enough to ensure integrated oral health practices by non-dental health

professionals. In 2018, an Australian study of non-dental health care providers for patients with diabetes identified three key areas that would be integral to the integration of oral health into diabetes care; education, resources and referral pathways (Poudel et al., 2018). In Parts A and B of this study, both dentists and GPs noted how a paucity of interprofessional oral health education may be a barrier to the integration of oral health practices. As noted above, it is possibly an oversimplification to suggest that once providers are made aware of the oral health-diabetes link that they would then alter their practices to integrate oral health. Poudel's group also suggested the need for resources, such as screening tools to identify patients who may benefit from dental referral (Poudel et al., 2018). It was suggested in Part A that one of the reasons why GPs may not readily integrate oral health as part of their existing scope of clinical care, would be due to competing systemic health priorities. In Part B, 82% of GPs reported often referring their patients with diabetes to other health care professionals as part of overall diabetes care. However, 93% of GPs reported never/rarely referring their patients with diabetes to other health care professionals as part of overall diabetes care. This is confusing as the results imply that GPs are comfortable referring patients to other providers for care as part of overall diabetes care, but yet dentistry seems to remain isolated from integrated care.

Harnagea's group noted that policy and guidelines may be an important barrier to surmount (Harnagea et al., 2017). The American Diabetes Association's "Standards of Medical Care in Diabetes" recommends referral of a patient to a dentist for a comprehensive oral health examination, as part of the initial management of a patient with diabetes (American Diabetes Association, 2015). Similarly, the RACGP and the IDF

recommends that referral to a dental professional should form part of the primary care provider's treatment plan for patients with diabetes (International Diabetes Federation, 2009, Royal Australian College of General Practitioners, 2016). By contrast, the HSE-supported "Practical guide to integrated type 2 diabetes care" does not address the oral health needs of patients with diabetes (other than mentioning dry mouth as a possible new symptom of diabetes) and specifically omits mention of visiting a dental professional as part of overall diabetes care (Harkins et al., 2016). The National Clinical Programme for Diabetes in Ireland aims to "reduce the morbidity and mortality associated with diabetes", which includes the development and dissemination of the aforementioned guidelines supporting integrated care. This Irish guideline supports integrated care for patients with type 2 diabetes, which involves the patient, the GP, the practice nurse, the diabetologist, the clinical nurse specialist in diabetes, the dietitian, the ophthalmologist and the podiatrist (Harkins et al., 2016). There is a compelling argument, as outlined in the foregoing, for including dentists as part of this integrated care guideline.

In addition to the management of oral disease, dentists are well positioned to evaluate risk factors and intra-oral signs and/or symptoms indicative of poor metabolic control in patients who have been diagnosed with diabetes, for example xerostomia and oral candidiasis (Lalla and Papapanou, 2011). In Part A of this study, dentists highlighted a need to integrate back into the health care team and show other health professionals, patients and stakeholders how dentists can contribute to the overall health of patients. Dentists are experienced in motivating behavioural change in their patients, and these skills may be used to support their medical colleagues to achieve a common goal such as

smoking cessation or diet modification, in order to improve the overall health of diabetic patients (Preshaw et al., 2012).

The primary care medical team is in a unique position to ensure that each patient with diabetes has engaged with a dental professional (Tsai et al., 2002), which in Ireland is accessible privately or through state subsidised schemes such as the DTBS or the DTSS (Health Service Executive, 2019, Department of Employment and Social Protection, 2019). However, the lack of universal dental health care coverage for patients with diabetes in Ireland also challenges the feasibility of incorporating oral health into routine diabetes care. Furthermore, whilst equitable access to dental health care services is important, Part B of this study showed that the majority of GPs do not refer their patients with diabetes to the dentist as part of overall care, whilst yet identifying that the majority of their patients in this study were medical card holders and thus would have been eligible for free dental health care under the DTSS. This suggests that even when free access to dental health care is present, GPs still do not incorporate oral health into their routine diabetes care plan. Poudel's group suggested that the development of clear referral pathways would be important to the successful integration of oral health into diabetes care (Poudel et al., 2018). In Part A, dentists thought that GPs would be more likely to refer patients to dentists if there was a more supportive framework. Oral health integration can be aided by a supportive referral environment (dela Cruz et al., 2004). Developing a "primary care-dentistry referral" network has been suggested as a way to enable GPs to facilitate access to dentists, which could be as simple as identifying a local dental surgery and establishing a professional relationship (Hummel et al., 2015).

6.3 An oral cancer prevention strategy in primary health care

In Parts A and B of this study, both dentists and GPs considered oral cancer and potentially malignant oral lesions to be the most important topic relating to the integration of oral health into primary health care in Ireland. The detection of oral cancer at an earlier stage is the most effective way to improve survival rates, with 5-year survival rates of approximately 80% for oral cancers detected at an early stage compared to survival rates of approximately 20% for those detected at a late stage (Van der Waal, 2013). Primary and secondary prevention strategies are key to reducing the burden of cancer in Ireland (Department of Health, 2017a). Primary prevention aims to reduce the incidence of disease through health promotion strategies. In the absence of effective primary prevention, secondary prevention focuses on detection of the disease at the earliest stage in an asymptomatic population, through screening examinations or tests (Speight et al., 2006).

6.3.1 Primary prevention

In Part A, dentists considered GPs to be in an opportune position to improve the primary prevention of oral cancer by promoting oral health to their patients. In Part B, through the online survey, GPs expressed a willingness to promote oral health and encourage dental attendance as part of oral health collaborative practice. This is a promising finding, because a previous randomised controlled trial of a pilot intervention demonstrated the effectiveness of providing a patient with an information leaflet and/or one-to-one advice in the general practice setting, in order to improve patients' awareness of oral cancer and encourage earlier presentation for potentially malignant oral signs or symptoms in a cohort of high-risk patients (Scott et al., 2012). Public awareness of oral cancer is poor when

compared to other types of cancer (Rogers et al., 2011a, Rogers et al., 2011b, Hertrampf et al., 2012, Monteiro et al., 2016) and late detection is associated with poor public awareness and delays in presentation (Scott et al., 2005, Scott et al., 2006). Thus, as dentists perceived a low level of oral health knowledge among patients in Part A, it was suggested that GPs could create a greater awareness of oral cancer among their patients by promoting oral health in the context of overall health, and by linking it to shared risk factors with other existing systemic conditions (e.g. by informing patients with COPD, that as their diagnosis of COPD was most likely caused by a significant smoking history, they should see a dentist at least once a year for an oral health screening examination, because smoking is also a significant risk factor for oral cancer). Dentists also believed that GPs would be well positioned to provide first contact advice and coordinate referral to primary dental health care services. In keeping with what was perceived as a low public awareness of oral health, dentists thought that patients had limited awareness of what diagnostic skills were accessible in a dental clinic, and thus tended to consult GPs instead of dentists for oral health problems, especially those affecting the oral soft tissues. This concern was compounded by the fact that during the interviews, dentists also felt that GPs most likely had not received adequate training in oral diseases, and therefore may not be as competent at screening the oral cavity for malignant or potentially malignant disease. Indeed, in Part B, GPs confirmed that they are often consulted by patients for oral health symptoms, especially in relation to the oral soft tissues. GPs also reported low levels of confidence when examining the oral cavity. In Part C, 51 of the 100 malignant and potentially malignant oral biopsy cases examined, were first detected as presenting complaints, 30 (59%) of which self-presented to GPs. In this study more than twice as many patients

