PATIENT RELATED DIAGNOSTIC DELAY, SYMPTOM APPRAISAL AND LAY CONSULTATION IN HEAD AND NECK CANCER

By

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ABSTRACT

The objectives of this thesis were to; 1) identify established risk factors and gaps in the current peer reviewed literature relating to factors associated with patient related diagnostic delay in head and neck cancer, 2) describe and document patients' personal responses to symptoms of head and neck cancer, the characteristics of the patients' lay-consultants and the responses that the patients received from their lay-consultants and 3) assess the association between patient/network-related diagnostic delay and a) whether the patient felt any urgency to investigate their symptoms, b) whether the patient told someone in their social network about their symptoms (lay-consultancy) and c) lay-consultant influence.

The first manuscript is a scoping review that demonstrates that there is a lack of studies that address; the personal symptom experiences of patients, the psycho-social processes of help-seeking and the independent effects of suspected risk factors for head and neck cancer. The results of the first manuscript also provided me with guidance on what the important confounders of our primary relationship of interest were most likely to be.

The second manuscript suggests that patient related delay may be influenced by the patients' mistaken belief that their symptoms were non-urgent with or without the influence of their lay-consultant.

The third manuscript provides evidence that the primary barrier to seeking help from an HCP is whether or not those individuals experiencing symptoms think they are urgent enough to warrant further investigation. The study found no evidence to support the assertion that increased risk of delay is associated with decreased lay-consultancy.

The results of this thesis indicate that most of the patient related delay occurs during the individuals' symptom appraisal process with or without input from their social network. I think that individuals at risk of late stage presentation of head and neck cancer should be provided with targeted information encouraging them to seek help from a health care provider if the key signs or symptoms of head and neck cancer have not resolved within three weeks.

STATEMENTS OF CO-AUTHORSHIP

The manuscripts presented in this thesis are the work of John A. Queenan in collaboration with his supervisors, Drs. Patti A. Groome and Benjamin H. Gottlieb, as well as co-authors. All of the manuscripts were written with award and grant support from the Terry Fox Foundation Training Program in Transdisciplinary Cancer Research in partnership with the CIHR and an Operating Grant from the CIHR.

Chapter 3, Manuscript 1: *A scoping review of the predictors of patient related diagnostic delay in head and neck cancer.* Co-authors on this manuscript are Benjamin H. Gottlieb, Deb Feldman-Stewart, Stephen F. Hall, Jonathan Irish, Colleen Webber and Patti A. Groome. Interpretation of results and writing of the manuscript was performed by John Queenan with supervision from Patti Groome and Ben Gottlieb, with feedback from Deb Feldman-Stewart, Stephen Hall and Jonathan Irish. Colleen Webber provided analytical support.

Chapter 4, Manuscript 2: *Symptom appraisal and help-seeking for symptoms of head and neck cancer.* Co-authors on this manuscript are Benjamin H. Gottlieb. Deb Feldman-Stewart. Stephen F. Hall. Jonathan Irish. and Patti A. Groome. Interpretation of results and writing of the manuscript was performed by John Queenan with supervision from Patti Groome and Ben Gottlieb, with feedback from Deb Feldman-Stewart, Stephen Hall and Jonathan Irish.

Chapter 5, Manuscript 3: *The relationship between patient related diagnostic delay, symptom urgency and lay consultation in head and neck cancer.* Co-authors on this manuscript are Benjamin H. Gottlieb. Deb Feldman-Stewart. Stephen F. Hall. Jonathan Irish. and Patti A. Groome. Interpretation of results and writing of the manuscript was performed by John Queenan with supervision from Patti Groome and Ben Gottlieb, with feedback from Deb Feldman-Stewart, Stephen Hall and Jonathan Irish.

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CHAPTER 1: GENERAL INTRODUCTION

1.1 Thesis Background and Rationale

People who are suffering or experiencing troublesome bodily sensations (symptoms) often seek help from the people they know [1–3]. In the context of a medical illness they want reassurance that the symptom is fleeting or benign or advice on what to do if the symptom is of concern to the person whom they told [1, 2]. Most people concerned about a worrisome symptom will tell a close contact in their social network first then progress to more distant contacts and finally make contact with a health care professional (HCP). Others may seek help from an HCP without telling anyone else first [4–7].

Social network studies offer a way to think about and document how people seek help within the context of their personal contacts. The number of people a help-seeker consults (lay-consultants), the relationship that the help seeker has with his/her consultant, and the substance of the consultants' responses all influence the help seekers' attitudes and actions towards the symptoms [4, 8–14]. These influences can shorten or lengthen the time it takes for a help–seeker to obtain help from an HCP [7, 13, 15–19]. Contextualizing an individual's help-seeking process within his/her social network can reveal important psychosocial processes that can impact the help-seeking process and subsequent time of diagnosis [4, 8–14].

Cancer of the head and neck presents the opportunity to use aspects of social network analysis to explain why a large proportion of patients with head and neck cancer are diagnosed with late stage disease. Despite the ease of detecting many head and neck cancers, a large number of patients present themselves to health professionals with late stage disease. The main source of delay has been identified as related to patient factors [20–27]. Five year survival estimates fall from 90% to 30% as the stage at which the cancer is diagnosed increases, earlier detection is associated with increased survival and screening examinations are easy to conduct [28–31].

Although the original intent of this thesis was to restrict our attention to cancers of the oral cavity study recruitment issues necessitated the addition of two other subsites. Thus, the main focus of this thesis was expanded to examine the social network and support related influences on the help-seeking processes of patients diagnosed with three of the most common head and neck cancer subsites: oral, oropharynx and larynx.

1.2 Thesis Overview and Study Design

I anticipated that there would be very little information available surrounding the predictors of patient delay in head and neck cancer in the literature. I therefore decided to conduct a scoping review of the literature focusing on studies that examined predictors of patient related diagnostic delay in head and neck cancer. I also conducted a cross-sectional study that involved structured telephone interviews and a medical chart review of patients diagnosed with squamous cell carcinomas of the three most common head and neck cancer sites: the oral cavity, oropharynx and larynx. As these cancers are relatively rare, I maximized my recruitment by conducting the study at both the Southeastern Ontario Regional Cancer Centre (SEORCC) and Princess Margaret Hospital (PMH), which sees about a third of all such cases in Ontario. The study retrospectively investigated the participants' symptom appraisal and help-seeking processes from the time that they first noticed sensations indicating a potential head and neck cancer issue until the time they first went to see an HCP. Information was collected on participants': symptom awareness prior to diagnosis, medical information seeking, the length of time from symptom onset to the date of the first visit to a relevant health care practitioner, characteristics of their social network and the feedback they received from their social network. Demographic, smoking and alcohol consumption information were also collected during the interview. A chart review captured key clinical and tumour characteristics.

1.3 Thesis Objectives

This thesis addresses three main objectives.

1. To identify established risk factors and gaps in the current peer reviewed literature relating to factors associated with patient related diagnostic delay in head and neck cancer.
2. To describe and document patients' personal responses to symptoms of head and neck cancer, the characteristics of the patients' lay-consultants and the responses that the patients received from their lay-consultants.
3. To assess the association between patient/network-related diagnostic delay and; a) whether the patient felt any urgency to investigate their symptoms, b) whether the patient told someone in their social network about their symptoms (lay-consultancy) and c) lay-consultant influence.

1.4 Thesis Organization

This thesis consists of six chapters including this introductory chapter. Chapter 2 contains a literature review, which provides a general overview of the theories and knowledge base that surround the help-seeking process and sources of diagnostic delay for head and neck cancer. Chapters 3, 4 and 5 are written in manuscript format. Manuscript 1 is a scoping review of the existing literature that answers the question "What factors are associated with the length of time it takes patients to see a health care professional after they first notice the early symptoms of a head and neck cancer?" Manuscript 2 is descriptive and documents the participants' personal reactions to their symptoms, the people they contacted about their symptoms and the content of the feedback they received from their lay-consultants. Manuscript 3 presents the results of the analysis that tested for associations between the patient's social network characteristics (lay-consultancy and influence) and the length of time that elapsed between symptom onset and seeing an HCP. Finally, Chapter 6 consists of a general overview that summarizes and contextualizes my results and conclusions.

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CHAPTER 2: LITERATURE REVIEW

2.1 Overview

This literature review has two parts. The first part is a general overview. Sections 2.2-2.6 describe the psychosocial theories and the existing knowledge base surrounding help-seeking for cancer related symptoms. It also explains why head and neck cancer is particularly suited for this line of inquiry. Sections 2.7-2.10 describe the existing knowledge base surrounding diagnostic delay in head and neck cancer. The second part is written in the form of a manuscript that consists of a scoping review of the predictors of patient related diagnostic delay in head and neck cancer patients. The manuscript is provided in Chapter 3. An effort has been made to keep repetition to a minimum; however, because the second part of this review is a complete manuscript, some repetition is unavoidable.

The literature search was conducted on both online search engines and the Queens' University Bracken Library OVID search database. Databases selected in OVID to include in the search were: PubMed, EMBASE, CINAHAL, PsycINFO, PsycARTICLES and Health and Psychosocial Instruments (HAPI).

2.2 Symptom Appraisal

A symptom is an abnormal bodily sensation experienced by an individual that is indicative of a disease [1]. On a daily basis most bodily sensations experienced by an individual are not interpreted as abnormal nor are they indicative of a specific disease or illness [2–4]. The symptom appraisal process starts when a person first notices an unusual bodily sensation and tries to interpret the sensation by asking, either consciously or unconsciously, if the sensations can be ignored or not [2, 3]. If not, then the person determines what the sensations may mean and whether they pose any threat. If the sensations are subjectively conceived as prolonged and/or intense, and if they are ambiguous or uninterpretable, then a person determines whether to tolerate or manage them on their own, seek a consultation with a health care professional (HCP) or seek information from written, electronic, and/or other social sources prior to consulting with an HCP [2, 3].

Generally sensations that exceed normal expectations of intensity, duration, and/or disability or sensations that increase a person's sense of vulnerability tend to be interpreted as worrisome and are then presented to HCP's and/or others to be either dismissed, legitimatized or found to be uninterpretable as symptoms [3]. Notable exceptions to this generalization are those with prior knowledge or experience with specific signs and symptoms or those who have access to a health professional within our immediate social circles.

2.3 Social Networks

There are two general categories of social networks: whole networks and egocentric networks. A whole network is an entire web of relationships among individuals in a defined population [5–7]. An egocentric network is the set of direct relationships that surround a single person and will be the focus of this study [5, 6]. An egocentric network can be envisioned as a rimless wheel with the individual (referred to as "ego") at the hub and the members of the individual's social network (referred to as "alters") at the end of the spokes [6]. Social networks are typically characterized by the number of network members (size), the closeness of the relationships with the members (strength), the extent to which members are connected to each other, (density), clustering such as a set of neighbours (boundedness) and the extent of similarity among members of the network (homogeneity or heterogeneity) [5].

Social networks can have an effect on the health and morale of individuals by influencing behaviour and providing support in ways that affect mortality and morbidity across a wide range of illnesses. Cancer is not an exception [5, 7, 8]. For instance, an individual's help-seeking behaviour can be influenced by his/her social relationships/ties and the search for information and referral can either be a protracted process or quick one [5, 9, 10]. Structural properties of the social network, such as size and composition, affect the resources that are available such as information and advice, emotional/affectionate support and instrumental aid [5, 10–14]. Residing within these networks are individuals or groups of individuals who can influence help-seeking behaviours by the information and advice that they offer. Focusing our attention on a patient's social network can identify structural properties (such as the number of people they talk to) and the functional processes of these social ties (such as encouragement to see a doctor) that can influence the time it takes for a patient to seek help from a health care provider [10, 12, 15]. In summary because non-professional contacts (lay consultants) [14, 16–18] are often consulted before the health professional is contacted, we focused our attention on the lay-diagnostic and referral functions of the network. Specifically, we focused on the size of the participant's lay-consultant network and the information/advice offered to the patient by the members of that network.

2.4 Help-Seeking

In the context of a medical illness, we seek feedback by communicating information to members of our social network regarding abnormal bodily sensations (symptoms). We seek help or care in an effort to make sense of our experience and to obtain information, feedback, comfort, assistance, reassurance and advice [13, 19, 20]. Individuals seeking feedback for symptoms typically start with close family and/or friends, progress to more distant contacts and then may resort to professional services [13, 16–18]. The people who are contacted for help other than health professionals are referred to as lay-consultants [14, 16]. Notable exceptions to this general pattern are people who have prior knowledge or experience, are highly oriented to expert or professional help, and people in medical emergencies that typically remove the patient from the help seeking process [21].

Help-seeking that proceeds after the onset of symptoms follows an observable and measurable pathway [22]. This pathway is a series of steps individuals take to reduce uncertainty about a matter of personal interest or concern (Figure 1) [22–28]. Although these pathways may vary among individuals, they generally start with the onset of symptoms and then involve efforts to interpret or make meaning of those bodily sensations (symptom appraisal). Depending on the extent to which the person discloses their bodily sensations to network members, the latter are in a position to offer information regarding what they think the bodily sensations mean or what can be done about them [18, 22]. This process is iterative and does not necessarily involve a linear and predictable pattern. For example, some individuals may confer with friends and family more than once, assessing and reassessing their bodily sensation before deciding that it is worrisome enough to warrant a visit with a health professional. Others may initially seek information without conferring with friends and family by reading books or by searching for information on the internet (self-help activities). Those who seek information by reading or consulting the internet may or may not go on to consult with friends and family about the information that they obtained from these sources. Others may proceed directly to seeking a consultation with an HPC. We will focus our attention on socially mediated help seeking.

2.5 Help Seeking for Symptoms of Cancer

Social networks play an important role in the help-seeking process [5, 9, 10, 12–14, 29, 30]. Overall, this body of literature reveals that before consulting with a health professional, the majority of individuals seeking feedback consults with a lay person first and these lay consultants are influential. They are part of and influence the help seeking process by transmitting values, beliefs, attitudes, experiences, advice and information. Although there is considerable evidence that certain patient characteristics distinguish those who seek the opinions of HCPs from those who do not, few quantitative studies within the cancer literature have focused on the role that the social network plays in patients' help seeking and/or subsequent stage at diagnosis [31–34]. Patients who are free of mental illness [35–38], are white [39–41], married [36, 42, 43], insured [32, 42, 43], in good general health [44, 45], knowledgeable [33, 34, 46–49] socially/economically advantaged [32, 33, 39, 40] and female [9, 13] are quicker to contact a health professional than their opposite counterparts in the presence of symptoms and/or late stage disease. The lack of information available on the role the social network may play in hastening or delaying a patient from seeing an HCP provides an opportunity to fill a gap in the present knowledge base surrounding socially mediated help seeking for cancer symptoms.

L. K Smith conducted a systematic review of 32 qualitative research papers published between 1985 and 2004 on patients' help-seeking experiences and delay in cancer presentation [47]. All the studies were about delay in adult symptomatic patients with any kind of cancer. The authors then systematically identified shared concepts and themes identified by the original authors of the studies (second order constructs) and then conducted a further analysis to identify themes in the body of literature as a whole (third level constructs). The second order constructs largely related to delay in seeking help for symptoms of cancer, including themes of "recognition and interpretation of symptoms” and two separate sources of fear: the fear of embarrassment and the fear of cancer. Patients who experienced severe symptoms reported less delay, and patients who correctly interpreted symptoms as abnormal enough to warrant a visit to the doctor were also reported less delay. With respect to fear, a consistent theme was that patients delayed seeking medical advice because they were afraid they would be seen as wasting the doctor’s time or appearing neurotic. Men also reported fears of embarrassment; they thought they may be perceived as being unmasculine. Fear of a cancer diagnosis was also a consistent theme; patients who delayed reported that they were afraid that the symptoms indicated a fatal, incurable disease calling for unpleasant treatments. The third order constructs offered by Smith et al. were related to two themes: sex/gender and sanctioning. With respect to sex and gender issues, men reported that they thought women found help seeking easier because of their increased contact with health services for themselves and the family, and women often cited prioritizing work and family over their own health. With respect to sanctioning, patients who had someone informally approve a visit to the doctor for their symptoms were less likely to delay seeking help. Symptoms that started to interfere with work or had reached a crisis point also merited a visit to the doctor. Overall, the authors summarize a growing body of empirical evidence demonstrating that independently recognizing early changes as possible symptoms (knowledge) and consulting with others before seeking medical advice are related to the length of time it takes to seek medical attention.

Three reviews of the literature have focused on the predictors of delayed presentation of symptomatic cancer [31, 32, 34]. All three reviews concluded that patients who disclosed their symptoms to another person prior to seeking help from an HCP experienced less delay than those who did not. The evidence was strongest for patients with breast cancer and colorectal cancer.

From these reviews we identified three relevant studies that demonstrate relatively high rates of lay consultation for cancer-relevant symptoms.

Holliday and Hardcastle interviewed 116 patients with symptomatic colorectal cancer in order to investigate factors associated with patient delay [50]. Their analysis was restricted to proportional counts. They reported that 90% of the patients had disclosed their symptoms to at least one other person prior to seeing a medical doctor about their symptoms. The authors did not perform any statistical comparisons between groups of delayers and non-delayers.

Coates [51] et al conducted a cross sectional study of 735 women with symptomatic breast cancer and tested for relationships between patient related diagnostic delay and 24 risk factors that covered the general themes of demographic, disease specific, symptomatic, health status, health behavioural, knowledge and access to service characteristics. Participants were also asked if they disclosed their symptoms to at least one other person prior to seeing an HCP and 71% of them had done so. The odds ratio for not disclosing symptoms to another and patient related delay, controlling for age and place of residence, was 1.35 (95% C.I 1.15-1.59).

Lastly, Burgess et al [33] conducted a cross sectional study of 185 symptomatic breast cancer patients investigating the reasons for patient related delay. Patient delay was defined as waiting 3 months or more. Nineteen percent of the women in the study were classified as having delayed presentation to an HCP for symptoms of breast cancer and 47% had disclosed their symptoms to another person. Logistic regression revealed that not disclosing the symptoms to another within 6 days of self-discovery and waiting until prompted by another to see a medical doctor were both significant risk factors for patient delay (OR 6.0 95% C.I 1.7-12 and OR 4.4, 95% C.I 1.5-13.5). The logistic regression model was mutually adjusted for the nature of the first symptom, symptom attribution, amount of fear, time thinking about the symptom, and an opportunistic consult with a general practitioner.

Both the qualitative and quantitative literature provide substantial evidence suggesting that most symptomatic cancer patients tell at least one other person about their symptoms prior to seeking help from an HCP. The quantitative literature, though sparse, provides good evidence suggesting that telling others may protect patients from delaying especially for patients with breast and colorectal cancer. What remains unknown is the actual length of time that was shortened by lay consultation. However, Macleod et al, who reviewed the evidence for risk factors of delayed presentation for multiple cancer sites, also concluded that this shortening effect depended on the site of the cancer; the provision of advice from others was unrelated to patient delay in patients with lung, upper gastrointestinal and urological cancers [31]. It is noteworthy that most of the studies covered in the articles found that patients believed that their symptoms were due to benign conditions. This tendency underscores the importance of symptomatology in the help seeking process and people's psychological tendency to ward off threat.

The scarcity of more detailed investigations of social network influences on the help-seeking process for cancer-relevant symptoms provides an opportunity and justification for examining the possible social network factors that might be associated with the stage at which a patient is diagnosed with their disease. Of particular interest are cancers whose causes are largely attributable to lifestyle/health behavioral risk factors, such as smoking or heavy alcohol use, and that are consistently diagnosed at a late stage despite having notable early warning signs and symptoms [52]. Additionally, the analytical studies that employed multivariate methods have been conducted with breast cancer patients. Hence, we cannot assume that the social network is involved in the help-seeking process to the same extent and in similar ways across other disease sites and among males.

2.6 Head and Neck Cancers

Head and neck mucosal malignancies are a group of tumours that include cancers of the lip, oral cavity, oropharynx, nasopharynx, hypopharynx, larynx, nasal cavity and paranasal sinuses. Non-mucosal malignancies that arise from salivary glands and the thyroid gland are also included in this group [53]. The most common sites for mucosal malignancy in the head and neck are the oral cavity, oropharynx and larynx. [54, 55]. Together, these three sites make up approximately two-thirds of all head and neck cancers and have an annual Canadian incidence rate of approximately 10/100,000 [54, 55]. The treatment options include surgery, chemotherapy and radiotherapy, alone or in combination and become more aggressive and debilitating as their stage at presentation increases [56–60]. Survival also decreases markedly with stage at diagnosis [56, 59–61].

Cancers of the oral cavity, oropharynx and larynx are well suited to this thesis' line of inquiry because they have been identified as cancers whose cause and stage at diagnosis appear related to both individual health behaviours and social factors [48]. Furthermore, although mass screening programs do not exist for these cancers, it is still possible to detect most of these cancers in their early stages with a simple procedure and a disproportionate number of patients present with late stage disease [62–64]. There is also a body of convincing evidence that the major source of diagnostic delay is patient rather than physician or health system delay [65–69]. The lack of readily available information on the predictors of patient related delay in head and neck cancer justifies the need for the scoping review that we conducted. This detailed review is provided in manuscript format in Chapter 3 of this thesis.

2.6.1 Oral Cancer: Epidemiology and Prognosis

1% of all cancers diagnosed in Canada are cancers of the oral cavity [70, 71]. In Ontario, the age-standardized incidence is 3.2 per 100,000 [72]. The Canadian rate is 4.5 per 100, 000 [54]. Worldwide the rates of oral cancer range from less than 1.5 to 16.4 per 100, 000 [54]. Oral cavity cancers are predominantly squamous cell carcinomas (91%). They are classified according to anatomical site: the anterior two-thirds of the tongue (39.5%), floor of mouth (25.4%), buccal mucosa (15.3%), gums (11.8%), and hard palate (3.9%) [73].

Five year survival rates for oral cancers are approximately 90 % for Stage I, 75% for Stage II, 60 % for Stage III, 30 % for Stage IVa, 25 % for Stage IVb and < 4% for Stage IVc. Many patients (30% to 77%) present with advanced disease [69, 74]. In Ontario, 40% of cancers of the oral cavity are Stage III or IV at the time of diagnosis [75]. Males are twice as likely as females to be diagnosed with, and die from, a cancer of the oral cavity. About 80% of these cancers are directly attributable to tobacco use, and the incidence is six times higher in heavy alcohol users [76].

Although a few asymptomatic cases of cancer of the oral cavity are detected by visual inspection or by fluorescent techniques, most patients typically present with a persistent oral lesion that is associated with pain and bleeding. In more advanced stages they may present with changes in articulation, difficulty swallowing, or a neck mass [56]. Patients presenting with early-stage lesions are primarily treated surgically. Surgical treatment for moderately advanced lesions is complex, possibly requiring partial removal of the tongue and/or mandible and often followed by radiation therapy. Patients with advanced disease undergo radical surgery that may require removal of a significant portion of the tongue and mandible followed by radiation therapy. Long-term disability from oral cancer treatment is largely related to the extent of tongue and oral cavity structure ablation. In addition to better survival, patients presenting with earlier stage disease have a significantly better postoperative functional result with respect to speech and swallowing than patients presenting with advanced disease [56, 57].

2.6.2 Oropharyngeal Cancer: Epidemiology and Prognosis

The age standardized incidence for oropharyngeal cancers in Ontario is approximately 2.1 per 100,000 [72]. The Canadian rate is 3.5 per 100, 000 [54] and worldwide rates of oropharyngeal cancer range from less than 1.5 to 16.4 per 100, 000 [54]. Approximately 95% of oropharyngeal cancers are squamous cell carcinomas and are classified according to the following anatomic subsites: base of tongue, tonsil, soft palate and lateral wall of the pharynx [77]. Five year survival rates for oropharyngeal cancer are approximately 67% for Stage I, 46% for Stage II, 31% for Stage III and 32% for Stage IV [78]. In Ontario, 37% of patients are diagnosed with T3 or T4 disease [79].