diagnosed with SCC presented to GPs rather than to dentists. This trend has also been observed in other countries (Rogers et al., 2007, Kaing et al., 2016). In the U.K., a study that examined the case notes of 473 patients, showed that 49% of patients diagnosed with oral cancer first presented to a GP, while 43% first presented to a dentist (Rogers et al., 2007). Similarly, in a recent Australian study of 101 patients who were diagnosed with oral cancer, 52% first presented to a GP, while 43% first presented to a dentist (Kaing et al., 2016). This tendency among patients to first consult a GP first was also noted in studies based in Denmark and Finland (Wildt et al., 1995, Kantola et al., 2001). In Denmark, a study of 167 patients diagnosed with oral cancer showed that 45% of patients first presented to a GP, while 35% first presented to a dentist (Wildt et al., 1995). In Finland, a study of 75 patients diagnosed with oral cancer showed that 81% of patients first presented to a GP, while 19% of patients first presented to a dentist (Kantola et al., 2001). In the U.K., an interview study where 535 participants were asked what they might do if they had a mouth ulcer that had persisted for greater than three weeks, showed that 61% of participants would consult a GP initially, and 27% would consult a dentist. It has been suggested that patients tend to present to their GP rather than their dentist for symptoms related to oral cancer (Eadie et al., 2009). This is difficult to explain because GPs do not routinely examine the mouth (Wade et al., 2009). However, some authors state that patients may prefer to speak with medical professionals if their concern is in relation to cancer (Zohoori et al., 2012). However, this would imply a certain level of disease awareness among the patient population, that they would be aware that whatever their oral symptoms were which caused them to self-present to the GP, that their concern was that the symptoms may represent an oral cancer or an oral precancer. As noted in the foregoing,

public awareness of oral cancer is poor when compared to other types of cancer (Rogers et al., 2011a, Rogers et al., 2011b, Hertrampf et al., 2012, Monteiro et al., 2016). Instead, this is surely more likely to suggest that the tendency of patients to present to GPs with oral soft tissues concerns in general may relate to a lack of awareness of what dentists are actually capable of screening for in primary dental care, which was suggested by participants in the qualitative study. In Part A, dentists also felt that patients who present with oral soft tissue symptoms to their GP, instead of their dentist, might also do so because it is a non-tooth related complaint, and therefore considered not to be the domain of the dentist. Participants also suggested that patients may associate attending the dentist with incurring a higher cost or may indeed not be aware of how best to access dental health care services. Ironically, the best way of improving patient knowledge of oral health and oral health care services, and changing the current perception described in the foregoing, is through more regular dental attendance (Taniguchi-Tabata et al., 2017). Thus, participants in Part A suggested that a GP's role should entail the promotion of oral health and the coordination of dental referral to start a cycle of care that might change this pattern of presentation. Results from the qualitative study also suggested that most patients attributed little value to oral health, and often only attended the dentist when they were suffering from the symptoms of oral disease. The promotion of oral health in the context of an emergency situation is not a good way to improve oral health awareness among patients (Barnett et al., 2014), which is another reason why promoting regular dental attendance as part of disease prevention would be a better way to influence behavioural change in high-risk groups.

6.3.2 Secondary Prevention

In Part A, dentists also believed that in addition to improving the primary prevention of oral cancer, GPs are well positioned to improve the secondary prevention of oral cancer by advising high-risk patients of their increased oral cancer risk and facilitating referral to a dentist, where opportunistic screening may occur as part of a routine dental examination (Walsh et al., 2013). It has been shown that personalised advice from a health professional, based on the individual's risk factors, is more effective in promoting the uptake of screening than generalised advice (Edwards et al., 2013). It has been stated that the most high-risk patients are often more likely to see a GP more regularly than a dentist (Netuveli et al., 2006). A Cochrane review, which looked at the effectiveness of different methods for detecting potentially malignant oral lesions and early oral cancers found that the conventional oral examination (COE), which forms part of any routine dental examination, had sensitivities and specificities similar to those reported for breast cancer screening programmes (Walsh et al., 2013). There is an assumption that a COE forms part of any routine dental examination (Walsh et al., 2013, Epstein and Huber, 2015). This is significant then because by getting high-risk patients to attend a dentist for a routine dental examination would allow for opportunistic screening of the oral cavity, thus fulfilling the criteria for oral cancer screening (Rethman et al., 2010). Therefore, supporting GPs to identify high-risk patients and facilitate dental referral was advocated as the best way to integrate an oral cancer prevention strategy in Part A. Poudel's group noted that integrating oral health practices would be easier if there were more available resources (Poudel et al., 2018). As noted in the literature review, here are a number of studies that have shown the effectiveness of an oral health assessment tool for non-dental health professionals

(Jeganathan et al., 2010, George et al., 2016). In 2010, a three-item oral health assessment tool was developed for use by dietitians in an ambulatory care setting in Australia. The tool was designed to screen HIV-infected patients at risk of oral diseases to facilitate dental referral. Authors found that the three-item oral health assessment was a valid and sensitive tool to “trigger” for further oral health assessment and referral to a dental professional (Jeganathan et al., 2010). In 2016, a two-item oral health assessment tool was developed for use by midwives in the antenatal care setting in Australia. The tool was designed to identify pregnant women who were at risk of oral disease and to facilitate dental referral. Authors found that the two-item screening tool was reliable, valid and easy to use by midwives, and potentially also by other antenatal care providers, including GPs (George et al., 2016).

In Part C of this study, the majority of the patients included in the retrospective analysis were “high-risk”, because 79% were older than 50 years of age and 81% had a positive smoking history (Conway et al., 2008). Although, there were equal numbers of male and female patients overall, male patients were less likely to be diagnosed with a PMD than female patients overall, male patients were less likely to be diagnosed with a PMD than female patients (0.41 (0.18, 0.91)). In Ireland, females aged between 35 and 74 years are more likely than males in the same age group to visit a dentist regularly, which may explain why male patients were less likely than female patients to be diagnosed with early, typically asymptomatic lesions like PMDs (IPSOS MRBI, 2018). Patients who attend a dentist regularly are more likely to have oral disease detected at an earlier stage (Elwood and Gallagher, 1985). This makes sense because it affords the dentist the opportunity to perform a COE and screen for oral disease during a routine dental examination (Walsh et al., 2013, Epstein and Huber, 2015). If men aged between 35 and 74 years are less likely to

attend the dentist than women in Ireland, then it should follow that they would be less likely to have an asymptomatic lesion picked up opportunistically during a routine dental visit, as the results of Part C suggest. It was found that PMDs in general were statistically more likely to be detected as opportunistic findings (OR 7.82; 95% CI (2.67, 22.94)). In Part C, 62% of PMDs were detected as opportunistic findings, 94% of which were detected by dentists. Dentists are well positioned to visually inspect the oral mucosa as part of a routine dental check-up (Walsh et al., 2013). By contrast, GPs do not routinely inspect the oral mucosa (Wade et al., 2009), so detecting an oral lesion opportunistically is much less likely, as the results suggest. This was the rationale used by dentists in Part A of this study. Interviewees felt that it was fair to assume that by increasing dental attendance among patients, especially those with significant risk factors for oral cancer, that there would be an expected increase in the amount of early oral cancers and precancers detected. In Part C, it was statistically more likely that PMDs would be detected by a dentist (OR 5.29; 95% CI (2.08, 13.45)). The 6% (2 cases) of PMDs that were detected by GPs were not true opportunistic detections. The first case was a patient who presented with a lump on the palate, who, on examination, was found to have a lesion on the floor of the mouth. The second case was a patient who presented with a wart-like lesion on the tongue, who, on examination, was found to have a lesion on the buccal mucosa.