As with oral cancer, males are twice as likely as females to be diagnosed and die of the disease. The traditional primary risk factors for oropharyngeal cancer are tobacco and alcohol use but the emergence of HPV infection as the major etiological factor in the last 10 years has resulted in a significant change in the demographics of this disease with patients being 10 years younger at presentation, less co-morbidity status, higher incidence of regional disease and lower incidence of smoking and alcohol abuse [54, 80, 81]. Patients with oropharyngeal cancer typically present with a persistent sore throat, pain or difficulty with swallowing, unexplained weight loss, voice changes, ear pain, a lump in the back of the throat or mouth or a lump in the neck [56, 82]. However, a recent report indicates that patients with HPV related cancer are more likely to report that their first symptom was a neck lump [83].

Early disease is treated with either surgery or radiotherapy. More advanced disease is treated with surgery and radiotherapy in combination with platinum-based chemotherapy [58]. As is the case with cancers of the oral cavity, patients presenting with earlier stage disease have significantly better survival and post treatment functional result with respect to speech and swallowing than patients presenting with advanced disease [56, 57]

2.6.3 Laryngeal Cancer: Epidemiology and Prognosis.

The age-standardized incidence rate for laryngeal cancers in Ontario is 2.32 per 100,000 [84]. The Canadian rate is 2.0 per 100, 000 [55]. Worldwide rates of laryngeal cancer are estimated to range from less than 1 to 8.3 per 100, 000 [85]. Approximately 95% of laryngeal cancers are squamous cell carcinomas and are classified into three anatomic subsites: the supraglottis, the glottis, and the subglottis [82, 86, 87]. Five-year survival rates for supraglottic cancer are approximately 74% for Stage I or II, 55.7% for Stage III, and 28.5% for Stage IV [88, 89]. For glottic cancer, five-year survival rates in Ontario were 78% for T1, 69% for T2, 47% for T3, and 33% for T4 [88, 89]. In Ontario, 65.2% of supraglottic cancers and 17.6% of glottic cancers are diagnosed as Stage III or Stage IV disease [90].

Cancers of the larynx are diagnosed in males more frequently than in females, with the typical age at diagnosis between 50 and 70 years [82, 88, 91]. Between 85% and 95% of laryngeal cancers can be directly attributed to tobacco use or alcohol abuse [82, 87]. Hoarseness is reported in 99% of cases of glottic laryngeal cancer and presents in the early stages of disease [92].

Supraglottic cancers are associated with significantly more symptoms compared to glottic cancers. The symptoms can include sore throat, difficulty swallowing, painful swallowing and shortness of breath [92, 93]. Surgery and radiotherapy are the primary treatment for laryngeal cancer. Early disease is typically treated with either surgery or radiation alone, while combined radiation and chemotherapy and adjuvant chemotherapy is used for the treatment of advanced disease [82, 87, 91]. Patients who present with early stage disease are more likely to receive minimally invasive treatments that preserve speech and voice quality whereas those who present late are more likely to undergo partial or total laryngectomy [56, 57, 59, 60].

2.7 Screening for Head and Neck Cancer

Screening for oral and oropharyngeal cancer is a simple procedure and early detection leads to improved prognosis. Almost all cases of oral cancer are detectable when they are asymptomatic by either direct or fluorescent examination of the oral cavity and oropharynx by a trained health professional [62–64]. However, there is little evidence that mass screening reduces mortality or incidence [94–98]. Most of the cases detected by mass screening are asymptomatic non-cancerous lesions, there is a lack of participation and compliance with referrals and, finally, the cost of mass screening is unjustifiable considering the rarity of the disease [94, 99]. Both the Canadian Task Force on the Preventative Health Care and the U.S. Preventive Services Task Force recommend that screening be limited to oral cavity cancer case finding among high-risk patients being seen for other reasons [94, 98, 100]. The British Columbia Cancer Agency also launched a targeted effort at increasing the detection of oral cavity cancers in that province in 2008 [101]. It is recommended that patients seek help from a health professional if they are experiencing the following symptoms for more than two weeks: red or white patches, sores that will not heal, bleeding, loose teeth, difficulty or pain when swallowing, difficulty wearing dentures, a neck lump or earache [102]. Health professionals are offered guidance on who is at risk; how to conduct thorough physical examinations of the head, neck and oral cavity; how to assess suspicious lesions and the role of toluidine blue and fluorescence visualization [103, 104].

Although the diagnosis of asymptomatic disease can be made by a dentist or family physician conducting regular oral examinations, there are problems with access to these services by those most at risk [65, 99, 105–107] and health professionals rarely conduct oral cavity or oropharyngeal examinations [105, 108–110]. There are no screening recommendations for cancer of the larynx at the present time. Patients are recommended to go and see a doctor if they are experiencing a hoarse voice that lasts more than three weeks and/or pain or difficulty when swallowing. Other symptoms can include a lump in the throat or on the neck, a persistent cough, shortness of breath, bad breath and/or weight loss [56].

2.8 Patient Related Diagnostic Delay in Head and Neck Cancer

Studies prior to 2002 that investigate advanced stage diagnosis in head and neck cancer focussed on describing the duration and sources of diagnostic delay. This literature generally reports that patient delay, not physician or system delay, is the largest source of total delay, with median durations from 19 to 90 days [65–69]. Although most of this literature focused on measuring the length of delay rather than the sources of that delay three of these early studies investigated for predictors of delay or stage. Elwood et al. found associations between the stage of the patients’ tumour and regular dental care, alcohol consumption and socioeconomic status [65]. Pitiphat et al [69] found that the length of total delay was greater in single patients and non-smokers. Lastly, Jovanovic [66] et al. found no associations with delay on gender, dental status, site or tumour stage. Because we could find little information on the predictors of patient delay in head and neck cancer, we saw an opportunity to conduct a scoping review of the literature focusing on studies that examined predictors of patient related diagnostic delay in head and neck cancer. The manuscript that resulted from this review can be found in Chapter 3 of this thesis.

2.9 Diagnostic Delay and Stage at Diagnosis

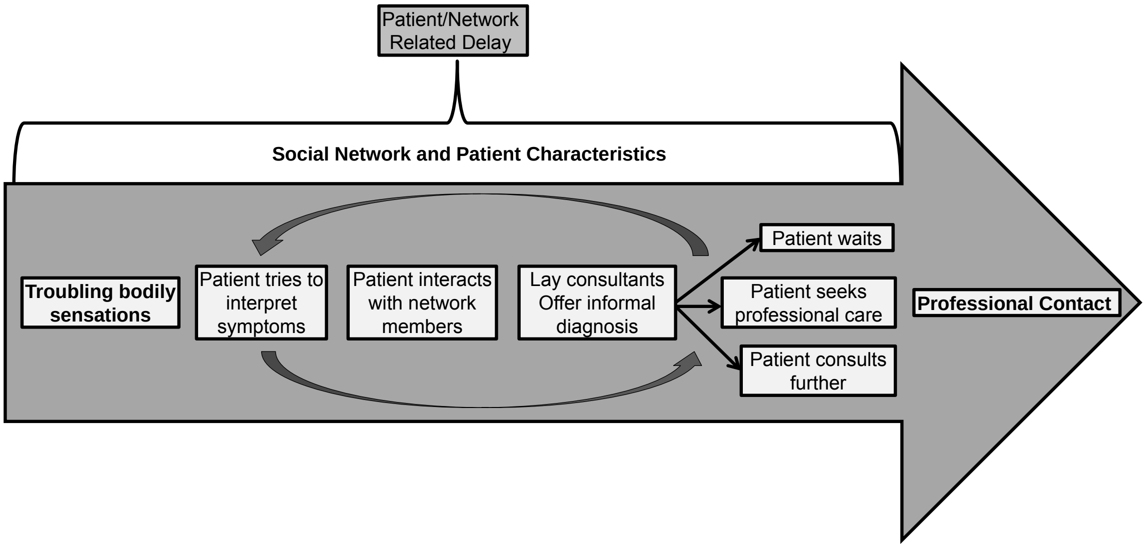
Diagnostic delay is most important if it leads to worse outcomes, the most serious being advanced disease. The evidence regarding the relationship between diagnostic delay and advanced stage disease is contradictory. Groome and Goy [111] conducted a systematic review on this question in the head and neck cancers and found no consistent direct relationship between diagnostic delay and stage at diagnosis. A meta-analysis of nine studies observed a direct relationship between diagnostic delay and advanced stage oral and oropharyngeal cancer [112]. Heterogeneity among studies was a concern for Groome and Goy and the meta-analysis confirmed it. Groome and Goy point out that the absence of consistently strong and statistically significant relationships between diagnostic delay and stage at diagnosis may be due to the breadth of the TNM size (T) categories such that the category would not progress during typical delay durations [111].

2.10 Study Rationale and Conceptual Model

We referred to Barbara Andersen's General Model of Total Patient Delay [113] as a starting point for our thinking about this project because it is the most commonly referenced theoretical model in the cancer diagnostic delay literature [115]. Andersens' Model conceptualized patient delay as being comprised of distinct stages that span five time delay periods: 1) Appraisal: the time from the patients detecting new/unusual signs/symptoms to deciding they are ill, 2) Illness: the time from deciding they are ill to the time they decide to seek care, 3) Behavioral: the time patients decide to seek care to the time they make a medical appointment, 4) Scheduling: the time they make a medical appointment to the time they receive medical attention and 5) Treatment: the time they receive medical attention to the time they receive treatment [113]. The empirical clinical/cancer literature defines patient delay as the time from first noticing symptoms (the beginning of the appraisal stage) to the time they first meet with a health professional (the completion of the scheduling stage), which spans the first four time periods of the Andersen Model [63–67, 69, 74, 114]. Andersen conducted two studies that provide empirical evidence that the stage of appraisal delay, the time from the patients detecting new/unusual signs/symptoms to deciding they are ill, accounts for the majority of total patient delay. In the first study Andersen et al interviewed 34 women with symptomatic gynecological cancers [113]. The participants were asked to identify the critical dates associated with each of the five stages. The mean total delay for the group was 97 days, 77 of which were accounted for by appraisal delay (79%). Similarly, in the second study the same authors interviewed 63 symptomatic women being evaluated for breast cancer. The mean total delay for the breast symptom group was 46 days, 27 of which were accounted for by appraisal delay (59%). The model has been further validated by Walter et al who conducted a systematic review of the literature that found strong evidence to support the central importance of appraisal delay, less evidence for the role of illness delay, limited evidence for the role of behavioral delay, and conflicting evidence for the role of scheduling delay [115]. Walter subsequently proposed that appraisal and illness delay stages be combined and renamed the “appraisal interval” and that the behavioral and scheduling delay stages be combined and renamed “the help-seeking interval”. Walters modification also points out that the moments in time at which the patient decides they are ill and decides/makes an appointment may be difficult to parse out and therefore difficult to recall. It may be easier for patients to recall when they saw a doctor rather than the closely spaced events leading up to making and/or waiting for the appointment. The focus of this thesis, therefore, was the entire length of time that elapses during the combined appraisal and help-seeking interval: symptom onset to seeing an HCP. Importantly, Walter formally recognizes the possible role of lay-consultants and other psychosocial factors as likely contributing to the length of time it takes for a patient to see an HCP whereas Andersen's original model assumes that patient delays are solely due to personal patient factors [113] [115].

Figure 1 presents our model of the series of steps patients may take on the pathway to meeting with an HCP [22–28]. The entire length of time (patient/network delay) it takes a patient to see an HCP after they first notice relevant symptoms depends on how long it takes them to recognize that the changes they are experiencing are bothersome and/or novel enough to merit further investigation to determine if disease is present (appraisal interval), make an appointment to see an HCP and finally meet with an HCP (help-seeking interval). Patients may or may not tell others and subsequently seek help from an HCP. Furthermore, if the length of time it takes a symptomatic patient to see an HCP is clinically important we would expect that those patients who take longer to see an HCP would also have a larger tumour at the time of their diagnosis. It is an empirical question as to whether the lay consultants they have spoken to about the symptoms have any influence on the speed of consulting a HCP (combined appraisal and help-seeking interval).

Figure 1: Study Conceptual Model



2.13 Summary and Potential Impact

Within the context of a medical illness, people who seek feedback for a novel and/or painful symptom generally follow a sequence of steps that starts with the onset of symptom(s) and ends with an encounter with a relevant health professional. These steps take place within the broader context of the individual's social network. Framing an investigation in this manner is particularly useful for examining serious illnesses, such as cancer, that have a relatively slow onset, may or may not present with particularly bothersome symptoms in its early stage and have disproportionately large numbers of patients presenting with late stage disease. We have an opportunity to test this "network hypothesis" within a relatively homogenous population: newly diagnosed patients with squamous cell carcinomas of the oral cavity, oropharynx and larynx. We are not aware of any other studies in the cancer literature that have done this.

This study presented us with the opportunity to discover if there were social network/support predictors of patient delay and fill a gap in the existing literature. Our description of the personal, demographic, clinical and especially the social experiences of newly diagnosed oral, oropharyngeal and laryngeal cancer patients aims to determine how and why so many of these patients are diagnosed with an advanced stage. The information produced by this thesis can be used to inform future health education interventions targeted at high-risk individuals and/or their attendant social networks and to generate hypotheses for further study.

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CHAPTER 3: A SCOPING REVIEW OF THE PREDICTORS OF PATIENT RELATED DIAGNOSTIC DELAY IN HEAD AND NECK CANCER

3.1 ABSTRACT

BACKGROUND: Most head and neck cancer patients present to their health care professional (HCP) with advanced disease despite the fact that many of these cancers can be detected and treated for cure in their earliest stages. Advanced stage patients therefore undergo avoidable, extensive and often debilitating treatments with low chances of survival. We need more information on the possible risk factors associated with patient related diagnostic delay to inform interventions aimed at reducing the length of time it takes for these patients to seek help from an (HCP).

METHODS: We used the Arskey and O'Malley framework to conduct a scoping review whose objective was to identify factors that influence the length of time it takes patients to see a health care professional after they first notice the early symptoms of a head and neck cancer.

RESULTS: We found three qualitative and 15 quantitative studies published on this subject since 1989. Five of the 17 studies specified the use of theoretical models in the design of the study. The qualitative studies suggest that patients who believe their symptoms are benign are most likely to delay professional help seeking and that patients generally disclose their symptoms to another person prior to meeting with an HCP. Ten studies restricted their statistical analysis to the use of a bivariate analysis. Only five of the quantitative studies included a multivariate regression model that attempted to control for confounding variables. Overall, the quantitative studies suggest that patients with less knowledge and education, smoke and/or drink heavily, are experiencing stress and have poor access to services were more likely to delay.

CONCLUSIONS: There is a lack of studies that address the symptom experience, the psychosocial processes of help-seeking and the independent effects of suspected risk factors. Filling these gaps will provide both a broader and deeper understanding of the process involved in

patient related diagnostic delay. Understanding these processes will be the key to designing effective education strategies targeting those at risk and/or their attendant lay-consultants to shorten patient delay and potentially increase cure rates.

3.2 INTRODUCTION

Diagnostic delay is a serious but potentially avoidable problem in head and neck cancer. Depending on the sub-site, as many as 62% of patients who present with a cancer of the head and neck are diagnosed with either stage III or IV cancers [1–3]. Five-year survival markedly decreases from as high as 90% for those patients diagnosed with stage I disease to less than 25% for the most advanced, stage IV patients [1–9]. A substantial number of studies have quantified the length of time that elapses from when a head and neck cancer patient starts to experience symptoms until the time they are diagnosed [1–9]. The literature reports median patient related diagnostic delays that range from zero to 90 days with patient related delay being the longest source of overall delay. A targeted effort to reduce the length of time it takes patients to consult with a health care professional after they start to experience symptoms is warranted.

Although screening for some head and neck cancers is as easy as conducting a visual inspection of an asymptomatic patients oral cavity, most of the suspected cases discovered by screening turn out to be a benign lesion [10–12]. Current screening methods, when administered to the general population, have a positive predictive value as low as 1.3% and generate a false positive rate of 91.8% [13]. There is little evidence that mass screening would reduce either morbidity or mortality incidence in either Canada or the United States [4, 12, 14–17]. Mass screening, especially among males, may be more applicable to countries with higher incidence rates such as France, Slovakia, Switzerland, India and Brazil [18]. Recommendations to doctors in Canada and the United States are therefore limited to opportunistically screening those patients at high risk [11, 12, 16, 17, 19]. Recommendations to the general public are to see a doctor if they have a sore, lump, difficulty swallowing or hoarseness for more than three weeks [20].

We conducted this scoping review to identify established risk factors and gaps in the current peer reviewed literature relating to factors associated with patient related diagnostic delay in head and neck cancer. The main purpose of the search was to ensure that we considered the confounding effects of other variables and was conducted prior to our own investigation into the role that socially mediated help-seeking may play on the length of time it takes a person to see an HCP after the onset of suspicious symptoms. We used the Arskey and O'Malley framework to conduct our scoping review [21–23]. Scoping reviews are well suited to sparse literature because one of their primary goals is to identify gaps in the evidence base and reveal opportunities to improve knowledge. Scoping reviews also focus on the existence of research activity. As such, all available peer-reviewed articles, regardless of quality, were eligible for inclusion in this scoping study.

3.3 MATERIALS AND METHODS

The study question was what factors influence the length of time it takes patients to see a health care professional after they first notice the symptoms of what is later diagnosed as a head and neck cancer?

The aim of the search was to find articles that fit the following general criteria:

- Patients with Head and Neck cancer
- Patient related diagnostic delay was the main dependent variable of interest.

An informal search was conducted using online search engines to generate key terms that could be used and mapped onto medical search heading terms (Mesh) for the formal search. The formal search was conducted on the OVID search database at the Queens' University Bracken Library. Databases selected in OVID to include in the search were PubMed, EMBASE, CINAH

L, PsycINFO, PsycARTICLES and Health and Psychosocial Instruments (HAPI). Articles were restricted to the English language. Duplicate articles were automatically removed. Their entire bibliographic information, including the abstracts, were then exported to a RefMan [24] database.

A single reviewer and abstractor conducted the search and selected the studies to be either removed or retained. A detailed copy of the search algorithm is appended. Figure 1 summarizes the steps taken to either retain or remove articles. Two reviewers read and abstracted the 36 articles that measured patient related diagnostic delay. Of these, 17 articles were identified that treated patient related diagnostic delay as a dependent variable.

Two of the 17 studies did not strictly fit the search criteria. However, they were both included in this study because they expressly focused on predictors of patient related delay in head and neck cancer despite the fact that the study group consisted of symptomatic patients who had not yet had a diagnostic assessment some of which proved to be benign lesions. We agree with Scott et al, who conducted a prior review of the literature restricted to cancers of the oral cavity, that there is probably little difference between two patients who are suffering similar symptoms whose only practical difference is that one turned out to have a benign condition whereas the other was malignant [25].

3.4 RESULTS

Table 1 presents the details of the reviewed studies. We found seventeen studies published between 1989 and 2010 that used patient related diagnostic delay as an outcome variable [26–42]. Three of the studies were qualitative [26–28].

The studies varied in how they defined the critical length of delay. Of the 14 quantitative studies, 3 dichotomized delay as those patients who sought professional help within approximately one month (21o 45 days) versus those who waited more than about a month [30, 36, 41], 5 used a three month split [34, 35, 37, 39, 40], 2 treated the delay as a continuous variable [32, 33], 3 used either tertiles or quartiles [29, 31, 38] and one study dichotomized delay using a median split to define early vs. late presentation at the median [42].

A theoretical framework in how they conceived steps in the delay process guided few of the studies; only five of the 17 studies specified the use of theoretical models in the design of the study either alone or in combination. Three [27, 37, 39] employed Andersen's model of Total Patient Delay [43]. One [41] study used the Andersen Model in combination with the Self-Regulation Model [44]. Finally, one study [32] employed the Triandis' Model of Social Behavior [45].

The studies varied in the patient population studied. Four restricted the study population to one site, either oral cavity cancer [30, 32, 42] or laryngeal cancers [37]. Two studies focused on patients who were experiencing suspicious symptoms prior to their diagnosis [26, 41]. The remainder studied multiple head and neck cancer sites including cancers of the oral cavity, lip, oropharynx and larynx, pharynx, salivary glands, ears and sinus cavities.

Delay-related factors suggested by qualitative studies

Three qualitative studies met the inclusion criteria. Suzanne Scott et al published two qualitative studies on patients with varying socio-economic backgrounds, one that focused on the pre diagnostic experiences of newly diagnosed patients with cancers of the oral cavity and oropharynx [26] and one that focused on patients suffering potentially malignant oral symptoms [27]. The 12 male and 5 female patients in her first study frequently misinterpreted their symptoms as benign oral conditions and delayed visiting a health care provider because they were not concerned enough to do so. Patients tended to tell close family and friends about their symptoms prior to consulting with a health care professional. Patients also reported difficulties in obtaining professional help either because they could not obtain a timely appointment with a health care professional or they had social obligations that prevented them from doing so [26].

In her second study (11 male and 46 female) she found that multiple factors contributed to patient delay such as mistakenly believing their symptoms were benign, being unsure when it was appropriate to consult with a health care professional and not wanting to bother a health care professional with a minor ailment. Still other patients reported that worsening symptoms, having another reason to visit a health care professional (opportunistic consult), the need to resolve uncertainty, desire for an early diagnosis and worry and advice from family and friends prompted them to seek help from a health care professional [27].

Grant et al conducted the third qualitative study on 15 patients (7 male, 8 female) with oral cancer, also of varying socio-economic backgrounds. They specifically focused on a younger group of patients whose ages ranged from 34 to 48 years of age. Most were somewhat aware of the signs and symptoms of oral cancer. Most were aware of smoking and drinking as risk factors but, as a group, smoking and drinking were thought not to be prominent causal factors in their personal accounts. All of the patients reported that they could retrospectively identify their first symptom of cancer. More patients who delayed reported that they had self-treated their condition. None thought they had oral cancer prior to diagnosis. Other sources of patient delay reported were self-treatment and reinterpretation of symptoms and symptoms that were not bothersome enough. A trigger to seeking prompt care was having a pre-existing appointment with a health care professional for another matter (opportunistic consult). All three studies underscore the complex psychosocial decision making processes that occur prior to seeking help from an HCP.

Predictors suggested by modeling studies

Fourteen quantitative studies met the inclusion criteria [29–42]. Table 2 presents a summary of the key methodological descriptors and the statistically significant predictive factors associated with patient related delay.

Potential predictor variables fell into one or more broad categories: clinical, health behavioral, personal and/or family matters, psychological characteristics, demographics, access to services and self-help. Variables collected for descriptive reasons were restricted to a few key demographic and clinical characteristics such as age, sex, living arrangements and presenting symptoms.

Ten studies restricted their statistical analysis methodology to the use of bivariate and/or stratification techniques [29–31, 33–35, 37–40, 42]. Five of the studies included a multivariate regression model containing two or more predictors [32, 34, 36, 41, 46].

Four studies found no statistically significant associations between any of their predictor variables and patient delay [29–31, 42]. The remaining quantitative studies reported a wide range of statistically significant predictor variables that fell into one or more categories: knowledge and/or level of education [32, 36, 41], health behaviors [34, 38, 40], the clinical characteristics of the tumor [37, 39, 40], personal beliefs and psychological characteristics [27, 32, 34, 35], personal/family stressors [32, 36, 41], and access to services [32]. Table 3 provides a summary of the statistically significant predictors.

3.5 DISCUSSION

This is a sparse literature. Only 17 studies on this subject matter have been published since 1989 and none prior to that date.

The results from the three qualitative studies suggest that patients who dismiss the early symptoms of a potential disease, treating them as benign, are most likely to delay professional help-seeking [26–28]. These studies also suggest that most patients tell someone they know well about their symptoms (a lay-consultant) before seeking a professional consult. It is not clear from the qualitative literature what impact the lay-consultants have on the length of delay or what role they play in the process. This presented us with an opportunity to design a unique study that places emphasis on the role that others may have on the length of patient delay. The qualitative literature also revealed that an opportunistic consult with a health care professional could play a role in reducing patient delay. None of the qualitative studies addressed the biological or clinical characteristics of the tumour itself; a fast growing and/or painful open lesion might generate more alarm than a slow growing and painless lump.

The quantitative literature consistently defines patient related diagnostic delay as the time that elapses from the moment a person recognizes a relevant symptom until the moment they seek help from an HCP. However, there is variation in the definition of what constitutes a clinically relevant delay. Only three of the studies [30, 36, 41] used the same definition as the current recommendations offered to the general public, namely that they wait no more than three weeks with suspicious symptoms before seeing an HCP [20]. Future studies should explicitly define a clinically relevant delay rather than depending on traditional definitions or data driven quartile or tertile splits. The length of the patient related delay reported in the reviewed studies is similar to that of the broader literature that measured the length of patient related delay [1–9]**.** This finding suggests that little has changed over the past thirty years as it pertains to the length of time head and neck patients typically wait before seeing an HCP.

Less than half of the studies proposed conceptual frameworks to guide their study design or contextualize their results[27, 32, 37, 39, 41]. The most commonly cited model was Andersen's General Model of Total Patient Delay [47] which conceptualizes patient delay as being comprised of 5 distinct stages: 1) the time from the patients detecting new/unusual signs/symptoms to deciding they are ill, 2) the time from deciding they are ill to the time they decide to seek care, 3) the time the patient decides to seek care to the time they make a medical appointment, 4) the time they make a medical appointment to the time they receive medical attention and 5) the time they receive medical attention to the time they receive treatment. Importantly, Andersen's model does not, by itself, provide any guidance on how other processes and contributing factors may be involved in delay. Walters et al. have since provided refinements to Andersen's model that re-categorizes some of the intervals and formally recognizes that there are patient factors and aspects of the healthcare system, providers, and disease that have the potential to influence patient delay [43].

Suspected Risk Factors

Patients who reported higher levels of education or who were aware of the early signs and symptoms of head and neck cancer were less likely to delay seeking help from an HCP after they became aware of their symptoms [32, 36, 41]. In one study, the protective effect afforded by more education was quite strong (OR = 0.05, 95% C.I = 0.01; 0.34) [36] whereas estimates for the protective effect afforded by specific knowledge of the early warning signs were weaker (OR 0.78 95% C.I = 0.57; 0.98 [41] and β =-0.99 95% C.I. = -1.68; -0.34) [32]. It may be that general knowledge about when it is appropriate to seek help from an HCP or a tendency to seek and use professionals among more educated people may be more important than specific knowledge of early warning signs. Higher levels of education and knowledge are reported to be protective factors for delayed help seeking in the broader cancer literature. It is therefore likely that increasing knowledge is an important strategy for decreasing patient delay. Public education is appropriate as an intervention [48–50].

Heavy smoking and alcohol consumption were related to longer delay in three studies [34, 38, 40]. The odds ratio's estimated for smoking and drinking ranged from 0.90 to 1.8 and were associated with rather wide 95% confidence intervals that included a relative risk of 1.0. Larger sample sizes are required to estimate small independent effects of smoking and drinking on delay. Smoking and alcohol consumption are also the primary risk factors for many cancers of the head and neck [11, 18, 51]. It is unclear what role smoking and drinking play in patient related delay in the revised studies. It may be that the cognitive impairment associated with chronic alcohol abuse makes it difficult for patients to notice early symptoms or to interpret them as abnormal. In the case of smoking, it is possible that smokers may be accustomed to minor mouth and throat irritations and are more likely to dismiss the early warning signs as unimportant until they have progressed.

Patient delay was associated with both increased stage and a larger tumour at the time of diagnosis [37, 39, 40]. The odds ratios associated with tumour size were larger than those related to stage (3.2-4.5 vs 1.1-2.1). This lends support to Goy and Groome's observation that the variation of risk estimates calculated between stage and delay in the general literature may be due to a lack of sensitivity due to using stage as an indication of disease progression [52].

The literature reported a range of personal beliefs and psychological characteristics that were associated with an increased risk of delay. Patients who believed that their disease was predetermined or fateful and patients who used traditional herbal medicine were more likely to delay [32, 33]. It is possible that these observations are culturally specific and may not be generalizable to other patient populations. Nevertheless, it is important to take into consideration that cultural beliefs may affect the time it takes a patient to seek a medical consultation. For example, newcomers to Canada may not know where to turn for medical help and their associates may misdirect them, thus further adding to delay. Additionally, patients who reported less optimism, the tendency to use avoidance to cope with stress, or had low self-efficacy for help-seeking and coping with health issues were more likely to delay [27, 34, 35].

Only one of the studies contextualized the stages of delay within an explanatory model [27]. Scott used Andersen's model of delay in conjunction with the Self-Regulatory Model. However, although the Self-Regulatory model is useful for conceptualizing personal motivations, it ignores the possible influence of the patients social network on help seeking [44]. In contrast, Kumar used the Triandis Model of Social Behavior [45] further illustrating the possibility that delay may be partly explained by a patients personal motivations and behaviors. Application of the Triandis model, which, includes aspects of the patient's social network [45], revealed that the patients perception of family tension is associated with longer patient delay ($p = 0.04$). The importance of contextualizing patient delay within appropriate psychosocial frameworks cannot be overstated.

Patients who reported higher levels of personal stress were also more likely to delay seeking help from an HCP [36, 41]. Llewellyn reported a rather high odds ratio of 7.00 whereas Scott reported a more modest odds ratio of 1.15. Although it stands to reason that preoccupation with other stressors is related to postponing consultation with an HCP, three reviews of the literature reported that there is inconclusive evidence of a relationship between delay and personal stress in patients with either symptomatic breast, upper G.I., colorectal, urological gynecological or lung cancer [53–55]

All of the review studies depended on the patients recall of when the first symptoms appeared, yet none of the authors reported the methods used, if any, to minimize errors inherent in depending on retrospection [56]. Although it is difficult to eliminate retrospective biases, there are validated methods available to minimize these errors, and they should be employed and reported in all future studies [56].

All of the studies reported both adjusted and unadjusted estimates where appropriate but none provided any information on which variables were considered a main independent study variable versus a potentially confounding variable. All future studies should provide this information contextualized within an appropriate causal model.

There was considerable variation on the definition of a relevant delay across studies, and most of the studies dichotomized their main dependent variable (patient delay). The subsequent problems of a loss in study power and an increased risk of false positive results that can result from hastily dichotomizing a continuous variable are well recognized in the literature [57, 58]. Future studies should be cautious about how they define a clinically relevant delay and should provide bivariate analysis of the continuous form of the delay variable, and suspected risk factor(s) to allow the reader to assess for the role that decreased study power played in the final adjusted models. Current clinical guidance infers that a clinically relevant delay is about four weeks [20], and future studies should use this definition to provide the consistency that will allow comparisons between studies.

Lastly, only one study examined associations between one aspect of the patient's immediate social network (family) and delay. Onizawa et al [42] found a trend that patients who lived alone were more likely to delay seeing an HCP than those who lived with at least two other people (OR 3.43 95% C.I. 0.86-13.7, p=0.081). Although this association failed to meet statistical significance, it does raise the possibility that it is a true relationship and the lack of statistical significance reflects lack of power. This finding is in keeping with the three systematic reviews on predictors of patient delay in breast, colorectal and gynecological cancers [53–55] that all concluded that patients who disclose their symptoms to another person experience less delay.

3.5 CONCLUSION

This scoping study confirmed/identified three gaps in the current literature. There is a lack of studies that address:

- The symptom experience
- The psycho-social processes of help-seeking
- The independent effects of suspected risk factors.

Filling these gaps will provide both a broader and deeper understanding of the process involved in patient related diagnostic delay. Understanding these processes will be the key to designing effective education strategies targeting those at risk and/or their attendant lay-consultants to shorten patient delay and potentially increase cure rates [59]. Recommended next steps should focus on interventions advising people to see an HCP if their symptoms last more than 3 weeks and implementing studies that are designed to assess the magnitude of effect of individual risk factors.

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Figure 1: Study Flow

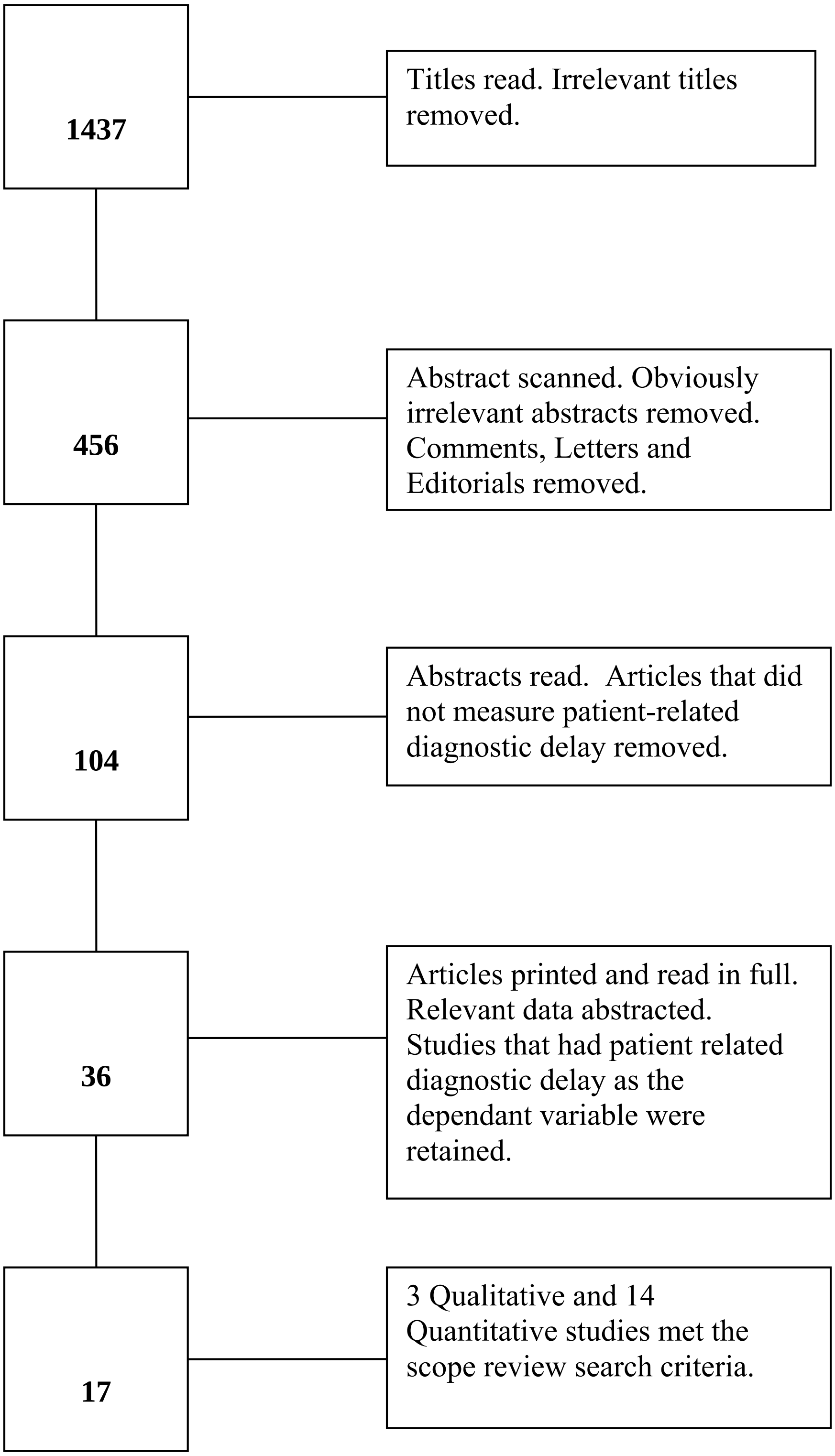

Table 1: Details of the reviewed studies

First Author (year)	Country	Disease Site	Theoretical Model	Sample Size	Timing of Interview	Patient Related Delay Variable*	Delay
Qualitative							
Scott (2006).	UK	Oral and oropharyngeal	None	17	Pre-treatment.	N/App.	Mean = 11 weeks, (S.D = 14.3 weeks). Median = 3 weeks, (Range = 0-48 weeks).
Scott (2009).	UK	Self discovered oral symptoms subsequently judged potentially malignant by HCP.	Yes (Andersens Model of Total Patient Delay)	57	Pre-diagnosis	N/App.	Mean = 71.5 days, (S.D = 71.3 days). Median = 36 days, (Range = 0-366).
Grant (2010).	UK	Oral, oropharyngeal.	None	15	Post treatment.	N/App.	Median = 4 weeks, (Range = 1-52 weeks).
Quantitative**							
Guggenheimer (1986).	USA	Oral and oropharyngeal	None	149	134 post-treatment 34 pre treatment	Categorical: ≤ 4 weeks 5-20 weeks ≥ 24 weeks	Median = 17 weeks, (Range = 365 days).
Wildt (1995).	Denmark	Oral	None	167	Post treatment.	Dichotomous: <45 days ≥45 days	Mean = 162 days. Median =122 days. (Range = 0-600 days)
Amir (1999).	UK	Oral cavity, lip, larynx, pharynx, salivary glands, ears and sinus cavities.	None	188	Not specified.	Quartiles	CLOC: Mean = 7.4 weeks. Median = 4 weeks, (Range = 0-36). OHCN: Mean = 12.3 weeks. Median 3 weeks, (Range = 0-6 years).
Kumar (2001).	India	Oral	Yes (Triandis' Model of Social Behavior)	79	Not Specified.	Continuous	Range = 3 days to 3 years.
Onizawa (2003).	Japan	Oral	None	152	N/App.	Median split	Median = 1.6 months. (Range = 0-60 months)

Table 1: Cont'd

First Author (year)	Country	Disease Site	Theoretical Model	Sample Size	Timing of Interview	Patient Related Delay Variable*	Delay
Kerdopon (2004).	Thailand	Oral cavity and lip.	None	161	Not specified.	Continuous unit :weeks.	Mean = 90.6 days. (Range = 0-200).
Tromp (2004).	Netherlands	Oral cavity, pharynx and larynx	None	306	Pre-treatment.	Dichotomous < 3 months ≥3 months	Mean = 90.75 days. (Range = 1-1436 days).
Tromp (2005).	Netherlands	Head and Neck (sites not specified)	None	264	Post-diagnosis	Dichotomous < 3 months ≥3 months	Average delays not reported.
Llewellyn (2004).	UK	Oral cavity and lip	None	53	Not Specified.	Dichotomous ≤3 weeks > 3 weeks	Mean = 9.81 weeks. Median = 5 weeks, (Range 1-104 weeks).
Brouha (2005).	Netherlands	Larynx	Yes (Andersens Model of Total Patient Delay)	117	Pre-treatment.	<4 weeks, 5-12 weeks and >12 weeks	Median = 8 weeks.
Brouha (2005).	Netherlands	Oral and Pharyngeal	Yes (Andersens Model of Total Patient Delay)	189	Not Specified.	Dichotomous < 3 months ≥3 months	Average delays not reported.
Brouha (2005).	Netherlands	Oral, pharynx and larynx	No	306	Not Specified.	Dichotomous < 3 months ≥3 months	*Entire sample* Median = 45 days. *Oral* Median = 34 days. *Pharynx* Median = 48 days. *Larynx* Median = 54 days.
Rogers (2007).	UK	Oral and oropharynx	None		N/App.	Dichotomous <3 months ≥3 months	Not reported
Scott (2008).	UK	Self-discovered oral symptoms subsequently judged potentially malignant by HCP.	Yes (Andersens Model of Total Patient Delay and the Self-Regulatory Model)	80	Pre diagnosis.	Dichotomous <31 days ≥31 days	Median = 35 days, (Range 0-300 days). Mean = 71.2 days.

of patient delay information was a patient interview for all studies with the exception of Onizawa and Rogers et al..
ıantitative studies were institutional and cross sectional.

Table 2: Variable descriptions, analytical methods and factors associated with patient delay for quantitative studies

First Author (year)	*Independent variables*	*Purely Descriptive variables*	*Analytical methods*	**Statistically Significant* Factors Associated with Patient Delay**
Guggenheimer (1989).	Gender, Age, Education, Tumour T stage.	Presenting Signs and Symptoms, Professional Delay	Bivariate. Stratified.	None.
Wildt (1995).	Tumour site, Tumour size, Stage grouping, Histological score, Sex, Age, Choice of primary medical contact, Regular visit to a dentist.	None	Bivariate.	None.
Amir (1999).	Cancer site (CLOC vs OHNC), Sex, Age, Social class, and Tumor size, First symptoms, Urgency to investigate, Symptom interpretation.	None.	Bivariate.	None.
Kumar (2001).	Patients fate, Gods destiny, Escorted by someone, Availability of transport, Cancer can develop if tobacco is used, Visiting a doctor for early detection of cancer, Necessity of consulting a doctor for small ulcers in the mouth for those who use tobacco, Regular visit to doctor in the past 12 years, Domestic remedies/medicine before consulting doctor, Any family member/relative/friends had cancer, Tired of treatment, Family tension due to long treatment, Socio-economic status.	Sex, Age, Literacy, Education.	Bivariate. Multivariate.	Patient's fate. God's Destiny. Availability of transport. Necessity of consulting a doctor for small ulcers in the mouth for those who use tobacco. Families' tension due to long treatment.
Kerdopon (2001.)	Sex, Age, Marital status, Tumor size, Lymph node metastasis, TNM stage, Religion, Area of residence, Occupation, Initial sign or symptom, Site of lesion, Type of health car professional, Treatment seeking before professional consultation, Traditional herbal medicine, Smoking, Alcohol, Drinking and Betel quid chewing.	None.	Bivariate.	Traditional herbal medicine use.
Onizawa (2003).	Gender, age, history of malignant disease, number of family members in same house, daily medication, employment status, tobacco use, alcohol use, first symptom, t category, n category primary site.	None.	Bivariate.	None.

***p<0.05**

Table 2: Cont'd

First Author (year)	*Independent variables*	*Purely Descriptive variables*	*Analytical methods*	Statistically Significant* Factors Associated with Patient Delay
Tromp (2004).	Life Orientation Test (8 items), Defense style Questionnaire (21 items), Health hardiness scale (35 items), Coping style (17 items), Hospital Anxiety and depression scale, Age, Gender, Education, Alcohol, Smoking.	Living situation, Tumour localization, Tumour size.	Bivariate. Stratified. Multivariate.	Alcohol use. Avoidance coping. Less optimism.
Tromp (2005).	Health risk behavior (smoking and drinking), Health value and control beliefs (locus of control and perceived health competence), psychological disteress.	Age	Bivariate Stratified Multivariate	Perceived Health Competence
Llewellyn (2004).	Demographic variables (8 items), Signs and symptoms (7 items), Medical history (5 items), Perception of significant stress, Factors related oral health (10 items), Risk habits (9)		Bivariate. Multivariate.	Further education. Under stress prior to diagnosis. Smoking.
Brouha (2005).	Sex, Age, Localization, Smoking, Alcohol, T classification, Stage classification N classification Presenting symptom(s).	None.	Bivariate. Stratified.	Age. T size. Stage.
Brouha (2005).	Site, First symptom (11 categories), Symptom attribution (12 categories), Reason for visit to HCP (11 categories)	Sex, age, marital status, living situation, education, Employment, Income, Smoking, Alcohol consumption .	Bivariate.	Site.
Brouha (2005).	Smoking. Alcohol. Smoking X Alcohol.	Sex Age Tumour localization Tumour size	Bivariate.	Alcohol. Smoking. Alcohol x Smoking.
Rogers (2007).	Symptoms, First professional contacted, Gender, age, Deprivation, marital status, smoking status, alcohol status, site, tumour size, t stage, tN stage.	None.	Bivariate.	Symptoms. Smoking. Stage.
Scott (2008).	Psychosocial Factors (7), Symptoms (11), Total number of symptoms, Site of lesion, Definitive diagnosis, SES, Health related behaviors (4).	None	Bivariate. Multivariate.	Knowledge of oral cancer. Average severity of life events in patient delay period. Perceived ability to seek help.

*p<0.05

Table 3: Factors Associated with Patient Delay

First Author (year)		***Measure of Effect***	**Statistical Significance**
Kumar (2001).	Patient's fate.	β = 0.65	95% C.I = -1.21*; -0.10
	God's destiny.	β = 0.86	95% C.I = 0.30 ; 1.43
	Availability of transport.	β = -1.34	95% C.I = 2.16 ; -0.51
	Necessity of consulting a doctor for small ulcers in the mouth for those who use tobacco.	β = -0.99	95% C.I = -1.68; -0.34
	Families' tension due to long treatment.	β = -1.32	95% C.I = -2.06; -0.57
Kerdopon (2001.)	Traditional herbal medicine use.	HR = 0.46	95% C.I = 0.28; 0.76
Tromp (2004).	Avoidance coping.	β = -0.55	p = 0.01
	Less optimism.	β = -0.40	p = 0.02
Tromp (2005).	Perceived Health Competence	OR = 0.55	95% C.I = 0.35; 0.87
Llewellyn (2004).	Further education.	OR = 0.05	95% C.I = 0.01; 0.34
	Under stress prior to diagnosis.	OR = 7.00	95% C.I = 1.23; 39.87
	Smoking.	OR = 0.90	95% C.I = 0.90; 1.00
Brouha (2005).	Pharynx:		
	Age.	OR = 5.00	95% C.I = 1.00; 25.60
	T size.	OR = 4.50	95% C.I = 1.40; 14.50
	Stage.	OR = 1.10	95% C.I = 0.30; 4.60
	Oral Cavity:		
	T size.	OR = 3.20	95% C.I = 1.40; 6.90
	Stage.	OR = 2.10	95% C.I = 1.00; 4.20
Brouha (2005).	Site**.	N/R*	p = .000
Brouha (2005).	Alcohol.	OR = 1.8	95% C.I = 1.00; 3.1
	Smoking.	OR = 2.2	95% C.I = 1.00; 5.0
	Alcohol X smoking.	OR = 1.9	95% C.I = 1.0; 3.5
Rogers (2007).	Symptoms.	N/R*	p = .030
	Smoking.	N/R*	p = .030
	Node Status	N/R*	p = .050
Scott (2008).	Knowledge of oral cancer.	OR = 0.78	95% C.I = 0.57; 0.98
	Average severity of life events in patient delay period.	OR = 1.15	95% C.I = 1.06; 1.25
	Perceived ability to seek help.	OR = 0.76	95% C.I = 0.6; 0.97

*As reported (A positive beta with corresponding confidence intervals that are both negative is a reporting error in the referenced article).

Appendix: Search algorithm.