6.3.3 Model of care to support an oral cancer prevention strategy

The second part of the third objective was to propose a model of care that would support an oral cancer prevention strategy in primary health care in Ireland. A model of care broadly defines the way patient care is delivered by ensuring patients get the “right care, at

the right time, by the right people in the right place” (Department of Health, 2012b). In advance of outlining any model of care, it is important to understand the outcome for which the model of care is designed to achieve, and how the key factors which may affect the outcome of interest could be addressed by the model of care (Department of Health, 2012b). In a recent study of GPs in Ireland, the three most important factors identified for the early detection of cancer in the primary care setting were: (i) increased public awareness of early cancer symptoms, (ii) earlier patient presentation and (iii) access to clinics for the urgent assessment of patients with suspected cancers (O’Shea and Collins, 2016). In 2019, an Australian study suggested that there is currently a missed opportunity regarding the early detection of oral cancer in the primary medical care setting. The authors noted that there needs to be increased awareness of oral cancer and precancers among GPs, in addition to creating a greater awareness among patients (Webster et al., 2019). This is essentially what Irish GPs identified as the most important issues surrounding the early detection of any cancer (O’Shea and Collins, 2016). In this study, as shown in Parts A and B, both dentists and GPs believe that GPs promoting oral health and encouraging dental attendance would be a feasible goal for oral health collaborative practice. These measures have been shown to increase oral cancer awareness and to encourage earlier presentation for potentially malignant oral signs and symptoms in a cohort of high-risk patients (Scott et al., 2012).

The third important factor for the early detection of cancer in the primary care setting highlighted by GPs was the rapid access to clinics for the urgent assessment of suspicious-looking lesions. In Part B of this study, GPs reported difficulty in facilitating access to

dental services for their patients. This was also noted by GPs in other studies (Andersson et al., 2007, Barnett et al., 2016). In Part A, dentists also reported poor communication with GPs. As oral soft tissue disease can present to clinicians from a variety of medical and dental professionals, especially those who work in primary health care (Carter and Ogden, 2007, Hollows et al., 2000), it is important to factor that in when proposing a model of care to support an oral cancer prevention strategy. Part C showed that the majority of oral cancer cases self-present to GPs, and results from Part B showed that GPs do not feel confident examining the oral cavity, and thus may not be able to adequately examine the oral cavity to sufficiently rule out a malignant or potentially malignant oral lesion. In fact, in Part A, dentists were strongly of the view that it would be unfair to expect GPs to reliably diagnose oral disease in the primary medical care setting without the appropriate equipment, support and resources. Although, this pattern of patient presentation may not affect the prognosis for patients who have frank malignancies, as GPs are considered reliable in their detection of overtly malignant lesions (Brocklehurst et al., 2010a), it may affect those with early disease, such as PMDs, which are typically more difficult to identify (Brocklehurst et al., 2010b). This combination presents a more pressing need for a model of care that would provide a clear pathway to facilitate rapid access to oral health care services for the urgent assessment of suspicious-looking oral lesions, thus ensuring that patients get the “right care, at the right time, by the right people, in the right place” (Department of Health, 2012b). In health care, a hub and spoke model is a network of health professionals, operating together to improve health outcomes, where there is a specialist unit called a hub, that is complimented by non-specialist units called spokes. The hub is where the expertise, support and resources are concentrated, and the spokes, which

are usually more plentiful and accessible, offer a more limited range of services in a setting with fewer resources available. Multi-hub networks can also exist, where there are major and minor hubs, both complimented by the spokes, with the minor hubs offering a more limited level of expertise than the major hubs (Porter and Lee, 2013, Elrod and Fortenberry, 2017).

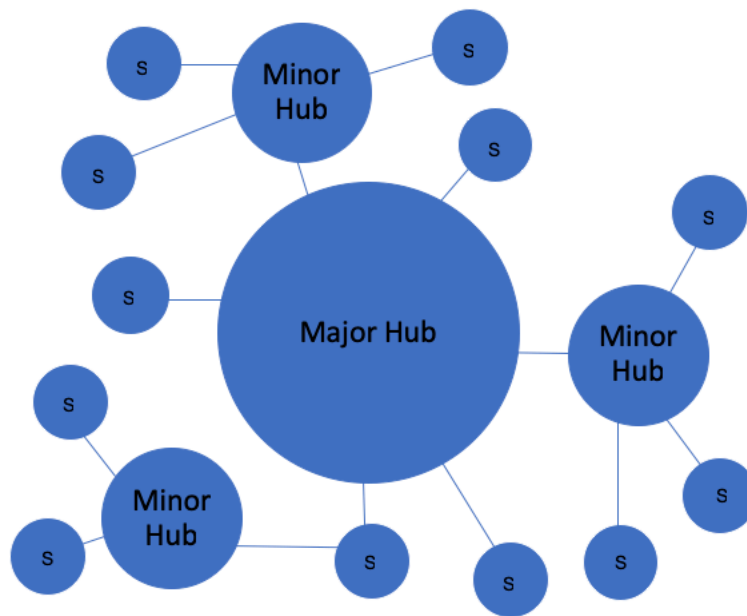


Figure 6.3.3.1: A traditional hub and spoke model *S =spoke

This thesis proposes a model of care that is based on the traditional hub and spoke model where the major hub would be an oral and maxillofacial surgery department, be it an oral and maxillofacial surgery clinic or an oral medicine clinic, because, in Part C, the majority of oral biopsies were submitted from oral and maxillofacial surgery departments, be it from dental or general hospitals. Dentists or local dental surgeries, would occupy the minor hub role, and thus, be an “oral health hub” within the primary care setting, thereby

providing GPs with rapid access to clinics for the urgent assessment of patients with suspected cancers, in addition to providing a supportive framework for their GP colleagues to engage in oral health collaborative practice, such as the aforementioned primary prevention approach, which would include oral health promotion and personalised advice based on the individual's risk factors (Edwards et al., 2013).