☐	# ▼	Searches	Results	Search Type	Actions
☐	1	early detection of cancer.mp. or exp "Early Detection of Cancer"/	3140	Advanced	Display More ≫
☐	2	delayed diagnosis.mp. or Delayed Diagnosis/	3415	Advanced	Display More ≫
☐	3	diagnostic delay.mp.	989	Advanced	Display More ≫
☐	4	Health Knowledge, Attitudes, Practice/ or "Patient Acceptance of Health Care"/ or patient delay.mp. or Attitude to Health/	136578	Advanced	Display More ≫
☐	5	patient delay.mp. or Attitude to Health/	66125	Advanced	Display More ≫
☐	6	social support.mp. or Social Support/	48301	Advanced	Display More ≫
☐	7	sociology/ or family/ or social class/ or social conditions/ or social control, formal/ or social control, informal/ or community networks/ or social support/ or socialization/ or socioeconomic factors/	230346	Advanced	Display Delete More ≫
☐	8	Attitude to Health/ or Personality Inventory/ or Sick Role/ or illness behaviour.mp.	98805	Advanced	Display More ≫
☐	9	illness behavior.mp. or Illness Behavior/	928	Advanced	Display More ≫
☐	10	"Patient Acceptance of Health Care"/ or help-seeking behaviour.mp. or	88846	Advanced	Display More ≫

		Attitude to Health/			
☐	11	help-seeking behavior.mp.	296	Advanced	Display More ≫
☐	12	Self Care/ or lay-consultation.mp. or "Patient Acceptance of Health Care"/	44272	Advanced	Display More ≫
☐	13	lay consultant$.mp.	4	Advanced	Display More ≫
☐	14	consulting behaviour.mp.	68	Advanced	Display More ≫
☐	15	"delivery of health care"/ or after-hours care/ or health services accessibility/ or healthcare disparities/	96112	Advanced	Display More ≫
☐	16	care seeking.mp.	1099	Advanced	Display More ≫
☐	17	attribution of symptoms.mp.	51	Advanced	Display More ≫
☐	18	1 or 2 or 3 or 4 or 5	143509	Advanced	Display More ≫
☐	19	6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17	434853	Advanced	Display More ≫
☐	20	(scott or scott se).au.	25	Advanced	Display More ≫
☐	21	"head and neck neoplasms"/ or esophageal neoplasms/ or facial neoplasms/ or eyelid neoplasms/ or mouth neoplasms/ or gingival neoplasms/ or leukoplakia, oral/ or leukoplakia, hairy/ or lip neoplasms/	212291	Advanced	Display Delete Save Auto-

		or palatal neoplasms/ or salivary gland neoplasms/ or parotid neoplasms/ or sublingual gland neoplasms/ or submandibular gland neoplasms/ or tongue neoplasms/ or otorhinolaryngologic neoplasms/ or ear neoplasms/ or laryngeal neoplasms/ or nose neoplasms/ or paranasal sinus neoplasms/ or maxillary sinus neoplasms/ or pharyngeal neoplasms/ or hypopharyngeal neoplasms/ or nasopharyngeal neoplasms/ or oropharyngeal neoplasms/ or tonsillar neoplasms/ or parathyroid neoplasms/ or thyroid neoplasms/ or thyroid nodule/ or tracheal neoplasms/			Alert RSS Feed
☐	22	18 and 21	840	Advanced	Display More ≫
☐	23	19 and 21	1203	Advanced	Display More ≫
☐	24	18 and 19 and 21	363	Advanced	Display More ≫
☐	25	22 or 23 or 24	1680	Advanced	Display More ≫
☐	26	limit 25 to english language	1470	Advanced	Display More ≫
☐	*27*	*remove duplicates from 26*	*1437*	*Advanced*	***Display More ≫***

CHAPTER 4: SYMPTOM APPRAISAL AND HELP-SEEKING FOR SYMPTOMS OF HEAD AND NECK CANCER.

4.1 ABSTRACT

BACKGROUND: Early diagnosis and treatment is important in head and neck cancer patients in order to maximize the effectiveness of the treatments and minimize the debilitation associated with both the cancer and the increasingly debilitating treatments associated with advanced stage. Many patients present with late stage disease, and there is little understanding as to why. This study investigated patients' symptom appraisal and help-seeking processes up to the time they first went to see a health care professional (HCP).

METHODS: We interviewed 83 patients who were diagnosed with cancers of the head and neck. The study design was cross-sectional and consisted of structured telephone interviews and a medical chart review. We gathered information on the participant's personal reactions to their symptoms, characteristics of their social network and the feedback they received. A chart review captured key clinical and tumour characteristics.

RESULTS: We found that only 18% of the participants thought that their symptoms were urgent enough to warrant further investigation. Participants rarely (6%) attributed their symptoms to cancer. A lack of knowledge about early and tolerable cancer symptoms was the primary barrier to seeking help with 89% saying that they were not aware of the early warning signs and symptoms of head and neck cancer. Fifty seven percent of the participants disclosed their symptoms to at least one lay-consultant before seeking help from an HCP. The lay-consultants are usually their spouse (77%) and the most common advice they offer is to see a doctor (76%). Lastly, 81% of the participants report that their spouse influenced their decision to see an HCP.

CONCLUSIONS: The results of this study suggest that patients frequently believe that their symptoms were non-urgent and that their lay-consultants influence their decision to seek help from an HCP. Future analyses will examine the role that these factors play on the length of time

it takes a symptomatic patient to see an HCP and will be the focus of a separate article. Interventions should then follow that focus on ways of informing those at risk and/or their attendant lay-consultants to act immediately when they first notice seemingly benign alarm symptoms lasting more than three weeks.

4.2 INTRODUCTION

Early diagnosis and treatment is important in cancer care in order to maximize the effectiveness of the treatments and minimize the debilitation associated with both the cancer and its treatment. Treatments offered to patients with cancers of the head and neck become more invasive, disfiguring, and debilitating as the stage at which the cancer is diagnosed increases [1–4]. Between one-third and two-thirds of men and women diagnosed with cancers of the oral cavity, oropharynx and larynx are diagnosed with stage III or IV disease, [5–13]. Many of these cancers could be detected earlier and survival decreases with increasing stage [5–7].

Symptoms and signs of oral and oropharyngeal cancer are readily appreciated on routine clinical examination and include oral ulcerations, swelling, red or white patches, difficulty swallowing and neck masses [1, 14]. Early manifestations of laryngeal cancer include breathing problems, earache and hoarseness [15, 16]. Many of these symptoms are similar to other common, benign and self-limiting, conditions so recommendations often suggest that the symptoms persist for at least three weeks before consulting with a health care professional [17, 18].

Andersen provides a model that is useful as a framework for analysis because it outlines the processes associated with symptom appraisal (delays associated with symptom appraisal), deciding to seek help from an HCP (delays associated with illness), making an appointment with an HCP (delays associated with behaviour) and meeting with an HCP (delays associated with scheduling) [19]. This model has subsequently been refined. Walter et al. propose that the time intervals associated with illness, behaviour and scheduling be combined and renamed the help-seeking interval [46]. Thus prior to meeting with an HCP patients will have gone through a process of symptom appraisal and help-seeking.

When people feel ill, they usually tell a personal associate (lay-consultant) about their symptoms prior to meeting with an HCP [20–25]. Furthermore, those contacts can influence the patient’s decision about whether or not to consult an HCP [21]. Hence, depending on their membership and characteristics, the social networks that patients inhabit can affect the length of time it takes for a help-seeker to reach a health professional. Although some literature has focussed attention on the predictors of patient delay in head and neck cancer patients, no studies to date have paid sufficient attention to the social processes that are implicated and few studies have employed the use of accepted psycho-social models of patient delay [26–42].

The number of people a help-seeker consults, the relationship the help seeker has with these consultants, and the substance of the consultants’ responses, could all determine the help seeker’s attitudes and health-related behaviours [20, 22–25, 43–45]. We need a better understanding of patients’ use of their social network for obtaining health-related information and advice. This could inform future educational strategies for improving the help-seeking behaviours of symptomatic individuals by targeting interventions at those at risk of delaying and/or their attendant lay-consultants. The aim of the current study is to describe and document patients’ personal responses to symptoms of head and neck cancer, the characteristics of the patients’ lay-consultants and the responses that the patients received from their lay-consultants. In addition we also explored relationships between factors that might influence the perceived urgency of the symptoms, use of lay consultants and their influence on help-seeking.

4.3 METHOD

We employed Walters’s refinement of Andersen’s Model of Total Patient Delay to design our study [46]. Figure 1 presents our conceptual model. The interval between the onset of symptoms and a meeting with an HCP includes the processes of symptom appraisal and help-seeking (patient/network delay). The length of time it takes a patient to appraise their symptoms and finally meet with an HCP may be influenced by whether or not they tell someone about their symptoms (lay consultancy) [20, 22–25, 43–45].

The study design was cross-sectional and consisted of structured telephone interviews and a medical chart review. The study population was patients diagnosed with cancers of the oral cavity, oropharynx and larynx. Patients were recruited from the combined surgical and radiotherapy head and neck oncology clinic at the Southeastern Ontario Regional Cancer Centre (SEORCC) in Kingston Ontario from September 2010 through Dec 2011, and at the head and neck surgical clinic at the Princess Margaret Hospital (PMH) in Toronto from November, 2010 through December, 2011. Research ethics approval was obtained from both sites and informed consent was obtained from all participants. Patients were excluded if: they were being followed for an asymptomatic lesion, had synchronous and/or previous cancers or were deemed unfit to participate by their physicians. Initially, we recruited consecutive newly diagnosed patients at their first clinic visit. To subsequently increase our sample size, we expanded the inclusion criteria to those diagnosed between July, 2009 and August, 2010 at SEORCC and between October, 2009 and November, 2010 at the PMH.

We used both bounded and aided recall techniques in our interviews to improve participant recall [47]. Specifically, participants were given memory aids that included a blank social network map, a "Sensations or Changes Calendar" constructed according to the Freedman et al. life calendar methodology [48] and a blank social network map to assist with a social network mapping exercise. We encouraged participants to prepare for the interview by completing the social network map and entering pertinent dates on the "Sensations or Changes Calendar".

During the interview we asked patients open-ended questions about their symptom appraisal and help-seeking experiences. Participants were asked what made them decide to see an HCP about their symptoms. We asked about cancer relevant: sensations/changes (symptoms) participants experienced, the factors that made them decide to see an HCP, whether or not they had investigated their symptoms, what they thought was going on, how worried they were, how urgently they thought they should investigate the symptoms (symptom urgency), whether or not they thought the symptoms reflected the presence of illness or disease, whether or not they had prior knowledge of the symptoms of head and neck cancer, the time of symptom onset and the date of their first visit to a relevant HCP. The questionnaire is appended. We also conducted a separate reliability study to compare the responses of the participants with those of their lay-consultants.

We collected information on two separate lay-consultation networks. First, we recorded how many people the participants thought they would normally notify if they were feeling sick or ill. Secondly, we asked the participants whether they told anyone about their symptoms prior to seeing an HCP, the number of those contacts, whether the contacts knew each other, the order in which they were contacted, the nature of the relationship they had with each contact, and what those contacts said to them about their symptoms. We gathered information on the closeness/intimacy of the relationship with the contact, and how much influence the contact had on the participants' decision to see an HCP. Both were rated on a five-point Likert scale. We calculated the network density [49] of each of the two lay-consultation networks identified during the interview. Network density was calculated by dividing the number of ties by the number of all possible ties [49]. Interviews were conducted by a single Research Associate with the exception of two interviews that were conducted by one of the investigators (JQ).

Demographic characteristics (age, sex, marital status, household income, education, ethnicity, living arrangements and whether the participant was born in Canada) were collected during the interview. A review of the participants' electronic medical chart at the relevant cancer clinic site captured the cancer anatomical and site stage grouping at diagnosis.

Frequency counts and percentages for all of the study variables were calculated and tabulated. Chi-square statistics and t-tests were performed to explore for differences between some key variables and whether or not the participants thought their symptoms warranted urgent investigation, whether or not they told a lay-consultant and how influential the lay-consultant was on the participant's decision to see an HCP. In cases where the frequency counts in individual cells were less than five Fisher's exact test was performed. Variables selected for comparison were based on the whether or not a plausible causal relationship may exist between the selected predictor variables and the three main variables (urgency, lay-consultancy and lay consultant influence). All data analysis was performed using SAS 9.3 [50]. The answers to the open ended questions were manually recorded by the Research Assistant interviewer. The processing of the open-ended responses into categories was conducted through an iterative process by two of the investigators and they were subsequently categorized (JQ, BG).

4.4 RESULTS

Particpants

Figure 1 presents the study flow over all patients. A total of 317 patients were available to participate across the two sites, and we were able to approach and invite 159. Barriers to recruitment of the other 138 patients included competing study recruitment responsibilities, simultaneous patient clinic appointments and many previously diagnosed patients did not have a follow-up appointment booked during the recruitment period. Forty four patients were deemed ineligible to participate by their physicians due to illness or cognitive impairment. 113 patients consented to participate and 94 of those were interviewed. Our overall recruitment rate was 58% of the eligible population, and 71% of those we approached consented. Ten participants were removed from the analysis because they were asymptomatic and had been diagnosed as the result of a screening exam. One participant reported a clinically improbable delay (>10 yrs.) and was subsequently removed from the analysis as an extreme outlier. Our final sample size was 83.

Table 1 presents the demographic characteristics of the study participants. The average age was 63 years of age, the youngest being 27 years old and the eldest 87 years old. The vast majority were male (81%) and either in a marital or common-law relationship (81%). Eighty-seven percent lived with someone, mostly with a spouse and/or children. Forty-two percent had a family income below $41, 000 per year and less than half had completed high-school (40%). Very few of the study participants identified themselves as non-Caucasian (8%), and 69% were born in Canada.

Table 2 reveals that 54% of the participants presented with a cancer of the oral cavity, 30% with oropharyngeal cancer and 16% with laryngeal cancer. Of the participants with oral cancer, 42% were stage III or IV cancers. Of the patients with oropharyngeal cancer, 88% presented with late stage disease. Most of patients with laryngeal cancer presented with early stage disease. Table 2 also displays the participants' presenting symptoms. More than three-quarters of the study participants presented to their health care provider with a single symptom (76%), most commonly a mouth lesion (31%) or pain (29%). Of the participants who presented with two or more symptoms, 61% reported suffering from additional pain, a neck mass or problems swallowing. The most common symptom reported by participants who had cancer of the oral cavity was pain (53%). Participants with oropharyngeal most commonly reported a neck mass (50%). Those participants who had laryngeal cancer most commonly reported a voice change (64%).

Symptom Appraisal

Table 3 presents study participants' personal reactions to the earliest symptoms of head and neck cancer. When we asked the participants how they appraised their bodily changes, the most common interpretation was that the changes reflected or were the result of a canker, dental problem, injury, irritant or infection (67%). When we asked the participants if "they recalled how worried they felt at the time the problems in their mouth, ear, throat or neck first appeared and how urgently they felt they needed to investigate the symptoms" we were able clearly separate urgency and worry into two distinct questions. Because the participants either answered yes or no to both urgency and worry we were also able to categorize both of these variables into either yes or no based on the actual response patterns of the participants, Based on these responses, 90% of the participants did not think their symptoms warranted urgent investigation and 82% were not worried. Furthermore, most of the participants reported that they did not think that the changes signified illness or disease (71%) nor were they aware of the signs and symptoms of head and neck cancer (89%). When we asked them what made them decide to see an HCP, three categories emerged: "persistent and worsening symptoms", "single symptom" and "more than one symptom". Only two participants reported that they decided to see an HCP because they were advised to do so by a lay consultant, in both cases, their spouse (not tabulated). More than half the study participants mentioned their symptoms to at least one other person prior to consulting with a health care professional (57%).

Lay-Consultation and Influence

Table 4 presents both the number of people the participants thought they would usually contact if they were ill and the numbers of people they actually contacted regarding their symptoms prior to seeing an HCP. Most (89%) of the participants identified at least one person who they thought they could talk to regarding feelings of illness. Fifty-seven percent told at least one other person about their symptoms prior to meeting with an HCP.

The identified network tended to be larger (0-7 potential contacts) than the network that was actually contacted (0-4). Both networks were of similar density (0.83 and 0.85) indicating that both networks consisted of individuals who knew each other.

Table 5 presents the sex, relationship, advice offered, closeness, influence, and impact (on the participants' understanding of their symptoms) of the participants' first network contacts. We present the characteristics of the first lay-contact only because 62% of the participants who contacted someone about their symptoms limited their interactions to just one person. Additionally, the participants' subsequent contacts were virtually all family members that were related to each other. The first person they told was typically their spouse (78%). Ninety-two percent of the participants reported that they had the closest possible relationship on a five point scale with their first contact. Furthermore, 76% of the participants' first contacts encouraged them to see an HCP. More than half (58%) of the participants reported that their lay-consultant changed their understanding of what they were dealing with. There was a wide variation of responses to the question regarding whether or not lay-consultants changed their understanding of what they were dealing with: 24% scored a 5 representing the most possible influence and 26% scored 3.

Table 6 presents our analysis of possible predictors of symptom urgency and lay-consultancy. Participants experiencing a change in their voice or speech were statistically significantly more likely to disclose their symptoms to a lay-consultant ($p = 0.005$). Lastly, there was no statistically significant relationship between symptom urgency and lay-consultation ($p = 0.49$)

4.5 DISCUSSION

To the best of our knowledge, this is the first description of the process of symptom appraisal and help seeking contextualized within the head and neck cancer patients' network of lay-consultants. Our findings support Andersen's Model of Total Patient Delay [14]. Participants in our study followed the general pattern of symptom appraisal followed by help-seeking and, because 57% of the participants told another person, about their symptoms prior to seeking help from an HCP we think that social networks play a role in the help-seeking process for symptoms of head and neck cancer.

Symptom Appraisal

We think that our finding, that 90% of the participants reported that they thought that the symptoms were nothing to worry about and that 82% thought that their symptoms were non-urgent, indicates that a lack of knowledge about the persistent nature of early and tolerable cancer symptoms is the primary barrier to seeking timely help. These findings confirm previous literature reporting low levels of awareness of the symptoms of cancer amongst the general population and within symptomatic cancer patients including cancers of the head and neck [26, 28, 41, 51, 55]. In our study, patients most commonly attributed their symptoms to a canker, a dental problem or some form of benign condition and rarely attributed their symptoms to cancer. We think that a large proportion of patient delay in head and neck cancer takes place while the patient is appraising the meaning of their symptoms prior to either telling another or seeking help from an HCP.

Lay-Consultation and Influence

Over half of the participants told at least one other person about their symptoms prior to seeing an HCP. The advice they received from their contact was to make an appointment with an HCP, and the advice they received influenced their decision to seek that help. The finding that many symptomatic head and neck cancer patients disclose their symptoms to at least one other person prior to meeting with an HCP is not surprising when compared to the broader cancer literature [21, 51–54]. However, our results do suggest that patients with head and neck cancer may be less likely to disclose their symptoms to another compared to patients with breast cancer. Coates et al. [54] reported that 71% of breast cancers patients disclosed their symptoms to another prior to a meeting with an HCP whereas our study found that only 57% did this. We also found that 77% of the participants' lay-consultants were their spouses and that those who told more than one person told people who knew each other. It is possible that by telling one significant person in their network they were in effect telling everyone. 43% did not tell anyone about their symptoms. Possibly this reflects their mistaken belief that the symptoms represented a non-urgent and benign condition or perhaps they sought help from an HCP quickly because their symptoms were alarming. Our finding that symptom urgency was not statistically significantly related to lay-consultation supports the latter interpretation. Participants who experienced a voice or speech change were more likely to report that they disclosed their symptom to a lay-consultant than participants who experienced pain, a lesion or a neck mass. This finding indicates that the nature of the symptom affects a patients' help-seeking behaviour; however, because a change in voice or speech is apparent to others we cannot rule out that the participants' lay-consultant elicited disclosure from the participant. There was some indication in our study that spouses were more influential in their decision to seek professional help than non-spouses. In contrast, 42% of the participants reported that their lay-contact did not change their understanding of what they were dealing with whereas the rest reported varying degrees of a change in understanding (24% reported a great deal of change in understanding). It is possible that a large proportion of participants were seeking confirmation rather than advice on what they were experiencing. We did not collect data on the timing of these lay-consultations in relation to the decision to seek medical attention so some lay consultants may have been endorsing the participants' decision. However, because only two participants reported that their lay-consultants were the main reason for their visit to an HCP, we think the decision endorsement explanation is more likely.

Our finding that participants in this study were mostly male, had a low family income and reported low levels of education is similar to the other studies cited above in this patient population [5–13]. The men in our study may have been less likely to disclose their symptoms to another compared to females but the 15% difference we observed was not statistically significant (p=0.27). A recent review of the literature in illness related help-seeking amongst men supports this idea and advises that future interventions to reduce delay in men will be of limited success unless sufficient attention is paid to explaining their underlying symptom appraisal and help-seeking processes [56].

Strengths and Limitations

This study depended on the recollections of patients who had already been diagnosed and, in some cases, treated for their cancer. Their ability to recall accurately the sequence of events and the content of past conversations may have been impaired by the emotional stress of their diagnosis and/or the passage of time. We are wholly dependent on this retrospective approach because patients are not identifiable until after these events have occurred and a prospective study in an at risk population would be impractical. Thus, we tried to structure the recall to improve its accuracy. All of the patients were instructed to talk to as many people as they wanted to help them recall the story of their pre-diagnostic period. The participants were given at least one week to prepare for the telephone interview. We recognize that we cannot eliminate or quantify errors related to the participants' recall of past events with our study design, but we think that our preparatory materials and our reliability assessment through the use of lay consultant interviews are key methodological strengths of this study.

We chose to interview patients on the telephone rather than face-to-face because we thought that it would minimize patient burden. We do not think that this represents a great limitation of our study as there is evidence that the quality of information obtained via a telephone interview is comparable to the quality of information obtained by a face-to-face interview [58].

We cannot generalize our findings to all patients with head and neck cancer because our recruitment process is likely to have resulted in a volunteer selection bias. By necessity, our study oversampled cancers of the oral cavity and oropharynx so that the relative proportions or oral cavity versus oropharyngeal versus laryngeal cancers in our study does not match what we would expect to see if we had had a fully representative sample [59]. We also have a different proportional distribution than a previous study conducted in the same patient population at the Princess Margaret Hospital using similar recruitment methods [12]. Our sample did not include those that physicians excluded because of cognitive impairment or advanced illness and we think that those who refused to participate were more likely to be both socially isolated and/or have advanced disease. We could not compare the characteristics of our sample to the target population outlined in Figure 1 as we did not have any information on the patients who were eligible but were not approached, nor do we have information on those who refused to participate. This combined with our low recruitment rate means that we cannot defend that these study participants represent our target population. Additionally, our rather small sample size leads to wide confidence intervals, ranging as high as +/-10% in the middle of the 0-100% range. However, the study does provide a textured description of the experiences and reactions to symptoms of head and neck cancer patients at two different cancer centers.

A key strength of our study is that we used Anderson's Model of Total Delay to conceptualize and design our study. This is exceedingly rare in the cancer literature [46]. Future studies should include the use of established conceptual models to guide their design.

Summary

In this study population, just over half of head and neck cancer patients disclosed their symptoms to at least one lay-consultant before seeking help from a HCP. The lay-consultants are usually their spouse and the most common advice they offer is to see a doctor. Furthermore, the participants report that their spouse, influenced their decision to see an HCP.

We need a better understanding of the processes involved in patient delay for head and neck related symptoms. Current interventions such as pamphlets distributed in dental and physicians' clinics containing relevant information on the early signs and symptoms of oral cancer have been found to be efficacious at communicating information to participants in randomized trials [60–62]. However, the results of this study suggest that we need a deeper understanding of how, or if, the symptom appraisal and help seeking processes affect the time from first symptom recognition to contacting an HCP. Interventions should then follow that focus on ways of informing those at risk and/or their attendant lay-consultants to seek help from an HCP if their seemingly benign symptoms have not resolved within three weeks of onset [63].