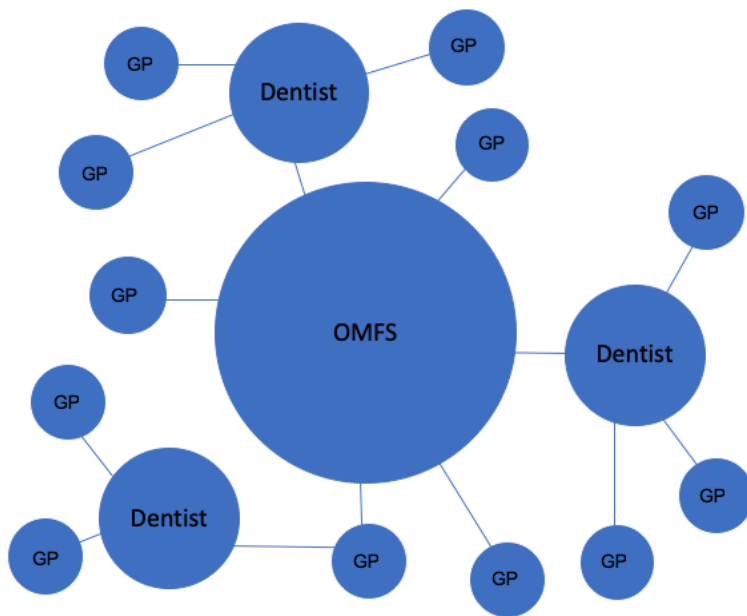


Figure 6.3.3.2: A model of care to support collaborative practice between GPs and dentists to improve the early detection of oral cancer

GPs would occupy the spoke role, because their skill set caters to various areas of responsibility such as, engaging in health promotion, providing first contact advice for patients, in addition to the coordination of care including the referral to specialist services (O'Dowd et al., 2017). This model of care is designed to support an oral cancer prevention strategy by making collaborative practice easier, which by definition, is to improve patient

care by utilising the skill set of each member of the health care team (World Health Organisation, 2010). This model brings GPs and dentists closer together so that they may utilise one another's skill sets. For example, the one of the goals of the National Cancer Strategy 2017-2026 is to improve the primary and secondary prevention of cancer (Department of Health, 2017a). In Part A of this study, dentists felt that GPs could contribute significantly to achieving this goal through enhancing the primary prevention of oral cancer by promoting oral health, providing first contact, personalised advice in relation to the major risk factors for oral cancer and facilitating referral to primary dental care. Dentists could support GPs in this effort by reinforcing primary prevention, whilst also screening for oral mucosal disease, thus enhancing the secondary prevention of oral cancer (Walsh et al., 2013)

The National Cancer Strategy 2017-2026 could be strengthened by this model of care because, the WHO has recommended that the prevention of oral cancer should be an integral part of any national cancer-control programme, which should involve oral health professionals and other primary medical care personnel, "with the relevant training to do so" (Petersen, 2009). Part B of this study showed that GPs have not had this "relevant training" at either the undergraduate or postgraduate level, and therefore, are not confident examining the oral cavity. However, dentists have had the relevant training to perform a COE as part of a routine dental examination (Walsh et al., 2013), and this model of care shows how dentists could be that first line of support for GPs, by acting as an "oral health hub" within the primary health care setting, whether the GP needs an urgent second opinion on a suspicious oral lesion, or whether the GP wants to start the chain of oral

cancer prevention, by improving oral cancer awareness and by getting patients to engage with a dental professional as previously described in Part A.

6.3.4 Policy, guidelines and accessing health care services

There are some policy improvements needed to support this model of care. Firstly, according to the HSE website; “If you attend the emergency department of a public hospital without being referred by your GP or family doctor, you may be charged a standard fee. There is no charge if you are referred by your GP. You must show the referral letter from your GP when you attend the emergency department”. As this study suggests, dentists are already functioning as gatekeepers for oral mucosal disease in Ireland, thus it is recommended that emergency department charges be waived for dental referrals too, and to have this be reflected on the HSE website, so that if a patient decides to consult the website about hospital charges and reads, “there is no charge if you are referred by your GP”, they may then elect to go to a GP instead of a dentist, even if the problem is of an oral health nature. Secondly, the National Cancer Strategy 2017-2026 states that other health professionals have an important role to play in supporting GPs in the early detection of cancer. Furthermore, it states; “For example, dentists have an important role to play in the prevention and early detection of mouth, head and neck cancer. They see many patients on a regular basis for routine dental check-ups, where the oral cavity is fully examined”. Whilst the inclusion of dentists in the National Cancer Strategy 2017-2026 is welcomed, ideally, the potential role of collaborative practice between GPs and dentists in this regard should be explained clearly through a recommendation for an annual GP-led referral to a dentist for an oral health check-up, such as that which exists in the Canadian health care

system (Hawkins et al., 1999). This recommendation is in line with that suggested by dentists in Part A, that “getting the patient to engage with a dentist would be the best approach”.

6.4 Limitations

Whilst this study focused on the integration of oral health into primary health care in Ireland, based on the findings from Part A, only two specific areas of integration were chosen to be explored in greater detail; the prevention of oral cancer and the bidirectional relationship between periodontal disease and diabetes. Although the aforementioned were worthy areas of focus, this study omitted other patient populations entirely, such as paediatric patients. As shown by the IMB programme in the U.S., the integration of oral health by medical professionals has been accomplished among paediatric patients (Rozier et al., 2003), and this integration has yielded many positive outcomes over the years (Achembong et al., 2014, Stearns et al., 2012, Kranz et al., 2015). Another general limitation of this study was the omission of general health integration into primary dental care. In the U.S., some authors have suggested that dentists could also integrate general health practices into their existing scope of care. For example, dentists could measure blood pressure, take HbA1c and cholesterol measurements, record Body Mass Index (BMI) and deliver preventive interventions such as smoking cessation (Dolce, et al., 2017). The focus of this study was confined to the integration of oral health into primary health care.

6.4.1 Part A

In Part A, the dentists recruited to take part in the qualitative study were from purposive sampling from one university dental hospital (DDUH), which is a limitation of this study. However, participants were recruited from this hospital because of their close collaborative practice relationships with both primary care medical and dental professionals. Furthermore, the participants themselves are typically based in a university hospital for their clinical work, and therefore may not be an appropriate cohort to give their opinions on the integration of oral health with primary health care. A better sampling strategy may have been to recruit dentists from the primary dental care setting and dentists from the hospital setting. However, Part A does not seek to represent the opinion of all dentists in Ireland, but rather to gain a deeper understanding of this topic from the perspective of those who are often on the receiving end of patient referrals that have originated in the primary care setting, be that from a medical or dental professional (Ritchie et al., 2003). Another consideration is that the integration of oral health into primary health care would involve multiple health care workers, and so it would have been beneficial to gather qualitative data from primary care medical professionals as part of this study to compare and contrast views. However, this study used an explanatory sequential design, and in Part B, medical professionals were asked questions that would test the perceptions noted by the dentists in Part A of this study. Nevertheless, a follow-up qualitative study would have gathered a different type of data, and this may have been a better comparison. In addition, the choice of interviewer may have been a source of bias in this part of the study. All of the dentists recruited would have known that the interviewer was both the lead researcher, and dual-qualified in medicine and dentistry. This may have influenced

their approach to discussing the topic, and an interviewer who was not directly involved with the research and unknown to the participants may have been better to reduce bias. Finally, the sample size of 14 interviews was small. The sample size, in addition to the relatively homogenous hospital-based dentist may have lowered the generalisability of the results.

6.4.2 Part B

In Part B of this study, a pilot questionnaire was tested on 8 GPs who were affiliated with the department in one of the chosen academic centres (UCC). Feedback from the pilot phase suggested that one question should be removed. This question asked participants about the colocation of a dentist within their primary care centre where they worked. The question was considered leading by those who participated in the pilot. It may have made good sense to allow the question to remain and perhaps modify the working because the colocation of a dentist in a primary care clinic was identified as a significant facilitator for oral health integration into primary health care (Harnagea et al., 2018). If this question had been included, perhaps it would have been possible to look for an association between the colocation and the tendency to coordinate dental referral.

Due to the sampling issues described in Chapter 4, the sample is not homogenous. Both of the aforementioned academic centres were chosen as recruitment sites because they had self-identified as GPs who were interested in learning more about diabetes care. They were amenable to online material (a questionnaire), and they were representative of two geographically distinct regions in Ireland. Unfortunately, a second recruitment cycle was added when the gatekeeper from NUIG failed to engage during the initial recruitment

cycle. One drawback of this sampling strategy was that the questionnaire had been designed for qualified GPs, and thus the questionnaire did not include a question to identify qualified GPs from GP registrars during the second recruitment phase. However, one question included in the questionnaire asked, “how many years have you worked in primary care practice as a GP”, and 19 participants out of 34, reported working in primary care for over 10 years, and so it was assumed from these figures that a maximum of 15 GP Registrars were recruited during the second recruitment phase, thus the homogeneity of the study sample is relatively well preserved in spite of the unforeseen logistical challenges. The study sample was small, so it questions the generalisability of the results. The GPs who participated in the pilot phase should have been recruited to increase the study numbers. However, this was not considered at the time.

There may have been some inherent bias in the study sample. The GPs who took the questionnaire were either GPs pursuing further education or GP registrars, thus still enrolled in further education. Therefore, this study sample represents a cohort who may be more likely to be open to the idea of more education and training in an area they have self-identified as weak. A larger population sample may have shown a lower level of interest in oral health as a topic and a greater unwillingness to integrate oral health as part of their existing scope of practice.

6.4.3 Part C

In Part C, there were a number of limitations. First, as this was a retrospective analysis, it was necessary to rely on the interpretation of the patient history as documented in the clinical notes for each case. That in itself has limitations, because it relies on the accuracy of the history reported by the patient and the accuracy of the history as documented by the treating clinician. Second, the opportunistic detection of a lesion was interpreted as detecting the lesion through opportunistic screening during a routine dental examination. This was interpreted as such because there is an expectation that opportunistic screening of the oral mucosa forms part of any routine dental examination (Rethman et al., 2010, Epstein and Huber, 2015, Walsh et al., 2013). However, the process of oral mucosal screening during a dental examination may vary from clinician to clinician, so it is not standardised in our results. Some clinicians may examine under the tongue and palpate the floor of the mouth, whereas others may simply conduct a visual examination of the oral mucosa, whilst focusing primarily on the oral hard tissues. Third, both oral cancer and PMDs were included in this study as “case”. Whilst this is relevant because oral cancer screening involves not only screening for oral cancer, but also screening for PMDs (Rethman et al., 2010), the clinical significance of PMDs remains uncertain, and the long-term follow-up of patients who have had PMDs surgically removed remains controversial (Speight and Warnakulasuriya, 2017, Brocklehurst and Speight, 2018). Therefore, the study design may have been better if it focused solely on oral cancer. However, what Part C did show was that the majority of patients with oral cancer self-present to medical doctors in Ireland, and that there is a statistically significant amount of potentially malignant disease detected during routine dental examinations, among a cohort that was

predominantly “high-risk”. So, although it would have been simpler to focus solely on oral cancer diagnoses, by definition, oral cancer screening involves “the evaluation of an asymptomatic patient to determine if he/she is unlikely to have a potentially malignant or malignant lesion” (Rethman et al., 2010).

In addition, head and neck cancers are a heterogeneous group, so, depending on the database or registry used for incidence figures, oral cancer can be defined as including the oropharynx, and/or the lip (Ali et al., 2013). This study focused on oral cavity cancers. If the search category was expanded to include cancers/precancers of the lip or the oropharynx, there may have been greater power in this study as oral cancer is relatively less common than other cancers in Ireland (Department of Health, 2017a). In addition, alcohol could have been added as an additional explanatory variable and would have given a more detailed description of the risk factor profile. However, the study did not set out to imply causality or make associations in that way. It was to identify how these oral lesions are first detected in primary care setting, and smoking status and age were used as measures to define “high-risk” (Conway, et al., 2008). Finally, the model of care described simply outlines how best patients can get the “right care, in the right place, by the right person at the right time” (Department of Health, 2012b). It does not lay out specifics or how GPs might be able to successfully incorporate this type of practice into their scope of clinical care. It is for that reason that more research is needed, such as a feasibility study within a designated region, to determine if collaborative practice between dentists and GPs can be improved by the model of care.

6.5 Strengths

Harnagea's group suggested that whilst there are general barriers and facilitators to oral health integration into primary health care, each health care system will have its own policies, guidelines, services and structures that either act as barriers or facilitators to integration (Harnagea et al., 2018). This is the first study to focus on the integration of oral health into primary health care in Ireland. The work of this study started in 2016, three years ahead of the newly published oral health policy. A strength of this study is that there are clear recommendations to address the barriers to oral health integration in Ireland in Section 6.6.

Furthermore, one of the actions to be taken noted in Part A of this study was that the dental profession needs to advocate more strongly for oral health integration, and to promote the role of the dentist to other health care professionals. This thesis has already published two manuscripts, one which focused exclusively on the need to update the national guidelines on routine diabetes care. This publication was in a national medical journal, with a predominantly medical readership.

In addition, simply by conducting a questionnaire among GPs, the issue of oral health integration has been raised among many practicing GPs in Ireland.

This is also the first study that examined the way oral cancer and PMDs are detected in the primary care setting in Ireland, which is an important addition to the National Cancer Strategy 2017-2026, because whilst dentists are alluded to very generally in the National Cancer Strategy 2017-2026, this study provides a clearer justification for promoting dental attendance to patients with known risk factors for oral cancer, as opportunistic detection may yield a greater number of early diagnoses.

6.6. Recommendations

This section considers recommendations for policy, guidelines and practice based on the outcomes from this study. In doing so, it fulfills the fourth and final objective, which was to make recommendations for the development of sustainable collaborative practice relationships between primary care medical and dental professionals, in order to support the integration of oral health into primary health care in Ireland.

6.6.1 Recommendation one

It is recommended that the national integrated care guidelines for people with type 2 diabetes be updated to (i) include dentists as part of the integrated care team and (ii) include a recommendation for a dental-check up as part of the treatment plan for all those newly diagnosed with diabetes, and annually thereafter.

The American Diabetes Association's "Standards of Medical Care in Diabetes" recommends referral of a patient to a dentist for a comprehensive oral health examination, as part of the initial management of a patient with diabetes (American Diabetes Association, 2015). Similarly, the RACGP and the IDF recommends that referral to a dental professional should form part of the treatment plan for any primary care provider for patients with diabetes (International Diabetes Federation, 2009, Royal Australian College of General Practitioners, 2016). Although participants in Part A of this study did not mention guidelines, they did specify that referral to a dental professional should be a "rule of thumb" for overall diabetes care.