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Figure 1: Study Conceptual Model

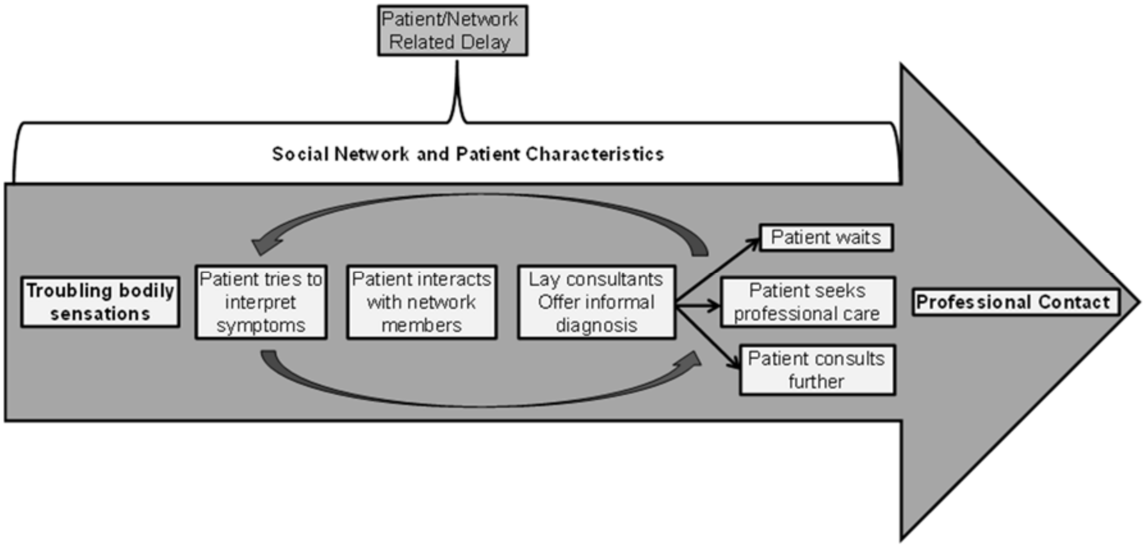

Figure 2: Study Flow

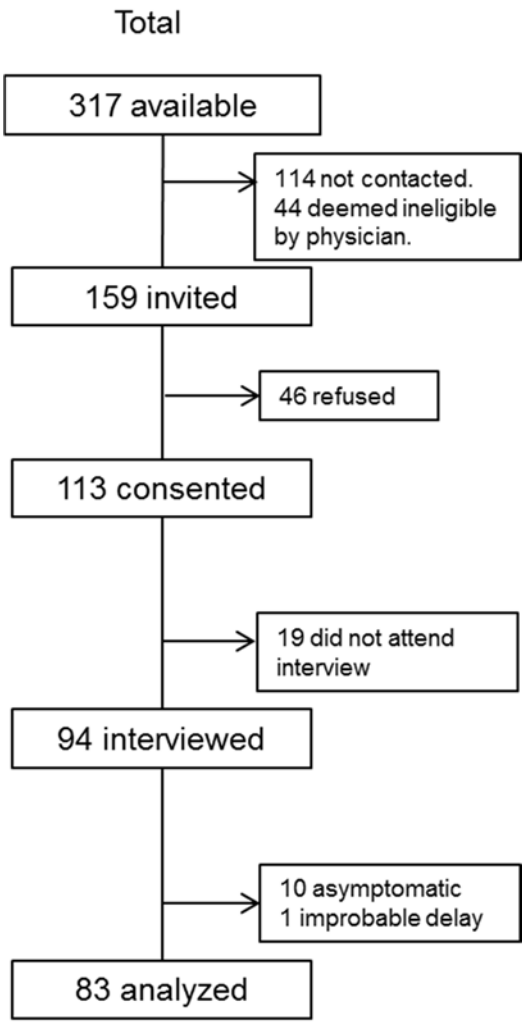

Table 1: Demographic Characteristics

Characteristic	Statistic
Age (n=83)	**Mean** = 63 yrs SD 15. **Range** 27-87
	Percent *
Sex (n=83)	
Male	81
Marital Status (n=83)	
Single	6
Married/Common-law	81
Separated	1
Divorced	7
Widowed	5
Household Income (n=82)	
Less than $20 000	11
$20 000 to $30 000	19
$31 000 to $40 000	12
$41 000 to $60 000	22
$61 000 to $80 000	10
More than $80 000	24
Education (n=80)	
Grade or High School	60
Greater than High School	40
Ethnicity (n=83)	
White	92
Chinese	1
South Asian	2
Black	2
Southeast Asian	2
Other	1
Born in Canada (n=83)	
Yes	69
Living Arrangements (n=82)	
Living Alone	13
Living with spouse/partner	57
Living with children	1
Living with spouse/children	21
Living with dependent adult family member	_6
Living with non-related adult	1
Other	1

*Some totals may not add up to 100% due to rounding.

Table 2: Site, Stage Grouping and Presenting Symptoms

Characteristics	Percent *
Site	
Stage Group	
Oral Cavity (n=42)	
0	13
I	9
II	36
III	20
IV	22
Oropharynx (n=24)	
0	0
I	8
II	4
III	12
IV	76
Larynx (n=13)	
0	30
I	46
II	8
III	8
IV	8
First Symptom	
mouth lesion	31
pain	28
neck mass	15
voice/speech problem	15
problems swallowing	5
bleeding	5
other**	1
Second Symptom	
pain	33
neck mass	14
problems swallowing	14
mouth lesion	10
bleeding	5
other***	24
Third Symptom	
neck mass	50
bleeding	25
voice/speech problem	25

*Some totals may not add up to 100% due to rounding.
**loose dentures.
***sinus problems, facial swelling, taste change, loose tooth, plugged ear.

Table 3: Personal Responses to Symptoms

Questions:	Percent*
When the problems first appeared do you recall what you said to yourself about what could be going on? (n=82)	
Canker and/or dental problem	26
Injury or irritant	23
Did not know	22
Infection	18
Cancer	6
Other and Multiple possibilities	5
Do you recall how worried you felt at the time the problems in your mouth, ear, throat or neck first appeared?**	
Any indication of worry (n=82)	10
Do you recall how urgently you felt you needed to investigate the symptoms?**	
Any indication of urgency (n=79)	18
Did you decide that they probably meant you had some sort of illness or disease? (n=76)	
No indication of illness	71
Benign possibly self-limiting illness	17
Serious illness	12
Did you do anything to investigate like looking on the internet or consulting a book? (n=82)	
Yes	10
Were you aware of the signs and symptoms of head and neck cancer? (n=83)	
Yes	11
Did you mention or discuss the problems in your mouth, ear, throat or neck with anyone before you met with the doctor, nurse, dentist or dental hygienist? (n=83)	
Yes	57
What made you decide that you should see a doctor, nurse, dentist or dental hygienist for the sensations or changes in your ear, neck, jaw, throat or the inside of your mouth (n=82).	
Persistent and Worsening Symptoms	39
Single symptom	34
More than One Symptom	27

*Some totals may not add up to 100% due to rounding.
**These questions were asked as part of a single two-part question.

Table 4: Characteristics of the Lay Consultant Network

Number of Lay-consultants	Percent*
Identified	
0	11
1	41
2	23
3	13
4	6
5	2
6	2
7	1
Contacted	
0	43
1	35
2	13
3	2
4	6

*Some totals may not add up to 100% due rounding.

Table 5: Characteristics of the First Lay Consultant

Characteristic	Percent*
Sex (n=45)	
Male	22
Female	78
Relationship (n=47)	
Spouse	77
Child	4
Parent	0
Sibling	4
Cousin	0
Personal friend	8
Work Related Friend/Associate	2
Other	4
Advice Given (n=47)	
No statement of concern with or without diagnosis and/or cause	23
No statement of concern with a referral to HCP	38
Statement of concern with a referral to HCP	38
Intimacy (n=47)	
On a scale from one to five, one representing close or intimate and five representing distant, how close is your relationship with this person?	
Close 1	92
2	2
3	2
4	0
Distant 5	4
Influence (n=47)	
On a scale from one to five, one representing “not influential at all” and five representing “extremely influential”, how much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?	
Not at all 1	19
2	6
3	13
4	13
Extremely 5	49
Change in Understanding (n=47)	
On a scale from one to five, one representing “no change at all” and five representing “great deal of change”, how much did talking to this person change your understanding of what you were dealing with?	
No change 1	42
2	2
3	26
4	5
Great Deal 5	24

*Some totals may not add up to 100% due to simple rounding errors.

Table 6: Exploratory analysis for associations between select covariates and Urgency and Lay-Consultancy.

Variable (n)	Patient and Network Characteristic					
	Urgency			Lay-Consultancy		
	yes			yes		
Sex	%		p	%		p
Male (65)	17		0.47	54		0.27
Female (14)	21			69		
Living Arrangements						
Living Alone (16)	9		0.42			
Other (67)	19					
Tumour Site						
Oral (42)	12		0.20	49		0.18
Oropharynx (24)	29			60		
Larynx (13)	15			77		
	mean			mean		
	yes	no		yes	no	
Tumour Size (cm)	3.2	2.7	0.28	2.9	2.7	0.53
Pain						
Yes (29)	10		0.19	54		0.54
No (30)	22			60		
Lesion						
Yes (25)	16		0.78	50		0.36
No (54)	19			61		
Neck mass						
Yes (18)	22		0.56	56		0.86
No (61)	16			58		
Voice/Speech Change						
Yes (13)	23		0.69	92		**.005**
No (66)	17			51		
Did you decide that they probably meant you had some sort of illness or disease?						
No indication of illness (54)	89		0.02	63		0.08
Benign possibly self-limiting illness (11)	28			31		
Serious illness (9)	45			44		

CHAPTER 5: THE RELATIONSHIP BETWEEN PATIENT RELATED DIAGNOSTIC DELAY, SYMPTOM URGENCY AND LAY CONSULTATION IN HEAD AND NECK CANCER.

5.1 ABSTRACT

BACKGROUND: Very little is understood about why many patients with head and neck cancer present with advanced disease. We applied Andersen's Model of Total Patient Delay to study the role a patients perception of symptom urgency and whether or not they consulted with someone in their social network (lay-consultancy) played on the length of time it took for them to seek help from a health care professional (HCP) after symptoms were first apparent.

METHODS: This was a cross-sectional study consisting of two primary data collection activities: a structured telephone interview and a medical chart review. The study population was patients diagnosed with cancers of the head and neck who were seen at the South-Eastern Ontario Regional Cancer Centre (SEORCC) in Kingston Ontario, or at the Princess Margaret Hospital (PMH), in Toronto. Participants were asked if they thought their symptoms were urgent enough to warrant further investigation, whether or not they disclosed their symptoms to others prior to meeting with an HCP and if those people they told influenced their decision to seek help from an HCP. Logistic regression was used to calculate adjusted odds ratios for patient delay by symptom urgency and lay-consultancy. Log-binomial regression was used to calculate corresponding adjusted relative risks for patient delay by symptom urgency and lay-consultancy.

RESULTS: We enrolled 83 patients. Forty-five percent waited more than 1 month after symptom onset to seek help from an HCP. Eighteen percent of the participants reported they felt their symptoms warranted urgent investigation (symptom urgency). Fifty-six percent told at least one other person about their symptoms (lay-consultancy) prior to meeting with an HCP, and of those, 64% reported an influence score of at least 4 out of a possible 5. The adjusted odds ratio for patient delay and a lack of symptom urgency was 7.00 (95% C.I 1.45, 33.86) and the corresponding adjusted relative risk was 3.81 (95% C.I 1.03, 14.06). The adjusted odds ratio for patient delay and not consulting with a lay-consultant was 1.00 (95% C.I 0.40-2.57) and the corresponding adjusted relative risk was 1.06 (95% C.I 0.67, 1.66).

CONCLUSIONS: Our results indicate that most of the patient-related delay occurs during the participants' symptom appraisal process with or without input from their social network. Those at risk of late stage presentation of head and neck cancer should be provided with targeted information encouraging them to seek help from an HCP if the key signs or symptoms have not resolved within three weeks.

5.2 INTRODUCTION

Patients who are diagnosed with an early stage head and neck cancer have a 90% chance of surviving five years whereas survival among those diagnosed with a late stage cancer is less than 30% [1–4]. Between 33% and 75% of patients with head and neck cancer present with late stage disease, many of which could be detected earlier [5–13]. Studies that have investigated diagnostic delay in head and neck cancer report that the length of time it takes from when patients first notice their symptoms to the time they consult a health professional is the largest source of diagnostic delay [5–13].

We used Walters refinement of Andersen's Model of Total Patient Delay to study the role of social networks on the reasons some people present with advanced disease and/or long after symptoms were first apparent [14]. Walter proposes that the entire length of time that takes a patient to first recognize the existence of symptoms until they see an HCP consists of two intervals: "appraisal" and "help-seeking" (patient/network delay). Specifically, we focussed on the entire length of time that elapsed between first noticing a symptom or bodily change and meeting with an HCP (combined appraisal and help-seeking intervals). Within the context of a medical illness, people who seek help for a distressing event generally follow a sequence of steps that starts with the onset of troubling bodily sensations and ends with an encounter with a relevant HCP [15–20]. These steps take place within the broader context of the individual's social network such that patients frequently tell a personal contact in their network (layconsultant) about their somatic or mental symptoms prior to seeing an HCP. Network members who observe signs of illness may also bring them to their associates' attention [15, 17–22].

Social networks operate in part by providing their members with a pool of resources from which they can draw social support [17, 23–25]. Social support can take the forms of information and advice, emotional support and assistance with everyday tasks. People experiencing unusual, worrisome or even alarming symptoms often ask for advice from lay consultants [21, 26, 27], and there is evidence that the provision of advice can influence the time it takes for a person to contact a health professional [16, 25, 28–31]. Contextualizing an individual's help seeking process within their social network can provide an opportunity to reveal important psychosocial processes, such as the provision of informational support, which can influence the help-seeking process and subsequent point in time when they are diagnosed [17, 32, 33].

We previously conducted a scoping review of the existing literature that examined the factors that contributed to patient related delay in head and neck cancer [34]. There have been only 17 studies that had published on this subject since 1989 with a wide range of factors identified as having a possible role in patient related diagnostic [34]. We found no studies that focused on the social processes that could impact the length of time it takes a head and neck cancer patient to seek help from a health care professional (HCP) after the onset of symptoms. Very little is understood about why so many patients present with advanced disease and/or long after symptoms were first apparent. Our prior descriptive study also revealed that very few participants were alarmed by their symptoms nor did most think they were urgent enough to warrant further investigation [35].

The aims of the current study are to assess the association between patient/network-related diagnostic delay and; a) whether the patient felt any urgency to investigate their symptoms, b) whether the patient told someone in their social network about their symptoms (lay-consultancy) and c) lay-consultant influence.

5.3 PATIENTS AND METHODS

The study population consisted of patients diagnosed with cancers of the oral cavity, oropharynx and larynx who were seen at the combined surgical and radiotherapy head and neck oncology clinic at the Southeastern Ontario Regional Cancer Centre (SEORCC) in Kingston Ontario from July 2009 through Dec 2011, or at the head and neck surgical clinic at the Princess Margaret Hospital (PMH), in Toronto from October 2009 through December 2011. Patients were excluded if they were being followed for an asymptomatic lesion, had synchronous and/or previous cancers or were deemed unfit to participate by their physicians. Patient recruitment was conducted by one of the investigators (JQ) at the Kingston site and by an experienced clinical study recruiter at the PMH site. We primarily sought newly-diagnosed, pre-treatment patients but also included some post-treatment patients to increase our sample size. Research ethics approval was obtained from both sites and written informed consent was obtained from all participants.

This was a cross-sectional study that consisted of two primary data collection activities: a structured telephone interview and a medical chart review. The telephone interview collected information on both patient delay and the patients' lay-consultancy network. All of the telephone interviews were conducted by a single experienced Research Associate. To enhance patient recall we prepared the participants for their interview by providing them with both a social network map and a "Sensations or Changes Calendar". The social network map provided the participants with the opportunity to list the names of all of the people that they would normally disclose health related matters to and then to further identify only those individuals that they actually disclosed their symptoms to prior to meeting with an HCP. The "Sensations and Changes Calendar" was constructed according to Freedman's Life Calendar Method [36]. The structured telephone interview included both bounded and aided recall techniques. To complete the calendar, participants were instructed to fill in the date of their first appointment at the cancer center. Then, they were instructed to fill in the names of the preceding six months under the appropriate column and to mark the calendar dates of personal "memorable events" that had occurred since the date of their first appointment at the cancer center. We asked the participants to recollect to the first time they felt or noticed a relevant new sensation or change and mark the date on their calendar. Finally, the participants were asked to mark the date when they first visited an HCP, defined as a doctor, nurse, dentist or dental hygienist, for consultation about these sensations.

For the network mapping exercise, participants were provided with a blank "bull's eye" diagram consisting of three concentric circles. The innermost circle was labeled "you", the middle circle was labeled "Close/Intimate/Family and Friends", and the outermost circle was labeled "Distant Family and Friends". Participants were instructed to nominate all the people to whom they would normally disclose symptoms and write the initials of those identified in the appropriate circle. Participants were then asked to make a separate list of those people they actually talked to about the sensations or discomfort in their head and neck prior to seeing an HCP. The participants were also encouraged to confer with the lay consultants who they identified regarding the dates, pertinent events, and discussions that they had prior to their interview. The chart review was conducted by JQ and it collected information about the patients' cancer site, tumour size, lymph node status, histological grade, comorbid conditions and the date of their biopsy.

Study Variables

The main outcome of interest was patient related diagnostic delay. It was measured by asking the patients the date that they first noticed any relevant bodily sensations or changes and the date that they first saw an HCP about those sensations or changes (elapsed time in months). Patient delay was also dichotomized as those who reported seeking help from an HCP within one month versus those patients who waited longer than one month. This cut point was chosen based on our delay distribution and because current recommendations are that people experiencing the signs and symptoms of head and neck cancer should see a doctor if symptoms last more than three weeks [37, 38]. The dichotomized patient delay variable was used in the multivariate models.

A separate detailed descriptive analysis that assessed the symptom appraisal process revealed that most patients did not think that their symptoms are urgent enough to warrant a visit to an HCP [35]. We therefore included symptom urgency as a predictor of patient related delay in this report to represent this key aspect of symptom appraisal. Specifically, participants were asked, "if they recalled how worried they felt at the time the problems in their mouth, ear, throat or neck first appeared and how urgently they felt they needed to investigate the symptoms". Although this question was asked as part of a two-part question that also queried the participant about worry, the participants' responses enabled us to clearly separate the two items. Participants responded by answering that they felt at least some sense of urgency or no urgency at all, therefore this variable was dichotomized.

Lay consultation was measured by asking the patients if they had told anyone about their symptoms prior to seeing an HCP. After examining the frequency distribution of number of lay consultations, we dichotomized this variable between those who told at least one other person and those who told no one.

Lay consultant influence was measured by the degree of influence the participants most intimate lay consultant was perceived to have on their decision to seek help from an HCP.

Answers were recorded using a 5-point Likert scale: one represented “not influential at all” and 5 represented “extremely influential”. For those participants who had a lay consultation, we categorized the degree of influence to seek help from an HCP into low (1-3), or high (4-5).

Confounding Variables

We identified relevant confounders in our scoping review. [34] Age [39], education [40], stress [41], heavy drinking [42], smoking (pack-years) [42], tumour size [43], disease stage [43] and avoidance coping [44] were all considered as they have all been shown to be related to patient delay and thus had the potential to confound any potential relationship between patient delay and the symptom appraisal and social network variables. We also included sex and whether or not participants had a family dentist at the time they were experiencing symptoms as potential confounders. Age was calculated using the information contained in the participants’ medical chart, as was gender and tumour size. Educational attainment was collected during the interview and dichotomized for analysis between those with a post-secondary school education and those without. Stress was assessed by asking the patient if, at the time they were experiencing symptoms but prior to seeking help from an HCP they were experiencing any stressful life events and dichotomized for analysis into yes or no. Participants were classified as heavy drinkers if they reported that they had at least 5 or more drinks for males or at least 4 or more drinks for females on one occasion in the past 4 weeks or there was any mention of a history of alcohol abuse in their medical chart. Smoking was assessed by calculating pack-years from information collected from the participant during the interview. Stage grouping was assigned using the tumour, node and metastases clinical classification contained in the participants medical charts according to rules contained in TNM Classification of Malignant Tumours (7th ed.) [45]. Avoidance coping was assessed during the participants interview using the Avoidance Coping subscale of the COPE Inventory by Carver, Scheir and Weintraub [46] as reassessed by Lyne and Roger [47].

Lastly, to verify the accuracy of the participant's responses, we contacted one of the participants' lay-consultants and performed a reliability check by asking them what they told the participant when asked about the symptom and whether they were concerned at that time.

Statistical Analysis

The associations between our study variables and delay were assessed in two ways. First we graphically compared the frequency of delay in months by each of the independent variables using histograms and calculated the mean and median delay for each subgroup. We then assessed differences in patient related delay in months using the Wilcoxon test for categorical variables.

We assessed the role of potentially confounding variables by first calculating their associations with the dichotomous form of the delay variable (≤ 1 month vs. > 1 month). Methods used depended on whether one of the variables being compared was continuous or categorical and required the use of the Wilcoxon 2 sample test or the chi-squared test. In the case of cell sizes less than 5 exact tests were used. Second, any variable having a relationship with the outcome at a liberal p-value ($p \leq 0.20$) was separately tested to determine if they were associated with a 10% change in the odds ratios associated with the main variables of interest using logistic regression: Urgency vs. delay and lay-consultancy vs. delay.

We conducted two sets of sensitivity analyses that excluded the post-treatment group and the PMH site. We also measured the reliability of the participants responses by calculating percent agreement and Kappa with the answers recorded from the patient's lay-consultants [49].

All statistical analysis was performed by using SAS (Statistical Analysis Software) version 9.3 [50].

5.4 RESULTS

Study participants

The study recruitment process has been previously reported [35]. We approached 58% of the eligible patient population and that group's participation rate was 59%. Figure 1 presents the study flow over all patients and by their pre versus post-treatment status.

Table 1 describes the participants' demographic and health and disease characteristics. The average age of the participants was 63 years of age (range 27 to 87); 81% were male; 81% reported that they were either married or were in a common law relationship and 60% had high school or less. At the time the participants were experiencing their symptoms, 76% reported that they had a family dentist and 99% reported that they had a family physician. Twenty-three percent reported at least one episode of heavy drinking within the same time period and 12% of the study participants' medical charts reported a history of alcohol abuse. More than half had a cancer of the oral cavity and 53% were diagnosed with either stage III or IV disease. Seventy-five percent of the 46% who had at least one positive lymph node were from the oropharyngeal cancer group (not tabulated). One third of all patients had a tumour with a histological grade of either G3 or G4.

Participants took on average 2.7 months (SD 3.5 months) after the onset of abnormalities to seek an HCP while the median was 1.0 month (IQR 2.0 months). Forty-five percent of the participants reported that they waited more than 1 month after symptom onset to seek help from an HCP.

We were able to contact 42 of 47 lay-consultants and asked them to think back to the time that the participant first told them that there was something going on in their mouth, ear, throat or neck. The lay-consultants were asked to report what they told the participants as it pertained to what they thought might be going on or whether or not they were concerned about the symptoms. We then compared their answers with those of the participants. Only two of the lay-consultants reports differed with the content of the conversation reported by the participant resulting in 95% agreement (Kappa= 0.91, 95% C.I. = 0.78 -1.00).

Patient Delay, Symptom Urgency and Social Network Use

Figures 2-4 present the relationship between patient related delay and symptom urgency, lay consultancy and lay-consultant influence. Only eighteen percent provided any indication that that they thought their symptom(s) were urgent enough to warrant further investigation. The median delay for patients who reported symptom urgency was 1 month whereas patients who reported no such urgency reported a median delay of 2 months (p=0.003).

Figure 3 presents the relationship between elapsed time in months and lay consultation. Fifty-seven percent told at least one other person about their symptoms prior to meeting with an HCP. Participants who contacted a lay-consultant reported the same median delay as those who did not (median 1 month, p = 0.86).

Figure 4 presents the relationship between elapsed time in months and lay consultant influence for 44 participants who consulted someone. The median delay was one month for those participants who reported that their lay consultants had a high influence and for those reporting low influence on the decision to seek help from an HCP (p = 0.57). We chose not do any further analyses on the influence variable due to the small number of those who talked to someone.

Confounding variables

Our confounder analysis did not reveal any variables that resulted in a 10% change in the estimates of interest. Only heavy drinking and avoidance coping were identified as having a statistically significant relationship with patient delay in the first stage of the confounder investigation (p> 0.20). Neither variable met the 10% change in estimate requirement in the second stage. Table 2 presents the results of our multivariable analysis mutually adjusted for both patient delay and urgency. The mutually adjusted odds ratio for patient delay and the absence of symptom urgency was 7.00 (95% C.I 1.45, 33.86) and the corresponding mutually adjusted relative risk was 3.81 (95% C.I 1.03, 14.06). The mutually adjusted odds ratio for patient delay and not consulting with a lay-consultant was 1.00 (95% C.I 0.40-2.57) and the corresponding mutually adjusted relative risk was 1.06 (95% C.I 0.67-1.66). Furthermore, the impact of mutually adjustment resulted in both the OR and RR for lay-consultancy moving closer to no effect, whereas the urgency risk estimates remained rather high and statistically significant.

Sensitivity analysis

The results of the sensitivity analysis (appended) revealed that the relationship between patient delay and symptom urgency did not materially change when we removed post treatment patients or KGH patients. The lay consultancy odds ratio estimate when the post-treatment group is removed is in the opposite direction of our main result, but none of the findings for that variable are statistically significant and the shift lies within the confidence limits of the main result.

5.5 DISCUSSION.

Studies that measure predictors of patient delay in head and neck cancer have been restricted to examinations of patient's health behaviors, clinical, psychological and personal knowledge/beliefs while largely ignoring the social context in which delay occurs [34]. This is despite evidence that strongly suggests that telling someone may be related to a quicker visit to the doctor [25, 28–31].

Our findings suggest that perceived symptom urgency has an influence on patient delay (adjusted OR= 7.00, 95% C.I 1.45, 33.86 and adjusted RR= 3.81, 95% C.I 1.03, 14.06). In this group of patients it appears that the social network may have had less opportunity to impart a protective effect possibly because most of the patients did not think the symptoms were particularly urgent, worrisome or indicative of disease, nor did their lay consultants [35]. We cannot rule out however that the nature of the symptoms in the 'urgent' group was more severe and therefore more alarming. That is, in this case, perception and reality may have been highly correlated. Consequently, we think that future efforts to understand patient delay in head and neck cancer should focus on the symptom appraisal interval.

The relationships we observed between patient delay and consultation with network members about initial sensations were not statistically significant. Our confidence intervals imply that the effects could vary by as much as a 33% reduction in risk of delay to a 66% increase and our relative risk estimate indicates only a 6% effect.

Our finding that 82% did not perceive their symptoms as urgent agrees with the existing literature [31, 41, 51, 52]. Our descriptive analyses also underscored the importance of the seemingly benign nature of early symptoms: most of the patients were not worried nor did they think the symptoms indicated serious illness [35]. Perceived symptom urgency is likely on the causal pathway between symptom recognition and lay network and HCP help seeking: if patients do not recognize that their symptoms should be urgently investigated, they may be less likely both to tell a lay consultant and subsequently see an HCP within one month of symptom onset. On the other hand, the positive predictive values associated with many cancer symptoms are frequently less than 5%, so it is not reasonable to expect patients to perceive apparently benign initial symptoms as a serious problem [53–57]. Nevertheless, interventions to reduce patient related delay should include a targeted educational intervention alerting individuals at risk that the early warning signs of head and neck cancer are frequently dismissed as benign and that if key symptoms have not resolved within three weeks of onset they should seek a consultation with an HCP [58].

Study Limitations.

Despite the expectation that 150 patients would be recruited into this study and that the outcome (patient related diagnostic delay) would be continuous, this study suffered from low statistical power based on the final sample size (83), the distributions of exposure (symptom urgency and lay consultancy) and the need to dichotomize the outcome (patient related diagnostic delay).

Our delay variable had a resolution of one month. Although we asked participants to attempt to identify which week of the month they either first noticed symptoms or saw an HCP participants who acted promptly reported seeing an HCP within the same week 34% were not able to identify the date or week, but were able to report that they saw an HCP in the same month as symptom onset. Thus, because 55% of the participants reported seeing an HCP within one month we had to dichotomize this variable.

The low sample size and dichotomous outcome impacted overall study power and the statistical power to investigate interactions. Additionally, few subjects reported that their symptoms warranted urgent investigation, which limited the ability to investigate this variable. It is possible that the estimates calculated are a result of uncontrolled confounding associated with variables that we did not collect information on that were nevertheless associated with delay in the literature [34]. Residual confounding is also a possibility in this study: the low sample size necessitated the dichotomization of potential confounders in an effort to maximize study power.

The participants in our study share the same demographic characteristics one would expect to see in a population of head and neck cancer patients [13, 41, 61, 62] However, our study population is not representative of the mix of head and neck cancer patients in the population as it is over represented by oral cancer (54%) and oropharyngeal (30%) cancer patients. Additionally, patients who were deemed ineligible to participate by their physician and those who declined participation may have included more socially isolated individuals and/or those with the longest delays. Thus, our participants are likely to consist of a sub-population of relatively highly functioning patients who presented to their HCP's within a reasonable, if not optimal, length of time.

Also, the inclusion of three head and neck cancer subsites means that the at-risk populations differ. In particular, those at-risk of an oral cavity or laryngeal cancer are persons who use tobacco and alcohol [63]. In contrast, those at risk for oropharyngeal cancer are increasingly made up of people with a previous HPV infection such that there has been a significant change in the demographics of this disease in the last 10 years. Those patients are 10 years younger at presentation, have less co-morbidity, higher incidence of regional disease and lower rates of smoking and alcohol abuse [64–66].

The symptomology varied considerably in this study partly because we included three subsites. Our prior descriptive analysis also revealed that participants with oropharyngeal cancer tended to report more symptom urgency and use lay-consultants more often than those with oral cancer [35]. This could be due to differences in the symptoms they experienced and/or differences in the help-seeking practices of this group attributable to their demographic profile. Patients with oral cavity cancer are more likely to experience painful mouth lesions which could affect their perceptions of their disease towards harmless white ulcers or food related irritations. In fact, this group were less likely to see their symptoms as being urgent compared to the other subsite groups [35]. As for laryngeal cancer, their symptoms were commonly voice related changes and they similarly perceived them as less urgent. In contrast, patients with oropharyngeal cancer are more likely to experience a neck mass and increased urgency [35]. So overall, our findings are a function of the sense of urgency felt by patients who could have been influenced by their differing subsites, demographics, and differing underlying symptoms. A more homogeneous study population would allow future researchers to limit the potential for cancer site-related confounding without relying on statistical control.

This study depended on the recollections of patients who had already been diagnosed and, in some cases, treated for their cancer. Thus we cannot rule out that our patient-related delay measure was subject to error related to the participants' variable ability to accurately recall the exact dates of symptom onset, discussions with lay-consultants and their subsequent visit to an HCP. The limitations related to the interview method we employed have been previously reported [35]. We underscore the difficulty in obtaining accurate recollections from patients, but, we think that for the most part the recollections are as accurate as can be given the well-known limitations of self-report [67, 68]. Furthermore, a previous report on the validity and reliability of the life calendar method suggests that recall errors tend towards the underreporting of events and that errors are less likely to occur when the events are related to personal or family experiences [67]. The effort we placed minimizing recall error is outlined as a strength below. Additionally the high inter-rater agreement (kappa = 0.91) we measured between the participants and their lay-consultants regarding the content of their conversations provides further evidence that recall bias is at a minimum.   It is also not likely that the degree of recall error differs between those participants who experience greater than one-month delay versus those who did not.

Our measure of symptom urgency may not be an adequate indication of symptom severity. It may have been influenced by the participant's personal reactions to the symptoms which may or may not have been objectively severe. As a result, our relative risks may be underestimates of the true risk associated with symptom severity. Future studies should include questions that more specifically address symptom severity.

Study Strengths

Our study design was informed by Anderson’s Model of Total Delay [14] thereby embedding our study within accepted psychosocial constructs. This approach is rarely used in cancer research [14]. We collected information on many potentially confounding variables [34] and when available we used established validated measurement tools such as the COPE questionnaire for avoidance coping [47] and the Kaplan-Feinstein Comorbidity Index. We maximized our ability to obtain accurate recall from patients by using the Life Calendar Method, which is designed to enhance recall in two ways: 1) the life calendar provides a visual reference point for key events that provide important anchors that allows the placement of less memorable but important events on a specific day or week; 2) it provides an opportunity for the participant to review and make corrections to the sequence of events prior to the final identification of a sequence of relevant dates [36] [67]. We also conducted a reliability study to assess agreement between patients and their lay consultants regarding their social network use and found very high agreement.

5.5.6 Conclusions and Future Research

We found that the nature of the symptoms of head and neck cancer and/or the symptom appraisal process may be the primary barrier to seeking help from an HCP and that there is little or no affect from the advice obtained from lay consultants on help seeking. We encourage future studies to include the detailed documentation of patients’ symptom presentation and experience and consider whether the seemingly benign or absent nature of disease symptomology poses a greater risk of delay than other patient related risk factors.

There is good evidence that information interventions are effective at communicating risk [69] [70]. Those at risk of late stage presentation of head and neck cancer should be provided with targeted information about the seemingly benign nature of the early signs and symptoms of oral, oropharyngeal and laryngeal cancer and the requirement to seek prompt medical attention if the symptoms have not resolved within three weeks [58] [71, 72]. Our conclusions are tempered by the need to confirm our findings in larger, more homogenous patient samples.

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Figure 1: Study Flow

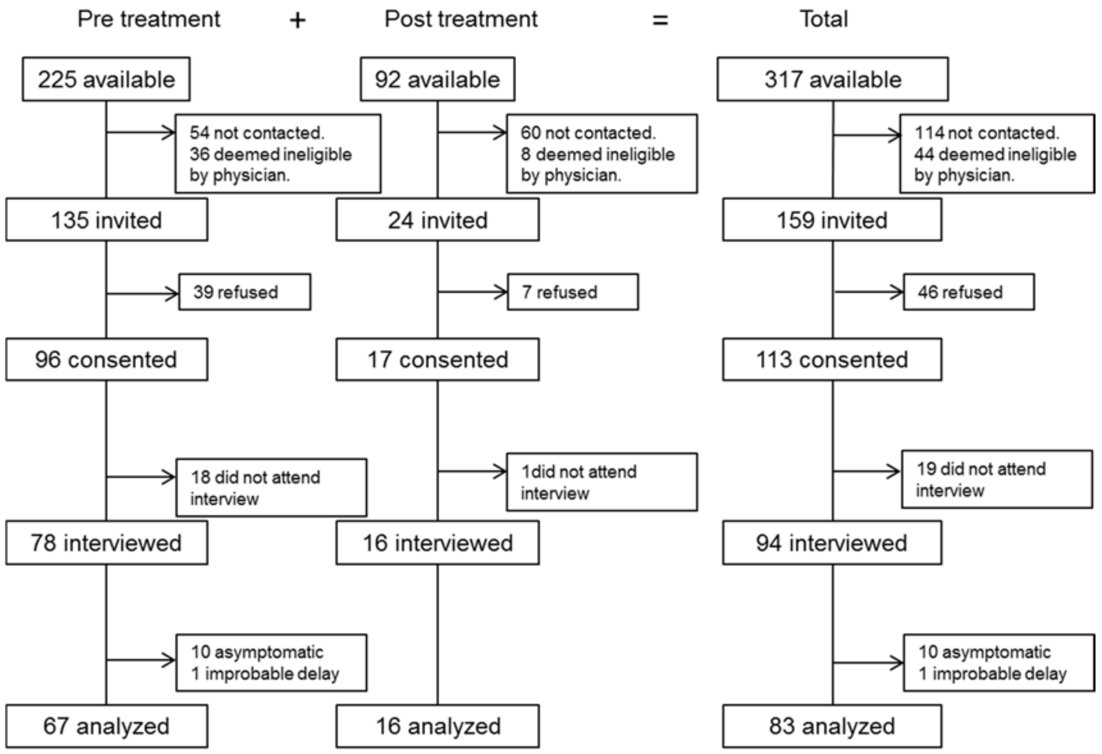


Table 1: Demographic, Health and Disease Characteristics

Characteristic (n)		Statistic
	Age (83)	Mean = 63 yrs SD 15. Range 27-87
		%
Sex (83)	Male	81
Marital Status (n=83)		
	Married/Common-law	81
	Single/Separated/Divorced/Widowed	19
Education (80)	High school or less	60
Household Income (n=82)	$40,000 or less	42
Smoking History (83)	Never smoked	22
	Pack-Years (83)	Mean 24.8 S.D 24.3
		%
Family Physician (n=83)	Yes	99
Family Dentist (n=83)	Yes	76
Alcohol Consumption (81)	None	41
	Once a month	4
	2-3 a month	7
	Once a week	7
	2-3 per week	6
	4-6 times a week	17
	Every day	6
	Don't know	11
* Episode of Heavy Drinking	Yes	23
**Problem with Alcohol	Yes	12
Comorbidities: Modified Kaplan/Feinstein Index (83)		
	No problem	18
	Slight decompensation	53
	Moderate decompensation	17
	Severe decompensation	12
*****Stress (83)**	Yes	24
******Avoidance Coping (81)**	Yes	10
		%
Site (83)	Oral Cavity	54
	Oropharynx	30
	Larynx	16
Stage Group (83)	0	12
	I	15
	II	21
	III	13
	IV	40
Tumour Size (68)		Mean 2.8 cm S.D 1.2 cm
		%
Node Status (83)	Neg	54
	Pos	46
Histological grade (76)	G1	8
	G2	59
	G3	26
	G4	7

*defined as having at least 5 or more drinks for males or having at least 4 or more drinks for females on one occasion in the past 4 weeks.

**any mention of history of alcohol abuse in the patient's medical chart.

***patients were asked if they were experiencing any stress at the time they were experiencing symptoms.

****Any indication by the patient that they thought they might would use avoidance as a coping behaviour when they experience illness.

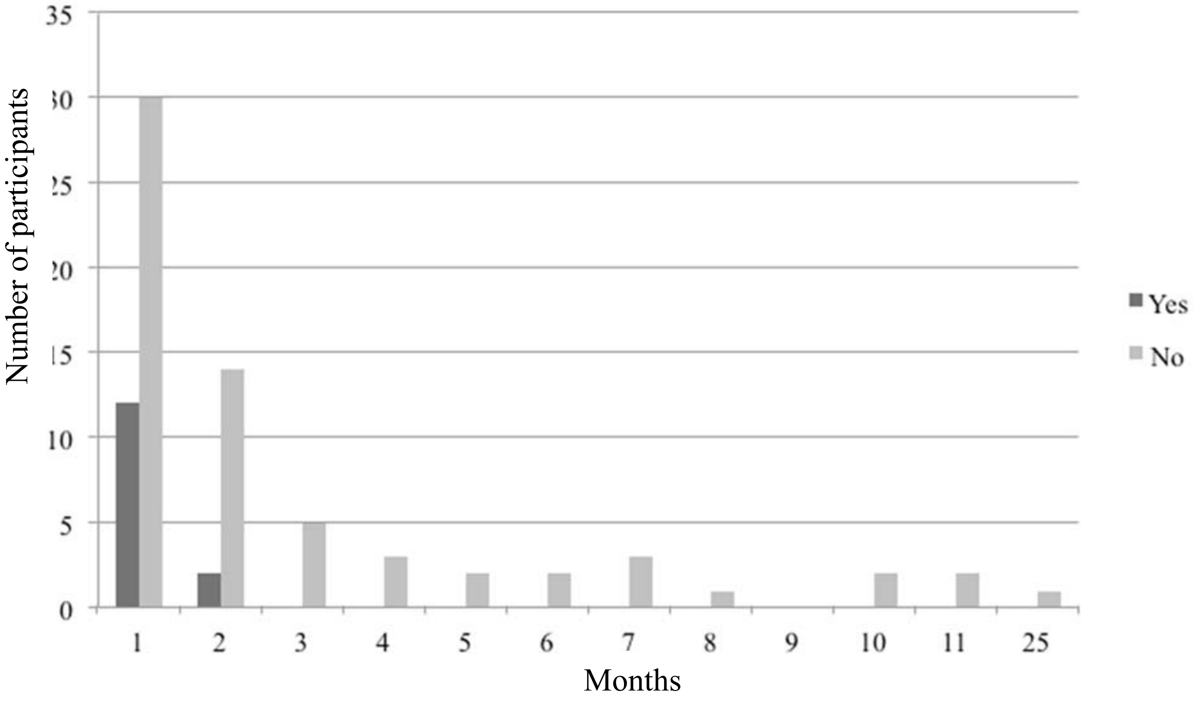


Figure 2: Relationship between Elapsed Time in Months and Symptom Urgency (n=79)
Yes: n=14 (18%), Mean=1.07 (SD= 0.26), Median=1.00 (IQR= 0.0)
No: n=65 (82%), Mean=3.09 (SD=3.85), Median=2.00 (IQR=2.0)
Wilcoxon Two-sample test p=0.003.

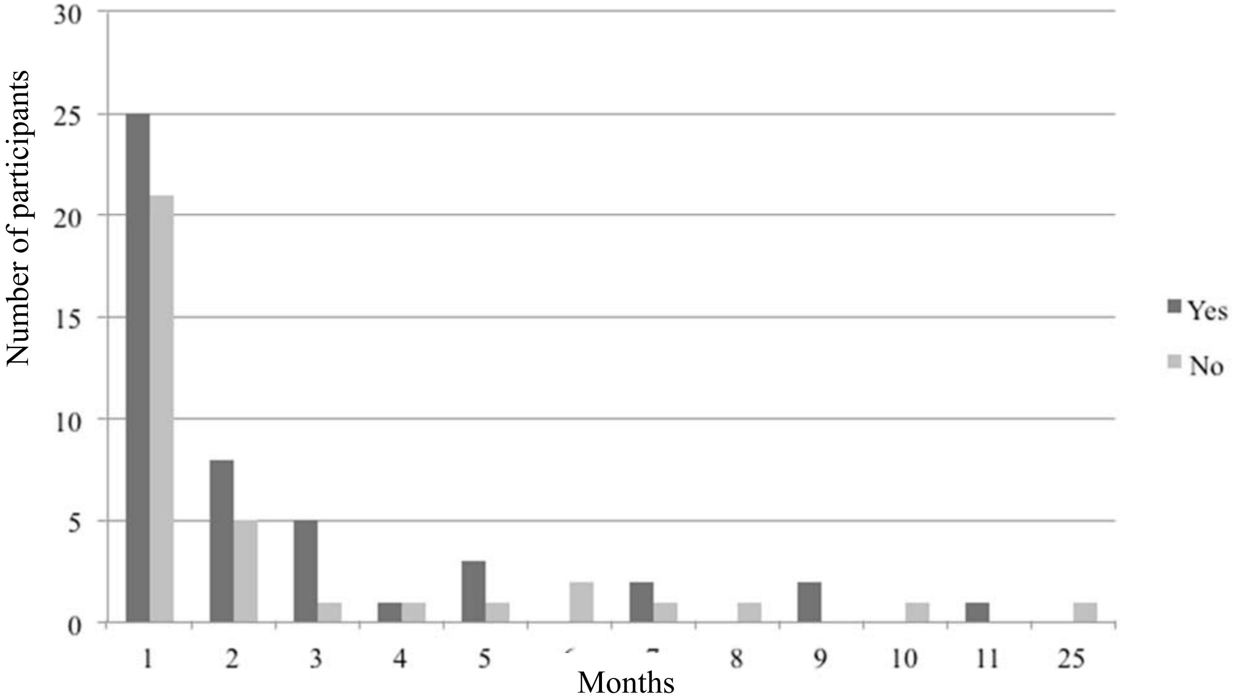


Figure 3: Relationship between Elapsed Time in Months and Lay Consultation (n=83)
Yes: n= 47 (57%), Mean=2.40 (SD=2.57), Median=1.00 (IQR=2.0).
No: n= 36 (43%), Mean=2.97 (SD= 4.46), Median=1.00 (IQR= 1.5).
Wilcoxon Two-sample test p=0.86.

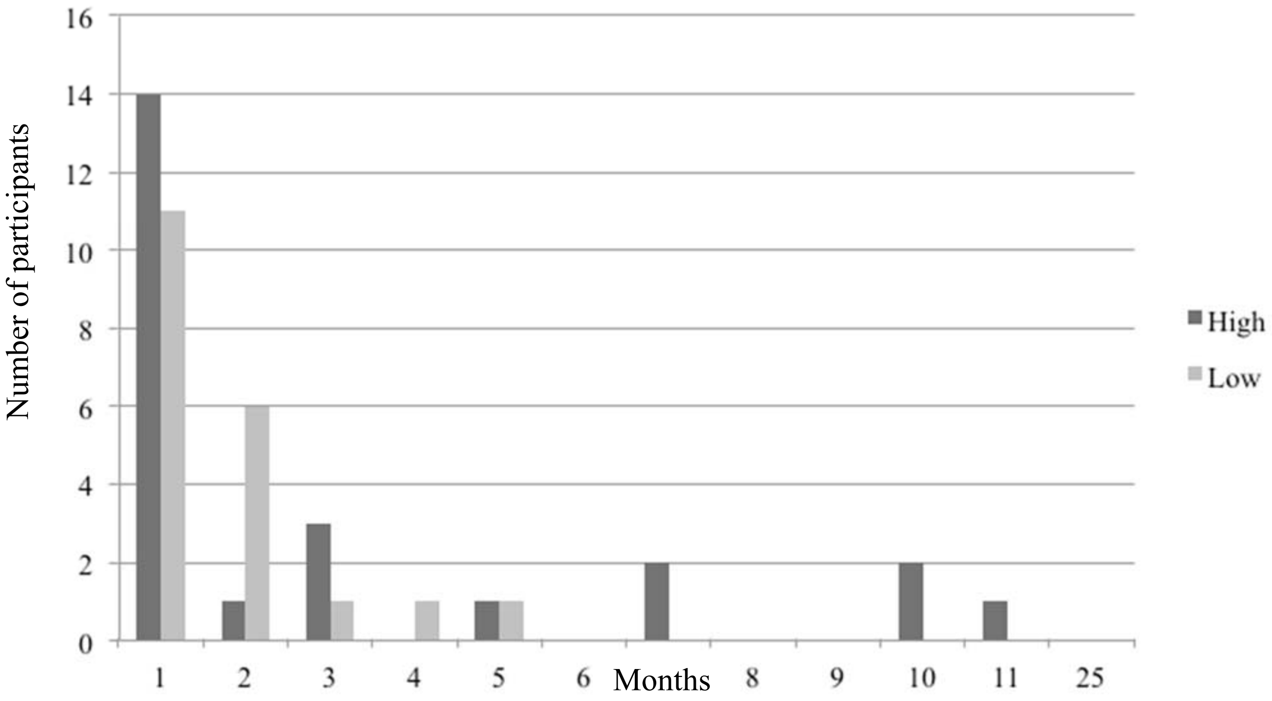


Figure 4: Relationship between Elapsed Time in Months and Lay Consultant Influence (n=44)
High: n=24 (55%) Mean=3.13 (SD=3.32), Median=1.00 (IQR=3.00).
Low: n=20 (45%) Mean=1.75 (SD=1.11), Median=1.00, (IQR= 1.00).
Wilcoxon Two-sample test p=0.54.

Table 2: The relationship between symptom urgency, lay consultancy and patient related diagnostic delay

Variables	Delay		Crude OR* (95% C.I.)	Mutually Adjusted OR ***(95% C.I.)	Mutually Adjusted RR**** (95% C.I.)
Symptom Urgency	Yes	No			
Yes	2	12			
No	35	30	7.00 (1.35, 67.32)**	7.00 (1.45-33.86)	3.81 (1.03, 14.06)
Lay-Consultancy					
Yes	22	25			
No	15	21	0.81 (0.34, 1.95)	1.00 (0.40-2.57)	1.06 (0.67, 1.66)

* OR's calculated using urgency and lay-consultancy = no as the risk groups and delay = yes as the outcome.
** exact C.I.
***Logistic regression model. OR calculated using urgency and lay-consultancy = no as the risk groups and delay = yes as the outcome.
****Log-binomial model. RR calculated using urgency and lay-consultancy = no as the risk groups and delay = yes as the outcome.

Appendix: Sensitivity analysis: change in mutually adjusted OR estimates upon removal of post treatment patients and KGH patients.

Variables	**Post treatment removed**			**KGH removed**		
	Delay		***Mutually Adjusted OR* (95% C.I.)***	**Delay**		***Mutually Adjusted OR* (95% C.I.)***
	Yes	No		Yes	No	
Symptom Urgency						
Yes	2	10		2	6	
No	29	24	5.89 (1.17-29.61)	20	19	3.20 (0.57-17.90)
Lay consultancy						
Yes	11	19		13	15	
No	20	18	0.66 (0.23-1.87)	9	13	0.84 (0.27-2.86

***** Logistic regression model. OR calculated using urgency and lay-consultancy = no as the risk groups and delay = yes as the outcome.