In Part B of this study GPs reported that they often refer patients to other health professionals as part of routine diabetes care, but yet rarely do so for dentists. GPs reported low levels of oral health knowledge, and this was also noted specifically in relation to diabetes knowledge where only a small percentage of GPs were aware of the bidirectional link between periodontal disease and diabetes. If the national guidelines were updated to include a recommendation for an annual dental check-up by a dentist, it is reasonable to expect that more GPs would become aware of the relationship between oral health and diabetes. Updated national guidelines would also serve as a reminder to GPs, and to other members of the primary health care team, to facilitate engagement with primary dental care, in addition to the other health professionals to whom they frequently refer, as part of the integrated care team noted in Part B of this study.

6.6.2 Recommendation two

It is recommended that the National Cancer Strategy 2017-2026 be updated to include a specific recommendation for an annual check-up by a dentist for high-risk populations.

There are many risk factors for oral cancer, but increasing age, tobacco use, and male sex are the most significant risk factors (Conway et al., 2008). Population-based screening programmes for oral cancer have not been recommended because the prevalence of oral cancer is too low, and the natural history is not fully understood (Speight and Warnakulasuriya, 2017). However, opportunistic screening of high-risk individuals, based on their risk factors, has been recommended (Shuman et al., 2010), and this would occur when high-risk patients attending a health professional for another purpose are examined for signs of malignant or PMDs (Brocklehurst et al., 2010a). The National Cancer Strategy

2017-2026 states that “dentists have an important role to play in the prevention and early detection of mouth, head and neck cancer. They see many patients on a regular basis for routine dental check-ups, where the oral cavity is fully examined” (Department of Health, 2017a). There is an expectation that opportunistic screening of the oral mucosa forms part of any routine dental examination (Walsh et al., 2013, Epstein and Huber, 2015). A Cochrane review, which looked at the effectiveness of different methods for detecting PMDs and early oral cancers found that the COE, which forms part of any routine dental examination, had sensitivities and specificities similar to those reported for breast cancer screening programmes (Walsh et al., 2013). In Part B of this study GPs reported that they were not confident examining the oral cavity. In addition, they also reported that they were not confident discussing oral health issues with their patients. GPs are not usually trained to examine the oral cavity, and thus tend not to integrate an oral examination into their scope of clinical practice (Carter and Ogden, 2007, Wade et al., 2009). In Part B, GPs reported a paucity of oral health training at both the undergraduate and postgraduate levels. In Part A of this study, dentists suggested that it would be an unrealistic goal to expect GPs to start screening the oral cavity for oral mucosal disease in the primary medical care setting because they do not have access to the correct dental instruments, a dental chair or a dental light, all of which make a COE much easier and reproducible. Dentists in the qualitative study felt that GPs should instead be a facilitator of dental access for patients with risk factors for oral cancer. The most high-risk patients are often more likely to attend a GP instead of a dentist (Netuveli, et al., 2006), therefore including a specific recommendation as part of the National Cancer Strategy 2017-2026 may serve as a reminder to GPs to promote dental attendance for high-risk patients. In Part C of this study,

results showed that simply by attending the dentist, there was a statistically significant amount of potentially malignant oral lesions detected opportunistically by dentists among a predominantly high-risk cohort in Ireland. In Part C, male patients were significantly less likely to be diagnosed with a potentially malignant oral lesion than females. This may be explained by the lower number of male patients between the age of 35-74 years attending a dentist (IPSOS MRBI, 2017). In that respect, when considering this second recommendation, “high-risk” populations should certainly include male patients, with a smoking history, over a certain age. Targeted opportunistic oral cancer screening of high-risk individuals has been found to be cost-effective through simulation modelling (Speight et al., 2006). However, although the decision as to whom specifically to target falls outside the work of this thesis, results from Part C would suggest that male patients would be worthwhile of special consideration in the National Cancer Strategy 2017-2026.

6.6.3 Recommendation three

It is recommended that all emergency department attendance charges in public hospitals be waived for patients who attend with a referral letter from a dentist, just as they are waived if a patient attends with a referral letter from a GP.

The HSE-website states that “if you attend the emergency department of a public hospital without being referred by your GP or family doctor, you may be charged a standard fee of 100 euro”. Statements such as this on the HSE-website may influence a patient to preferentially attend a GP, instead of a dentist, if they are worried about an oral lesion, and this is something which was identified as an issue in Part C of this study. In Part C, the vast

majority of oral cancers self-presented to GPs, and a significant percentage of cases first detected by GPs were referred indirectly, to the hospital-based specialist unit where the biopsy was carried out, thus delaying the time to diagnosis. In Part A of this study dentists suggested that many patients preferentially attend their GP for oral health symptoms, especially those related to the oral soft tissues. In Part B, GPs confirmed that they are often consulted by patients for oral health symptoms, especially those affected the oral soft tissues.

It would be worthwhile to amend the HSE-website to suggest that a referral letter from a dentist (e.g. “if the complaint is related to your mouth”) would also qualify for an emergency department fee waiver. In Part C there were no indirect referrals from dentists who detected malignant or potentially malignant oral lesions. Indeed, in Part A, it was noted that dentists have much better knowledge of the referral pathways for oral mucosal disease, thus their capacity to refer patients for urgent assessment at a secondary care facilitated should be reflected on the nationally accessible HSE-website.

6.6.4 Recommendation four

It is recommended that the 2019 National Oral Health policy acknowledge GPs, and other members of the primary health care team, as potential providers of oral health care in Ireland.

The 2019 National Oral Health policy has listed 41 actions as part of the 8-year policy. Actions 13 and 18 state, “to develop routine oral health care services for eligible adults” and “to develop clinical care pathways that originate in primary care to access oral health care in advanced oral health care centres” (Department of Health, 2019). This policy also

stipulates that most oral health care will be provided by local dentists, who are expected to be, “the first point of contact for all oral health care”, and from here, there should be a “clear route through to advanced oral health care services” (Department of Health, 2019). It is certainly worthwhile to suggest clear referral pathways from more basic oral health care services to more advanced oral health care services, and this is reflected in the model of care proposed in Part C of this study. However, the National Oral Health policy should it is time for a change in the way that we think about who can provide oral health care services. In this study, there were clear opportunities for GPs to be “the first point of contact” for oral health care in some instances, for example, for patients with diabetes, who regularly attend their GP as part of their chronic systemic disease management, but yet do not have a regular dentist, (as recommended in Part A of this study) these patients would undeniably benefit from oral health input from their GP in Ireland, even if it is just informing them of their increased risk of periodontal disease, and facilitating access to oral health care services. Similarly, as noted in the second recommendation, GPs may have a huge role to play in the primary and secondary prevention of oral cancer, be it through oral health promotion, patient education or by simply referring the patient to a dentist, which is in keeping with Action 18, because the local dental surgery is a “more advanced oral health care center” than the local GP surgery, because it is the oral health hub within the primary health care setting. By acknowledging the potential role for GPs, and/or other primary health care professionals, the 2019 National Oral Health policy could promote the integration of oral health into primary health care through casting the net out a little wider to funnel more patients into primary oral health care services from other services in the primary health care setting.