CHAPTER 6: GENERAL DISCUSSION

6.1 Overview

This thesis provides a detailed description of the symptom and help-seeking experiences of patients diagnosed with cancers of the oral cavity, oropharynx and larynx. Uniquely, this process of help-seeking is contextualized within the patient's social and clinical experience.

The main body of the thesis consists of three manuscripts:

1. "*A scoping review of the predictors of patient related diagnostic delay in head and neck cancer*": This article illustrates that there is a dearth of peer reviewed literature examining the patient related factors that contribute to clinically relevant time delays associated with presentation to a health care professional (HCP) for symptoms of head and neck cancer. The article also confirmed that there was a clear opportunity to examine the role that members of the patients social network (lay-consultants) play on the length of time it takes patients with head and neck cancer to seek help from an HCP.
2. "*Symptom appraisal and help seeking for symptoms of head and neck cancer*": This article is descriptive and provides evidence that, before seeking help from an HCP, most patients believed that their symptoms were non-urgent, that just over half of patients suffering from symptoms of head and neck cancer disclose their symptoms to at least one lay-consultant and that the lay consultant influences the patient's decision to seek help. The most common advice the patients received from their lay consultants was to see a doctor.
3. "*The relationship between patient related diagnostic delay, symptom urgency and lay consultation in head and neck cancer*": This article tests the main study hypothesis that those patients who tell someone about their symptoms will seek help from an HCP quicker

than those patients who tell no-one. The strongest predictor of patient related delay was whether or not the patient perceived the symptoms as being urgent enough to warrant further investigation. The study did not support the assertion that the patient's social network (lay-consultants) has an effect on the length of time it takes patients to seek help from an HCP after symptom onset. This indicates that the symptom appraisal process rather than the lay consultation process may be a more important source of patient delay.

6.2 Manuscript Summaries

Manuscript 1. "A critical scoping review of the predictors of patient related diagnostic delay in head and neck cancer": The first article presents the results of a systematic review of the existing head and neck cancer literature. This manuscript focused on finding those studies that clearly indicated that patient s related diagnostic delay was the dependent variable. The review identified 17 studies[1–17] and exposed three gaps in the current literature:

Gap 1: Few studies focus on relevant symptom experience. The review found three qualitative studies in the head and neck cancer literature that examined the reasons patients may have delayed seeing an HCP whilst experiencing symptoms [1-3]. The nature of the symptom generated by the tumor may influence the degree of urgency patients feel about how quickly they should seek help and thus impact the length of time that elapsed from symptom onset to meeting an HCP.

Gap 2: Few studies focus on the social processes of help-seeking. Despite the large body of literature that supports the assertion that when people feel ill they generally tell someone they know about their experiences prior to seeing a medical professional [18–28], the current literature has not yet examined the potential role that telling others may play on patient delay for symptoms of head and neck cancer. Only one study thought to determine if the patients social network had any potential effect on patient related delay [17]. When put within the context of the larger health literature cited above, Onizawa's result suggests that there is scientific merit in examining the social processes that may play on patient delay in head and neck cancer.

Gap 3: Few studies adequately assess the independence of suspected risk factors and only half invoke a conceptual model of help seeking to inform their design. This scoping review identified a large number of factors that may influence which patients are more likely to delay seeking help from an HCP than others, but coverage of those factors was variable. Four of the quantitative studies restricted their analysis to bivariate comparisons, and none addressed all factors proposed in the literature.

Manuscript 2 : "Symptom appraisal and help seeking for symptoms of head and neck cancer". This article is a comprehensive quantitative description of the help seeking processes of a representative sample of patients who had symptoms of head and neck cancer. This article employed Andersen's Model of Total Patient Delay and contextualized it within a social process of lay-consultation to identify the ways that patients with head and neck cancer first become aware of their symptoms, possibly seek help from their friends and family and finally meet with an HCP. This article illustrates that a lack of patient knowledge about the meaning of their symptoms is the primary barrier to seeking help from an HCP. Almost all of the patients thought that the symptoms were not urgent, bothersome or worrisome enough to seek help from an HCP as early as possible nor did they think that the symptoms indicated the presence of a potential cancer. Lastly, half of the patients told at least one other person about their symptoms prior to seeing either a dentist or medical doctor about their symptoms. This confirms the expectation that when people are ill they may tell someone. Furthermore, they also reported that the people they told influenced their decision to seek help from and HCP.

Manuscript 3: "The relationship between patient related diagnostic delay, symptom urgency and lay consultation in head and neck cancer". The study found that the primary barrier to seeking help from an HCP was whether or not the participant thought their symptoms were urgent enough to warrant further investigation. Participants who did not think that their symptoms were urgent were more likely to delay (Adjusted OR = 7.0 95% C.I 1.45, 33.86 and Adjusted RR = 3.81, 95% C.I 1.03, 14.06). There was no evidence to support the hypothesis that that telling at least one other person about the symptoms of head and neck cancer prior to meeting with an HCP was related to decreased patient related diagnostic delay (Adjusted OR = 1.00, 95% C.I 0.40-2.57, Adjusted RR =1.06, 95% C.I 0.67, 1.66). The results of this analysis support the descriptive analysis; the source of diagnostic delay lies during the symptom appraisal process.

6.3 Strengths

This study has three key strengths. The first strength of the study is that it employed Anderson's Model of Total Delay [29] to conceptualize and design the study. The second and possibly greatest strength of this study was the approach employed for data collection, particularly the memory aids used in the participant interview. This study was dependent on the ability of patients to recall accurately events that occurred prior to being diagnosed and/or treated for their cancer. To mitigate the inherent difficulties in obtaining accurate recall from patients the study employed the Life Calendar Method to design the interview tool [30, 31]. The study also employed the use of a social network map designed to enhance the ability of the patients to recall the people whom they told about their symptoms. Further details of the interview process are provided in Chapter 4: “Patient and Family Appraisals of Symptoms of Head and Neck Cancer”.

The third strength of the study was the ability to employ standard epidemiological methods to assess our statistical model for the effects of confounding variables. Although these techniques are rather common in the epidemiological literature, they are not common in the head and neck cancer delay literature [32].

6.4 Limitations

6.4.1 Study Validity

Selection Bias

It is likely that the patients who agreed to participate in this study differed from the underlying eligible population of head and neck cancer patients. Thus selection bias is a concern. There were two points of contact where selection bias could have occurred in this study.

First, of the 317 patients available for recruitment we were unable to screen or contact 114 participants due to logistical barriers such as competing study recruitment responsibilities at the PMH site and simultaneous patient clinic appointments. It is the latter barrier that is a source of selection bias: when multiple, eligible head and neck cancer patients presented at the clinic on a given day, priority went to those patients with a cancer of the oral cavity followed by oropharyngeal and lastly laryngeal. Thus, the study sample is overrepresented by cancers of the oral cavity and oropharynx and does not match the expected distribution of cancer sites in a random sample of head and neck cancer patients [33].

Second, of the 203 who were screened for inclusion or invited; 44 were deemed ineligible due to advanced disease or cognitive impairment, 46 refused, 19 did not appear for their interview, 10 were asymptomatic and 1 participant was removed from our analysis because (s)he reported a clinically improbable delay (10 years). We think that it is likely that those patients who were deemed ineligible because of advanced illness or who refused to participate/did not appear for their interview were more likely to contain a subgroup of patients who had corresponding characteristics that would lead them to present with very advanced disease. Consequently, length of patient related diagnostic delay observed in this study may not be representative of all head and neck patients referred to SEORCC or PMH and are likely underestimates.

However, while the estimates of diagnostic delay may be biased because of the low response rate in this study (83/159; 52%), there is less concern that the relative risk estimates for the main exposure variables in this study and diagnostic delay are biased. This is because the participants were informed, in general terms only, about the purpose of the study and the fact that we would be investigating multiple factors that might help explain a late diagnosis with advanced disease. It is therefore unlikely that the self-selection into this study would be related to both lay-consultancy/symptom urgency (exposures) and delay (outcome). (See appended consent forms).

Information bias and measurement error

It is unlikely that information about symptom urgency or lay consultancy was collected in a differential manner for patients with and without diagnostic delay. In this study, a single RA conducted standardized interviews with the study participants. Neither the interviewer nor participants were aware of the specific hypotheses being tested in this study.

A greater concern in this study is recall error and social desirability bias. In an attempt to minimize recall error, we used a validated methodology, the life calendar method, to help improve the ability of patients to recall past events [30]. This method has been demonstrated to reduce recall error, especially when the events are related to personal or family experiences [31]. In addition, the inter-rater reliability between participants and lay consultants was high (kappa:0.91).

Lastly, it is possible that participant recall may have been affected by social desirability. Participants may be reporting shorter delays than actually occurred because they may be embarrassed to report they waited too long before seeking health care. If participants systematically under-reported delay, this would have introduced non-differential misclassification which in turn would bias the relative risk estimates in this study towards the null.

6.4.2 Analytical Issues

Study Power

This study suffered from low statistical power based on the final sample size [83], the distributions of exposure (symptom urgency and lay consultancy) and ultimately the need to dichotomize a continuous outcome (patient related diagnostic delay).

The expectation to recruit 150 newly diagnosed participants with oral cancer over a 12 month period was based on the numbers of new patients that were seen in at both recruitment sites in 2006; 171 new cases of oral cavity cancer were seen at PMH and 20 at SEORCC. I also expected a high recruitment rate. A 2009 interview based study conducted on 40 patients diagnosed with oral cancer and oral premalignant lesions at the Dysplasia Clinic at the BC Cancer Agency had achieved a recruitment rate of 100% [36]. Dr. Irish's previous study on delay, that was conducted in the same setting at the PMH, with the same patient population, also achieved a high response rate: 80% (34). Thus, I thought that I would be would be able to recruit at least 80% of eligible patients with oral cancer, which would have given 99% power to detect a one month difference in delay between those who talked to a lay consultant versus those who did not. Power calculation assumptions were based on the work of Berkman and Syme [35] and Goldstein and Irish [34] and were calculated to satisfy the analytical rather than the descriptive objectives of the study. See Appendix J for additional justification of original power calculation.

However, despite the best efforts of the study recruiters (JQ and CS) only 83 participants were recruited into the study and only after expanding the target to include three head and neck cancer sites. Eligible patients were identified at the time of their first appointment at the head and neck clinic at either the PMH or SEORCC. The patient's physician determined if they were unfit to participate due to emotional or cognitive impairment and, depending on the clinical site, the research assistant (CS) or I met with eligible patients after their clinic appointment and invited them to participate in the study. Despite our diligence at approaching as many eligible patients as possible and a high level of cooperation from the respective clinic staff our recruitment rate was not what we expected: less new patients were presenting with oral cancer, more patients were ineligible and less patients were agreeing to participate. We subsequently expanded our eligibility criteria to include two extra sites (oropharynx and larynx) and to post-treatment patients. Despite expanding our eligibility criteria and extending the accrual period to a year and half and only 83 participants' were suitable for final analysis. Based on the revised sample size of 83, I still had ample power (98%) power to detect a one-month difference in delay between those who talked to a lay consultant versus those who did not. However, the reduced sample size of 83 patients posed a more serious threat to the study power when the main outcome variable, delay, had to be dichotomized. This was necessary because patient delay was highly skewed in the final study population, with more than 50% of the patients being seen within the one month of the onset of symptoms. Symptom urgency was also a dichotomous variable that further reduced study power and precision. The low sample size also impacted the level of precision of our descriptive estimates presented in Manuscript 2: confidence intervals ranged from as high as +/-10% in the middle of the 0-100% range.

Confounding

I restricted my confounder investigation to only those variables that we collected information on and that were found in the literature to have statistically significant relationships with delay ($p \leq 0.05$). Results of my confounder analysis are provided in Appendix J. It is possible that the estimates I calculated are a result of uncontrolled confounding associated with variables that I did not collect information on that were nevertheless associated with delay in the literature; patients fate [7], gods destiny [7], availability of transport [7], anticipation of a lengthy treatment [7], less optimism [9], perceived health competence [37] and perceived ability to seek help have all been found to be statistically significantly associated with patient related delay. Additionally, because I measured the entire length of time it took a person to actually see an HCP the results cannot rule out the potential for other non-patient related influences on delay such as difficulties associated with obtaining a quick appointment with an HCP. For example, a 2012 report that focused on wait times in 15 countries around the world pointed out that although 85% of Canadians report that they have access to a family doctor, 33% of Canadians reported that they waited 6 or more days to get an appointment [38]. I am also unable to assess for potential confounding associated with urban vs. rural status.

Residual confounding is also a possibility in this study. The low sample size necessitated the dichotomization of potential confounders in an effort to maximize study power. The low sample size also impacted on my ability to properly investigate confounding for my urgency variable: only two participants that reported that they felt that the symptoms warranted urgent investigation also reported delaying more than one month before meeting with an HCP.

6.4.3 Interaction

The low sample size in this study also negatively impacted my ability to properly explore for potential interactions. It is likely that an interaction by sex exists for the relationship between lay-consultancy and patient delay [39-41]. For example, Ikeda et al. found that amongst men with colorectal cancer low social support was related to both increased incidence and mortality (HR 1.48 , 95% CI 1.06, 2.05 and HR 3.07, 95% CI 1.65, 5.69) [41]. Males in my study were less likely to engage in lay-consultation than females. However, this relationship was only very marginally statistically significant (p=0.27) and it is possible that this was due to the low number of female participants (n=16). The exploration of interactions by other demographic variables, such as age and/or marital status [40], was equally inhibited by sample size considerations. The low sample size also impacted on our ability to test for interactions of the relationship between symptom urgency and patient delay. As with the impact on confounding mentioned above, only two participants both experienced delay and reported that they thought their symptoms were urgent enough to see an HCP quickly. Future studies need to be larger to investigate important interactions.

6.4.4 Other Methodological Considerations

Conceptual Model

Andersen’s model assumes that patient help-seeking is restricted to seeking help from an HCP. However, my conceptual model is also informed by the literature that illustrates the series of steps that symptomatic patients typically follow prior to meeting with a health care professional and thus help-seeking for symptomatic illness also includes lay-consultation [43–49]. One of the conceptual limitations of the model used in this study (Figure 1) was that it did not clearly differentiate between delays associated with symptom appraisal/lay consultancy vs. system related sources of delay. This is important because the length of time that elapses between deciding to see an HCP and finally meeting with an HCP is likely influenced by the availability of a family physician or dentist and being able to obtain a timely appointment. Although this study provides some evidence that the patient’s inability to appraise their symptoms as urgent is the greater source of delay, the study cannot rule out the role that non-patient related delay may play on the help-seeking interval, such as the availability of a speedy appointment. Future studies should include the measurement of the length of time it took patients to actually get an appointment [38].

Study Population

I could have targeted a larger patient pool by studying those who were experiencing the symptoms of head and neck cancers rather than restricting to those actually diagnosed only with oral, oropharyngeal or laryngeal cancer. Such a study would be able to determine if a relationship existed between lay-consultancy for those symptoms and delays in seeking help from an HCP. But, I decided to focus my attention solely on patients who had already been diagnosed with cancer of the head and neck and were symptomatic at the time of their diagnosis. The primary reasons for my choice were driven by the following considerations: the problem of late stage diagnosis of head and neck cancer was well described in the literature and needs to be better understood [50–54], early symptoms associated with early stage disease are readily recognizable [55–59], early signs and symptoms are easily detected with an inexpensive procedure [60–62] and survival benefit was associated with early diagnosis [63–65]. However, the unexpected difficulties this study encountered with obtaining a large enough sample size revealed that future studies should include patients who are experiencing similar symptoms with or without a subsequent diagnosis of cancer

6.5 Candidate's contribution

I was responsible for the overall conception, design and execution of this thesis project. Specifically, I am a co-investigator on the CIHR grant that funded this work and made a substantial contribution to the writing of that grant proposal. I subsequently produced the final study protocol. I administered the grant and coordinated the project. I drafted and piloted the interview instrument, obtained access to chart information and study subjects, conducted recruitment at the Kingston site, assisted with managing the activities at the Princess Margaret

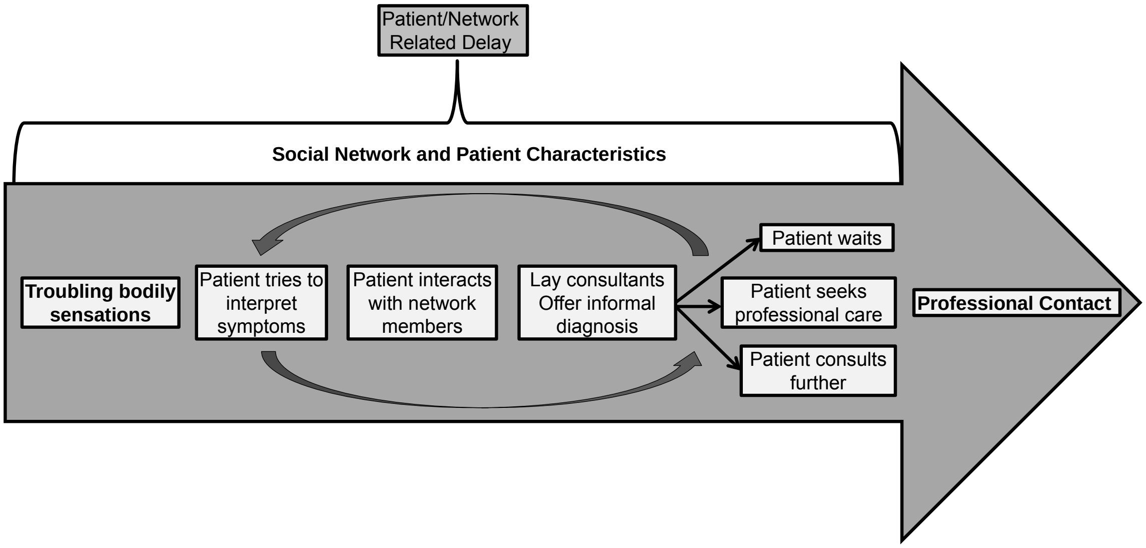
Hospital site, supervised the interview process, developed electronic data bases for chart abstraction and interview data, did all of the data entry, conducted data analysis for the study, and finally was responsible for writing the manuscripts and this thesis. I also presented study results at one international conference (the 2012, 8th International Conference on Head and Neck Cancer), and two national conferences (the 2011 and 2013 Canadian Cancer Research Conference).

6.6 Conclusions and Future Research

When head and neck cancer patients are experiencing early symptoms they may or may not have disclosed their symptoms to at least one lay-consultant prior to meeting with a health care practitioner. If they disclose their symptoms that lay-consultant will usually be their spouse and they will most often have been advised by them to make an appointment to see the doctor. The patients also think their spouses influenced their decision to see an HCP. However, the study found no clear evidence to demonstrate that telling someone about their symptoms influenced the length of time it took them to meet with an HCP. In fact, the strongest predictor of patient delay stemmed from the patients perception that the symptoms were or were not urgent enough to investigate what could be going on. However, it is important to note that urgency and lay-consultancy are probably interrelated: patients who do not think their symptoms are urgent may also be less likely to tell someone and one would expect them to seek help from an HCP quickly. Furthermore, as a group, they were not worried nor did they think that the changes they were experiencing indicated illness or disease. In fact, our findings do not differ from that of other cancer sites: patients frequently report that they were unaware that the changes they were experiencing could be early manifestations of cancer [1,3,16,68–70]. Although these findings may be relevant to other cancer sites, we think it is especially important in head and neck because the early symptoms are easy to detect, and a large proportion of patients present with late stage disease [34,50–54,60–62].

This thesis provides evidence that patient delay in head and neck cancer may be driven largely by the seemingly benign nature of the symptomology of head and neck cancer and that the majority of the delay occurs during the symptom appraisal process rather than the help-seeking process. The subgroup of patients likely to delay because they are not bothered by nor do they think the symptoms indicate illness may be amenable to a targeted information intervention that focuses on encouraging them to act immediately when they are experiencing symptoms that last more than three weeks (see our appended letter to the BMJ) [71–73].

Figure 1: Study Conceptual Model



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APPENDED LETTER TO BMJ

TITLE

Expanding Harm Reduction: Informing inveterate smokers about the importance of screening for smoking related cancers and acting promptly when symptoms appear.

AUTHORS

J. A. Queenan. 1 (corresponding author).

P. A. Groome. 2

W.J. Mackillop. 2

ABSTRACT

Information provided on cigarette packages is effective at communicating the cancer risks associated with smoking. This venue can be employed to provide information to inveterate smokers about the importance of screening for smoking related cancers and acting promptly when symptoms appear. Such warnings could decrease the number of smokers diagnosed with late stage smoking related disease and greatly improve their chances of survival.

MAIN TEXT

In Western countries, the prevalence of cigarette smoking has steadily decreased amongst all age groups. [1-3] Cessation programs have been implemented and nicotine replacement therapy is available over the counter at most pharmacies.[1] The anti-smoking campaign has been successful if one compares current smoking prevalence to that of the 50's and 60's, but what of the minority of current smokers who cannot or will not quit? Cigarette smoking is an addiction and addicts' ability to quit varies. The rate of decline in smoking prevalence has slowed in recent decades and it is unlikely that smoking prevalence will decrease to zero. [1-3] Perhaps it is time to consider expanding current harm reduction strategies to include information that promotes screening and early presentation that will target inveterate smokers who cannot or will not quit.

Harm reduction in its broadest definition refers to "the introduction of policies and programs which aim to reduce the health, social, and economic costs of legal and illegal psychoactive drug use without necessarily reducing drug consumption". [4] Current harm reduction efforts for smokers are restricted to strategies such as smokeless tobacco products for those individuals who are unable or unwilling to eliminate nicotine use (inveterate smokers). [5, 6] Inveterate smokers could benefit from the addition of further harm reduction strategies that could take the form of information provision about the importance of screening for smoking related cancers and acting promptly when symptoms appear. Such warnings could reduce the number of late smoking-related cancer diagnoses and result in earlier detection of other smoking-related health problems such as coronary vascular disease.

Since information provided on cigarette packages has been proven effective at communicating the cancer risks associated with smoking,[7,8] it makes sense to use this venue as a harm-reduction strategy to provide additional information. For example, the most common smoking-related cancer, lung cancer, is now a screenable disease. Evidence suggests that low-dose computed tomography has the potential to reduce mortality from lung cancer by as much as 20% amongst high risk current and previous heavy smokers. [9] Furthermore, some of the most common smoking-related cancers are that of the upper aerodigestive tract, particularly that of the throat and oral cavity. [8] The early signs and symptoms of throat and mouth cancer are easy to recognize,[10] but they are often ignored or attributed to benign causes due to patient's lack of knowledge.[11,12] Information provided to participants in randomized trials tailored to inform people about the existence of screening tests and/or the early signs and symptoms of cancer has been found to be efficacious at communicating information and providing opportunities for early detection. [13-15] In sum, it is likely that the smoking population in Western countries consists partly or largely of a core group who are unlikely to quit despite the use of graphic and shocking warnings that smoking can cause life threatening illnesses. A comprehensive harm reduction strategy that includes informing smokers of screening opportunities and encourages them to seek professional help promptly when they notice early warning signs could decrease the number of smokers diagnosed with late stage smoking related disease and greatly improve their chances of survival.