6.6.5 Recommendation five

To establish a partnership between institutions of dental educators, medical educators and GP educators in Ireland, which would support the development of an oral health interprofessional education strategy at both the undergraduate and postgraduate levels. It is recommended that this be acknowledged in the 2019 National Oral Health policy.

Actions 24 and 27 from the 2019 National Oral Health policy state, “to evaluate graduate education and put lifelong postgraduate mentoring and supervisory networks in place for dentists to support their professional career” and “to undertake an undergraduate review of dental education, placing primary care at its centre and embracing engaged learning”.

Harnagea’s group suggested that discipline-orientated education is a barrier to oral health integration in primary health care (Harnagea et al., 2017). The 2019 National Oral Health policy confines dental education to dental professionals in training, or those who have already qualified. In Part A of this study, the dentists who were interviewed suggested that health care professionals, other than dental professionals, should be exposed to dental education and training, especially medical professionals in practice or in training, be it for GPs or medical students, or both. This study demonstrated an absence of collaborative practice between GPs and dentists. In Part A, dentists reported poor communication with GPs. In Part B GPs reported a similar dearth in communication, and this was most poignantly represented by the absence of referrals to and from dental professionals. In part C, of the 9 indirect referrals from GPs in relation to malignant or potentially malignant oral lesions, only 3 were to dentists in the primary health care setting, the other 6 were to different health professionals at secondary care centres. Interprofessional education is necessary to prepare health professionals to effectively engage in collaborative practice.

Health care professionals must be “collaborative practice ready”, and interprofessional education is an important part of that preparation (World Health Organisation, 2010). In Ireland there are 14 individual GP-training programmes in Ireland, governed by the Irish College of General Practitioners and 6 individual medical schools. By setting up an Irish-based unit, similar to CIPCOH in Boston, it would be possible to develop and implement a national curriculum with the relevant training bodies like the ICGP, and the individual medical schools in Ireland, and to serve as a national resource for systems-level research on oral health integration into the education of medical professionals in practice or in training.

6.7 Conclusions

This study revealed an absence of a culture of collaborative practice between medical and dental professionals in primary health care in Ireland, thus suggesting that the integration of oral health into primary health care would require a multi-pronged approach to slowly change the existing culture over time.

It is clear from both the international literature, and from the findings of this study, that multiple factors can act as either barriers to or facilitators of oral health integration, and the local context that is shaped by existing policy, guidelines and the availability of health care services, should be considered when measuring the extent of oral health integration in primary health care. In this study, it became clear that one way to contribute to changing the existing culture would be to update national policies and guidelines, including the 2019 National Oral Health policy, the National Cancer Strategy 2017-2026, the National Integrated Care guidelines for people with diabetes and the website for the HSE, as suggested in the recommendations. Through fulfilling the study objectives, this thesis identified clear opportunities for oral health integration in primary health care. It would be reasonable to assume that by incrementally working to bring these opportunities into practice, that the existing culture may adapt to accommodate a more collaborative medical-dental form of practice. As there are many different stakeholders involved in health care policy, health care guidelines, health professional education and health care service provision, the integration of oral health in primary health would need cooperation from many groups, and that may remain the greatest obstacle to making meaningful progress in this area.

6.8 Future research

It would be helpful to establish a baseline in Ireland for the oral health education of non-dental health professionals, especially medical doctors in practice or in training. A survey is recommended of the various medical school curricula in Ireland, via the course coordinators/directors, to measure the existing oral health content in the curricula. It is also recommended that a survey be carried out on the 14 GP training programmes in Ireland, ideally via the lead trainers for each programme, to measure the existing oral health content in the 14 programmes representing different regions in Ireland, and how the results correlate with the 2018 ICGP curriculum.

The development and validation of an oral health screening tool is recommended for use by GPs, and/or other non-dental primary health care professionals, to identify patients who are high-risk for oral cancer. If the National Cancer Strategy 2017-2026 is to be amended, to support a targeted opportunistic oral cancer screening strategy, then GPs would need to be able to identify who to “target”, so that they could facilitate dental referral where opportunistic screening may occur.

A feasibility study of a brief oral health intervention as part of diabetes care is recommended, to determine if a GP-led recommendation or “nudge” to attend a dentist as part of diabetes care, would translate into dental attendance. It would also be helpful to gather data from patients in this study to determine the acceptability of a brief oral health intervention by a GP in primary health care.

CHAPTER 7

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APPENDICES

APPENDIX A

Consent Form

- I have read this consent form.
- This study has been explained to me.
- The principal researcher has answered all my questions to my satisfaction.
- I believe I understand what will happen if I agree to be part of this study.
- I voluntarily agree to be part of this study, without prejudice to my legal and ethical rights.
- I have received a copy of this agreement and I understand that, if there is a sponsoring company, a signed copy will be sent to that sponsor.

PARTICIPANT'S NAME:

PARTICIPANT'S SIGNATURE:

Date:

Date on which the participant was first furnished with this form:

Statement of investigator's responsibility: I have explained the nature, purpose, procedures, benefits, risks of, or alternatives to, this research study. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

I acknowledge that each participant has the right to a copy of their interview transcript and I will offer each participant access to a copy. In addition, I will offer each participant access to the findings of the study. I also assure that data from this study will not be used in future unrelated studies without further specific consent being obtained.

Principal researcher signature:

Date:

APPENDIX B



Will my taking part in the research be kept confidential?

All information that you provide for this study will be kept strictly confidential. The principal researcher will be the only person who will have access to your identity. Your name will not appear on any documents, instead you will be allocated a number which will be used as an identifier.

Only you and the principal researcher will know your code number. Your name will not be used in the data analysis or write-up of the findings. However direct quotes from the interview may be used anonymously in the write-up (this is the nature of qualitative research, so do not be alarmed by this). Your data will be kept in a safe locked cabinet.

What are the possible benefits?

This study is part of a broader Trinity College-based research project, which is jointly linked to the Department of Public Health & Primary Care, and the Dublin Dental University Hospital. The overall aim of this research project is to integrate oral health with general medical practice. Data obtained in this study will be used in conjunction with published material to make recommendations to support oral health integration with general medical practice in Ireland.

What are the possible disadvantages and risks of taking part?

There are no known risks, but it will require some of your time as outlined.

Who can I contact for further information?

Dr John Ahern
ahernjm@tcd.ie



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Participant Information

Semi-structured interviews with dental professionals working in the Dublin Dental University Hospital.

Exploring the aspects of oral healthcare delivery, that should be introduced to general medical practice in Ireland.



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Participant Information

You are being invited to take part in a research study.

Before you decide to take part, it is important that you understand why the research is being done and what it will involve taking part.

What is the purpose of the study?

The aim of this study is to explore which aspects of oral health, including oral health promotion and the prevention, diagnosis and management of oral disease, should be introduced to the education and practice of non-dental health professionals in primary care.

Why have I been chosen to take part?

You have been chosen to take part in this study because you are a qualified dentist, and you have worked in, or undergone clinical specialty training in the Dublin Dental University Hospital for a period longer than 6 months, within the last 5 years. As a national center for referral, from both dental and non-dental sources, the interdisciplinary team and collaborative approach adopted throughout the hospital ensures that clinical and educational staff would be well positioned to offer an insight to the aspects of oral health which should be included in the education and practice of non-dental health professionals.

Do I have to take part?

It is your decision whether or not you choose to take part in the study. You are also free to withdraw from the study at any time and do not have to give a reason for this.



Participant Information

What does it mean to participate in this study?

This is not a test of your knowledge, there is no right answer. It is your professional opinion which is important.

If you decide to take part, you will be asked to participate in a one-to-one interview with Dr Ahern. You will be asked about the relative importance of oral health and oral health competencies that you would like to see adopted in practice by other members of the health workforce. You will be asked about important oral diseases that share common risk factors with major non-communicable systemic diseases, and how the prevention of oral disease, its early detection and effective communication with dental health professionals may be incorporated with general medical practice. At the end of the interview you will be asked to describe an oral health screening tool, that may include questions and/or an examination, which you would deem realistic and appropriate for a non-dental health professional in the general medical practice setting.

The interview will take approximately 1 hour and can be set up at a time and place convenient for you. The interview will be recorded and afterwards transcribed so that the themes raised can be analysed. Each participant will be offered access to the transcript of their interview.

The principal researcher is **Dr. John Ahern**, a dual-qualified clinician in Dentistry and Medicine, and a part-time PhD candidate in Trinity College Dublin. This research project is being supervised by Professor Joe Barry, Professor Tom O'Dowd and Professor June Nunn.

*Professor Barry; Professorial Chair in Public Health Medicine, TCD.
Professor O'Dowd; Professorial Chair in General Practice, TCD.
Professor June Nunn; Emeritus Professor of Special Care Dentistry, TCD.*

APPENDIX C

Oral Health integration with General Medical Practice

1) Relative importance of Oral Health

Oral health is often regarded as not a priority, because it affects morbidity as opposed to mortality. In some cultures, teeth are seen as expendable and therefore oral health is given little importance.

- When you hear the words “oral health”, what does it mean to you?
- How do you think other non-dental health professionals regard oral health, and can you tell me your reasoning?
- Are there any areas of systemic healthcare delivery, be it preventive advice or active clinical examination, with which you feel oral health should be incorporated?
- Are there areas of oral health promotion that you believe should remain the sole responsibility of the dental profession, or which may fit well with primary medical care?

2) Knowledge & Attitudes

Most oral disease and chronic general diseases have common risk factors such as tobacco use, excessive consumption of alcohol or sugar and non-health promoting behaviours.

- Caries, Periodontal disease, Oral Cancer; in terms of the broad headings, what aspects of these common oral diseases do you think other health professionals should receive training?
- Dental professionals are generally reacting to the sequelae of oral disease (e.g. restoring teeth, extracting teeth), as the vast majority of patients are “symptomatic attenders”. Do you think educating other health professionals on the common risk

factors for oral disease would increase the numbers of patients who attend the dentist proactively, as part of their overall systemic disease management?

3) Competencies

- How do you think a non- dental health professional should approach screening for oral disease? Screening questions relating to common symptoms (e.g. bleeding gums, loose teeth?) Do you think a screening examination is appropriate for every patient with known risk factors for common oral diseases? Do you see any barriers to this in the real world (i.e equipment, time, expertise)?
- The ability to impart patient education, is heavily reliant on the health professionals level of knowledge; bearing in mind the wide array of diseases confronting a non-dental health professional in primary care, to what extent do you think a health professional should be able to educate patients in relation to oral health (solely patient education +/- preventive advice/treatment +/- dental referral)

4) Inter-professional Collaboration

- What is your opinion on the appropriateness of referrals to dental professionals in primary care from non-dental health professionals if suggested by the risk assessment, screening questions or examination? Do you see any barriers? What impact could this have on overall health?
- What has been your experience of accepting referrals from non-dental health workers in the past?

5) Educational Curriculum

- What aspects of oral healthcare delivery do you feel would fall within the scope of a curriculum suitable for non-oral health care providers?
- What aspects of oral healthcare delivery do you feel would be too much to integrate with general medical practice?

- Interventions can range from patient education (common risk factors, dental health services), a nudge/referral to dental professionals, to operative treatments; what scale of intervention do you envisage as achievable, with the *potential for effect* by a general medical practitioner.

6) Closing

- In relation to the oral health integration with general medical practice, are there other issues that I have not addressed that you think are relevant to the topic and design of the proposed intervention?

APPENDIX D

What is your sex?

Female Male

How many years have you worked in primary care practice as a GP?

<10 years 11-20 years 21-30 years >30 years

What is your average number of hours worked per week as a GP?

<20 hours 21-30 hours 31-40 hours >40 hours

What percentage of your adult patients have a medical card?

<25% 26-50% 51-75% >75%

How much oral health education and training did you receive as a medical student?

None Very little Some A lot

How much oral health education and training did you receive as part of your GP training?

None Very little Some A lot

How would you rate your current level of oral/dental health knowledge?

Very poor Poor Good Very good

How often do patients consult your opinion on problems affecting the oral hard tissues (i.e. teeth)?

Often Sometimes Rarely Never

How often do patients consult your opinion on problems affecting the oral soft tissues (i.e. oral mucosa and gums)?

Often Sometimes Rarely Never

I feel confident in my ability to examine the oral hard tissues (i.e. teeth)?

Strongly disagree Disagree Agree Strongly Agree

I feel confident in my ability to examine the oral soft tissues (i.e. oral mucosa and gums)?

Strongly disagree Disagree Agree Strongly Agree

I feel confident in my knowledge of how to facilitate access to dental services in Ireland for my patients?

Strongly disagree Disagree Agree Strongly Agree

How often do you refer a patient to see a dentist?

Often Sometimes Rarely Never

How often do you receive a patient referral from a dentist?

Often Sometimes Rarely Never

What percentage of your adult patients have diabetes?

<25% 26-50% 51-75% >75%

Periodontal (gum) disease can have a negative effect on glycaemic control?

True False

Poor glycaemic control can negatively impact periodontal (gum) disease?

True False

Do you ask your patients if they attend a dentist as part of routine diabetes care?

Often Sometimes Rarely Never

Do you refer your patients with diabetes to see a dentist as part of routine diabetes care?

Often Sometimes Rarely Never

Do you refer your patients with diabetes to see other health professionals as part of routine diabetes care?

Often Sometimes Rarely Never

In relation to oral health education and training, please choose what you consider to be the most important topic for GPs and GP trainees?

- i) Periodontal (gum) disease
- ii) Oral cancer and potentially malignant oral lesions
- iii) Dental caries (tooth decay)
- iv) Dental Trauma
- v) None of the above

How many (if any) of the options listed below do you consider to be feasible oral health education and training goals for GPs and GP trainees in Ireland?

- i) To identify the risk factors which put patients at an increased risk of oral health complications
- ii) To promote oral health and dental service attendance to patients who, based on their risk factors, are at an increased risk of oral health complications
- iii) To facilitate access to dental services through the appropriate referral of patients to see a dentist who, based on their risk factors, are at an increased risk of oral health complications
- iv) To examine the oral hard and soft tissues (e.g. teeth, gums and oral mucosa) and offer a provisional diagnosis in patients who, based on their risk factors, are at an increased risk of oral health complications
- v) None of these options are feasible education and training goals