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APPENDIX A: Ethics Approvals

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD

June 24, 2010

This Ethics Application was subject to:

☐ Full Board Review
Meeting Date:
☒ Expedited Review

Dr. Patti Groome
Division of Cancer Care and Epidemiology
Queen's Cancer Research Institute
10 Stuart Street, Level 2
Queen's University

Dear Dr. Groome,

Study Title:	**Patient and Social Network Related Diagnostic Delay in Oral Cavity Cancer**
Co-Investigators:	**J. Queenan, B. Gottlieb, D. Feldman-Stewart, S. Hall, W. Mackillop, J. Irish and B. O'Sullivan**

I am writing to acknowledge receipt of your recent ethics submission. We have examined the protocol and revised consent form (Version 2 6/24/2010) for your project (as stated above) and consider it to be ethically acceptable. This approval is valid for one year from the date of the Chair's signature below. This approval will be reported to the Research Ethics Board. Please attend carefully to the following list of ethics requirements you must fulfill over the course of your study:

- **Reporting of Amendments:** If there are any changes to your study (e.g. consent, protocol, study procedures, etc.), you must submit an amendment to the Research Ethics Board for approval. (see http://www.queensu.ca/vpr/reb.htm).
- **Reporting of Serious Adverse Events:** Any unexpected serious adverse event occurring locally must be reported within 2 working days or earlier if required by the study sponsor. All other serious adverse events must be reported within 15 days after becoming aware of the information.
- **Reporting of Complaints:** Any complaints made by participants or persons acting on behalf of participants must be reported to the Research Ethics Board within 7 days of becoming aware of the complaint. Note: All documents supplied to participants must have the contact information for the Research Ethics Board.
- **Annual Renewal:** Prior to the expiration of your approval (which is one year from the date of the Chair's signature below), you will be reminded to submit your renewal form along with any new changes or amendments you wish to make to your study. If there have been no major changes to your protocol, your approval may be renewed for another year.

Yours sincerely,

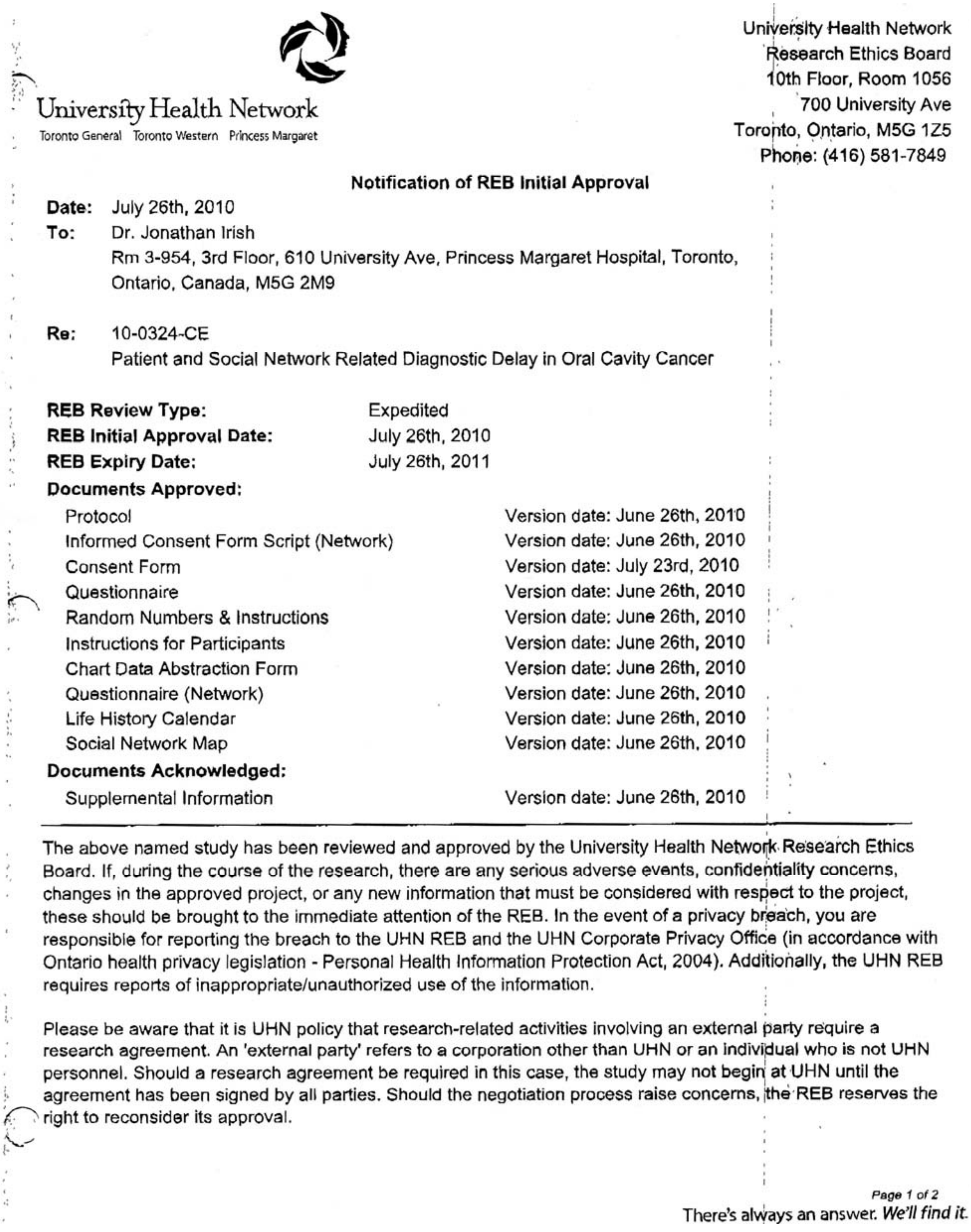
Albert Clark
Chair, Research Ethics Board

June 24, 2010
Date

ORIGINAL TO INVESTIGATOR - COPY TO DEPARTMENT HEAD - COPY TO HOSPITAL(S) /P&T (If appropriate) - FILE COPY

Study Code: EPID-318-10

- **Investigators please note that if your trial is registered by the sponsor, you must take responsibility to ensure that the registration information is accurate and complete**



University Health Network
Toronto General Toronto Western Princess Margaret

University Health Network
Research Ethics Board
10th Floor, Room 1056
700 University Ave
Toronto, Ontario, M5G 1Z5
Phone: (416) 581-7849

Notification of REB Initial Approval

Date: July 26th, 2010

To: Dr. Jonathan Irish
Rm 3-954, 3rd Floor, 610 University Ave, Princess Margaret Hospital, Toronto, Ontario, Canada, M5G 2M9

Re: 10-0324-CE
Patient and Social Network Related Diagnostic Delay in Oral Cavity Cancer

REB Review Type:	Expedited
REB Initial Approval Date:	July 26th, 2010
REB Expiry Date:	July 26th, 2011

Documents Approved:

Protocol	Version date: June 26th, 2010
Informed Consent Form Script (Network)	Version date: June 26th, 2010
Consent Form	Version date: July 23rd, 2010
Questionnaire	Version date: June 26th, 2010
Random Numbers & Instructions	Version date: June 26th, 2010
Instructions for Participants	Version date: June 26th, 2010
Chart Data Abstraction Form	Version date: June 26th, 2010
Questionnaire (Network)	Version date: June 26th, 2010
Life History Calendar	Version date: June 26th, 2010
Social Network Map	Version date: June 26th, 2010

Documents Acknowledged:

Supplemental Information	Version date: June 26th, 2010

The above named study has been reviewed and approved by the University Health Network Research Ethics Board. If, during the course of the research, there are any serious adverse events, confidentiality concerns, changes in the approved project, or any new information that must be considered with respect to the project, these should be brought to the immediate attention of the REB. In the event of a privacy breach, you are responsible for reporting the breach to the UHN REB and the UHN Corporate Privacy Office (in accordance with Ontario health privacy legislation - Personal Health Information Protection Act, 2004). Additionally, the UHN REB requires reports of inappropriate/unauthorized use of the information.

Please be aware that it is UHN policy that research-related activities involving an external party require a research agreement. An 'external party' refers to a corporation other than UHN or an individual who is not UHN personnel. Should a research agreement be required in this case, the study may not begin at UHN until the agreement has been signed by all parties. Should the negotiation process raise concerns, the REB reserves the right to reconsider its approval.

If the study is expected to continue beyond the expiry date, you are responsible for ensuring the study receives re-approval. The REB must be notified of the completion or termination of this study and a final report provided. As the Principal Investigator, you are responsible for the ethical conduct of this study.

The UHN Research Ethics Board operates in compliance with the Tri-Council Policy Statement, ICH/GCP Guidelines, the Ontario Personal Health Information Protection Act (2004), and Part C, Division 5 of the Food and Drug Regulations of Health Canada.

Sincerely,

Anna Gagliardi, PhD
Co-Chair, University Health Network Research Ethics Board

APPENDIX B: Kingston Site Consent Form

University Health Network

Queen's UNIVERSITY

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Title; Patient and Social Network Related Diagnostic Delay in Oral Cavity Cancer.

Investigator	Dr. Patti Groome
Co-Investigators	Dr. Deb Feldman-Stewart, Dr. Stephen Hall, Dr. Bill Mackillop, Dr. Jonathan Irish, Dr. Brian O'Sullivan and Mr. John Queenan.
Sponsor	Canadian Institutes of Health Research (CIHR)

Introduction

You are being asked to take part in a research study that is being conducted in collaboration with the University Health Network in Toronto. Please read this explanation about the study and its risks and benefits before you decide if you would like to take part. You should take as much time as you need to make your decision. You should ask the study doctor or study staff to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

Background and Purpose

We know that oral cavity cancers can be detected early with an oral examination. Unfortunately, about 40% of patients in Ontario are diagnosed with advanced disease.

You have been asked to take part in this research study because very little is understood about why so many patients are diagnosed with an advanced case of oral cancer. The overall goal of the project is to investigate the reasons behind a late stage diagnosis. This study may uncover ways to shorten the length of time it takes for a patient to be diagnosed and improve survival for patients like yourself who have oral cancer.

We would like to describe what patients, like yourself, thought was going on when they first noticed something was wrong with their ear, neck, jaw, throat or the inside of their mouth. We would also like to know who they told about these experiences, and what the people they told thought they should do.

The information that we get from patients, like yourself, will be used to help us think of ways to decrease the number of patients who are diagnosed late and increase their chances of survival.

About 150 people from 2 places will be in the study. About 130 will come from the Princess Margaret Hospital and 20 from the Kingston General Hospital.

Study Design

This study involves one telephone interview and we will review your medical chart to collect relevant to the study information.

- During the telephone interview we will ask you about when you first noticed that something was wrong with your ear, or neck, or jaw, or throat or the inside of your mouth. We would also ask who you told about these experiences, and what the people you told thought you should do.
  We will also ask during the interview about demographic, smoking and alcohol consumption.

- We will collect information from medical charts on key clinical and tumour characteristics.

Study Visits and Procedures

A Research Assistant will spend about 15-20 minutes explaining how you should prepare for the telephone interview. Then you will be given a package of materials to take home. This package contains an exercise to help you remember who you talked to about the things that were happening in your mouth, neck or head and a calendar to help you remember when these things started to happen. You may ask as many people and take as much time as you want to help you complete these exercises.

A date and time will be set for the telephone interview to take place.

A Research Assistant will call you two days from now to help with any questions you may have and to reconfirm your appointment. You will also be called on the telephone the day before your telephone interview as a reminder.

If we cannot reach you on the appointed date we will try to reach you again.

The telephone interview will be in four sections and should take about 45 minutes to complete. Some of the questions will be related to the exercises you will have completed.

Risks Related to Being in the Study

There are no medical risks if you take part in this study, but being in this study may make you feel uncomfortable. The interview will ask you about important and very personal matters, and may be emotionally difficult. For example, we will be asking you to recall the experiences you had when you first started to realize that you might have a serious health problem. You can take your time in answering the questions if you so choose and may change your mind about answering the questions at any time. You may also stop the interview at any time if there is any discomfort.

Additionally, we would like to remind you that the Cancer Center has services available to you that provide professional support in times of emotional, psychological or social distress. Below we have provided the names and telephone numbers of two social workers who you can call for assistance.

- Cindy Fitzpatrick: 613-544-2631 ext. 6737
- Debbie Stark: 613-544-2631 ext. 6680

If during the interview you become distressed we will remind you that help is available. We will also ask if you would like us to contact Cindy or Debbie on your behalf. We will only do so with your permission.

Benefits to Being in the Study

You may not receive any direct benefit from being in this study. Information learned from this study may help other people with oral cancer in the future. The results of our study could point to ways of shortening the length of time it takes for some patients to go to a doctor when they first notice particular changes.

Voluntary Participation

Your participation in this study is voluntary. You may decide not to be in this study, or to be in the study now and then change your mind later. You may leave the study at any time without affecting your care. You may refuse to answer any question you do not want to answer, or not answer an interview question by saying “pass”.

We will give you new information that is learned during the study that might affect your decision to stay in the study.

Confidentiality

Personal Health Information

If you agree to join this study, the study doctor and his/her study team will look at your personal health information and collect only the information they need for the study. Personal health information is any information that could be used to identify you and includes your: name, telephone number, age, new or existing medical records, that includes types, dates and results of medical tests or procedures.

The information that is collected for the study will be kept in a locked and secure area by the study doctor for 10 years. Only the study team or the people or groups listed below will be allowed to look at your records. Your participation in this study also may be recorded in your medical record at this hospital.

Study Information that Does Not Identify You

All information collected during this study, including your personal health information, will be kept confidential and will not be shared with anyone outside the study unless required by law.

You will not be named in any reports, publications, or presentations that may come from this study.

If you decide to leave the study, the information about you that was collected before you left the study will still be used. No new information will be collected without your permission.

The study data will be stored at a secure facility at Queen's University in Kingston Ontario for processing and analysis. This data will not contain *any* identifiable personal information about you such as your name, phone number or date of birth.

In no way does signing this consent form waive your legal rights nor does it relieve the investigators, sponsors or involved institutions from their legal and professional responsibilities. You do not give up any of your legal rights by signing this consent form.

Expenses Associated with Participating in the Study

If you agree to participate in the study we will pay a stipend of $25 as a token of our appreciation for your participation and to help defer out of pocket costs for the extra time you spend in the clinic today, parking and the time you will spend preparing for and participating in the telephone interview. You will be given the stipend at the time that you agree to participate. If you choose to take the study materials home with you and think about whether or not you want to participate, you will receive your stipend at the time of your next clinic visit.

Conflict of Interest

This study is funded by an operating grant provided by the Canadian Institutes of Health Research. The operating grant is covering the costs incurred by the hospital and researchers for doing this study. All of the people involved in this study namely; Dr.

Jonathan Irish, Dr. Deb Feldman-Stewart, Dr. Stephen Hall, Dr. Bill Mackillop, Dr. Brian O'Sullivan and Mr. John Queenan have a professional interest in completing this study. Their interests should not influence your decision to participate in this study. You should not feel pressured to join this study.

Questions About the Study

If you have any questions, concerns or would like to speak to the study team for any reason, please call: Dr. Patti Groome at 613-533-6000 Ext. 78512 or John Queenan at 613-533-6000 Ext. 78568.

If you have any questions about your rights as a research participant or have concerns about this study, call Dr. Albert Clark, Chair, Queen's University Health Sciences and Affiliated Teaching Hospitals Research Ethics Board (REB) at 613-533-6081.

The REB is a group of people who oversee the ethical conduct of research studies. These people are not part of the study team. Everything that you discuss will be kept confidential.

Consent

This study has been explained to me and any questions I had have been answered. I know that I may leave the study at any time. I agree to take part in this study.

______________________	________________	__________
Print Study Participant's Name	Signature	Date

(You will be given a signed copy of this consent form)

My signature means that I have explained the study to the participant named above. I have answered all questions...

__________________________	________________	__________
Print Name of Person Obtaining Consent	Signature	Date

Was the participant assisted during the consent process? ☐ **YES** ☐ **NO**

If **YES**, please check the relevant box and complete the signature space below:

☐ The person signing below acted as a translator for the participant during the consent process and attests that the study as set out in this form was accurately translated and has had any questions answered..

_______________________	____________________	_____
Print Name of Translator	Signature	Date
_______________________	____________________	
Relationship to Participant	Language	

☐ The consent form was read to the participant. The person signing below attests that the study as set out in this form was accurately explained to, and has had any questions answered.

_______________________	____________________	_____
Print Name of Witness	Signature	Date

____

Relationship to Participant

APPENDIX C: PMH Site Consent Form

University Health Network

Queen's University

CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Title; Patient and Social Network Related Diagnostic Delay in Oral Cavity Cancer.

Investigator	Dr. Jonathan Irish
Co-Investigators	Dr. Patti Groome, Dr. Deb Feldman-Stewart, Dr. Stephen Hall, Dr. Bill Mackillop, Dr. Brian O'Sullivan and Mr. John Queenan.
Sponsor	Canadian Institutes of Health Research (CIHR)

Introduction

You are being asked to take part in a research study that is being conducted in collaboration with Queen's University in Kingston, Ontario. Please read this explanation about the study and its risks and benefits before you decide if you would like to take part. You should take as much time as you need to make your decision. You should ask the study doctor or study staff to explain anything that you do not understand and make sure that all of your questions have been answered before signing this consent form. Before you make your decision, feel free to talk about this study with anyone you wish. Participation in this study is voluntary.

Background and Purpose

We know that oral cavity cancers can be detected early with an oral examination. Unfortunately, about 40% of patients in Ontario are diagnosed with advanced disease.

You have been asked to take part in this research study because very little is understood about why so many patients are diagnosed with an advanced case of oral cancer. The overall goal of the project is to investigate the reasons behind a late stage diagnosis. This study may uncover ways to shorten the length of time it takes for a patient to be diagnosed and improve survival for patients like yourself who have oral cancer.

We would like to describe what patients, like yourself, thought was going on when they first noticed something was wrong with their ear, neck, jaw, throat or the inside of their mouth. We would also like to know who they told about these experiences, and what the people they told thought they should do.

The information that we get from patients, like yourself, will be used to help us think of ways to decrease the number of patients who are diagnosed late and increase their chances of survival.

About 150 people from 2 places will be in the study. About 130 will come from the Princess Margaret Hospital and 20 from the Kingston General Hospital.

Study Design

This study involves one telephone interview and we will review your medical chart to collect relevant to the study information.

- During the telephone interview we will ask you about when you first noticed that something was wrong with your ear, or neck, or jaw, or throat or the inside of your mouth. We would also ask who you told about these experiences, and what the people you told thought you should do.
  We will also ask during the interview about demographic, smoking and alcohol consumption.

- We will collect information from medical charts on key clinical and tumour characteristics.

Study Visits and Procedures

A Research Assistant will spend about 15-20 minutes explaining how you should prepare for the telephone interview. Then you will be given a package of materials to take home. This package contains an exercise to help you remember who you talked to about the things that were happening in your mouth, neck or head and a calendar to help you remember when these things started to happen. You may ask as many people and take as much time as you want to help you complete these exercises.

A date and time will be set for the telephone interview to take place.

A Research Assistant will call you two days from now to help with any questions you may have and to reconfirm your appointment. You will also be called on the telephone the day before your telephone interview as a reminder
.
If we cannot reach you on the appointed date we will try to reach you again.

The telephone interview will be in four sections and should take about 45 minutes to complete. Some of the questions will be related to the exercises you will have completed.

Risks Related to Being in the Study

There are no medical risks if you take part in this study, but being in this study may make you feel uncomfortable. The interview will ask you about important and very personal matters, and may be emotionally difficult. For example, we will be asking you to recall the experiences you had when you first started to realize that you might have a serious health problem. You can take your time in answering the questions if you so choose and may change your mind about answering the questions at any time. You may also stop the interview at any time if there is any discomfort.

Benefits to Being in the Study

You may not receive any direct benefit from being in this study. Information learned from this study may help other people with oral cancer in the future. The results of our study could point to ways of shortening the length of time it takes for some patients to go to a doctor when they first notice particular changes.

Voluntary Participation

Your participation in this study is voluntary. You may decide not to be in this study, or to be in the study now and then change your mind later. You may leave the study at any time without affecting your care. You may refuse to answer any question you do not want to answer, or not answer an interview question by saying “pass”.

We will give you new information that is learned during the study that might affect your decision to stay in the study.

Confidentiality

Personal Health Information

If you agree to join this study, the study doctor and his/her study team will look at your personal health information and collect only the information they need for the study. Personal health information is any information that could be used to identify you and includes your: name, telephone number, age, new or existing medical records, that includes types, dates and results of medical tests or procedures.

The information that is collected for the study will be kept in a locked and secure area by the study doctor for 10 years. Only the study team or the people or groups listed below will be allowed to look at your records. Your participation in this study also may be recorded in your medical record at this hospital.

Representatives of the University Health Network Research Ethics Board. May come to the hospital to look at the study records and at your personal health information to check that the information collected for the study is correct and to make sure the study followed proper laws and guidelines:

Study Information that Does Not Identify You

All information collected during this study, including your personal health information, will be kept confidential and will not be shared with anyone outside the study unless required by law.

You will not be named in any reports, publications, or presentations that may come from this study.

If you decide to leave the study, the information about you that was collected before you left the study will still be used. No new information will be collected without your permission.

The study data will be stored at a secure facility at Queen’s University in Kingston Ontario for processing and analysis. This data will not contain *any* identifiable personal information about you such as your name, phone number or date of birth.

In no way does signing this consent form waive your legal rights nor does it relieve the investigators, sponsors or involved institutions from their legal and professional responsibilities. You do not give up any of your legal rights by signing this consent form.

Expenses Associated with Participating in the Study

If you agree to participate in the study we will pay a stipend of $25 as a token of our appreciation for your participation and to help defer out of pocket costs for the extra time you spend in the clinic today, parking and the time you will spend preparing for and participating in the telephone interview. You will be given the stipend at the time that you agree to participate. If you choose to take the study materials home with you and think about whether or not you want to participate, you will receive your stipend at the time of your next clinic visit.

Conflict of Interest

This study is funded by an operating grant provided by the Canadian Institutes of Health Research. The operating grant is covering the costs incurred by the hospital and researchers for doing this study. All of the people involved in this study namely; Dr. Jonathan Irish, Dr. Deb Feldman-Stewart, Dr. Stephen Hall, Dr. Bill Mackillop, Dr. Brian O’Sullivan and Mr. John Queenan have a professional interest in completing this study. Their interests should not influence your decision to participate in this study. You should not feel pressured to join this study.

Questions About the Study

If you have any questions, concerns or would like to speak to the study team for any reason, please call: Dr. Jon Irish at 416-946-4501 Ext 2149 or Colleen Simpson at 416-946-4501 Ext 4729.

If you have any questions about your rights as a research participant or have concerns about this study, call Chair of the University Health Network Research Ethics Board (REB) or the Research Ethics office number at 416-946-4438. The REB is a group of people who oversee the ethical conduct of research studies. These people are not part of the study team. Everything that you discuss will be kept confidential.

Consent

This study has been explained to me and any questions I had have been answered. I know that I may leave the study at any time. I agree to take part in this study.

Print Study Participant's Name	Signature	Date

(You will be given a signed copy of this consent form)

My signature means that I have explained the study to the participant named above. I have answered all questions...

Print Name of Person Obtaining Consent	Signature	Date

Was the participant assisted during the consent process? ☐ **YES** ☐ **NO**

If **YES**, please check the relevant box and complete the signature space below:

☐ The person signing below acted as a translator for the participant during the consent process and attests that the study as set out in this form was accurately translated and has had any questions answered..

Print Name of Translator	Signature	Date
Relationship to Participant	Language	

☐ The consent form was read to the participant. The person signing below attests that the study as set out in this form was accurately explained to, and has had any questions answered.

Print Name of Witness	Signature	Date
Relationship to Participant		

APPENDIX D: Chart Abstraction Form

CHART DATA: ABSTRACTION FORM

PATIENT INFORMATION

Study ID _______

Age as of January 1 2011: ____

Sex: M/F: _____

DISEASE CHARACTERISTICS

Clinical Tumour Size

Size of tumour at widest margin by CT scan:____ cm ____ mm

Clinical TNM classification

T: _____
N: _____
M:_____

Biopsy date: Day:______Month:______Year:_______

Histological Grade

GX (Grade cannot be assessed)
G1 (Well differentiated)
G2 (Moderately differentiated)
G3-4 (Poorly differentiated or undifferentiated)
GNR (Grade not reported by pathologist)

COMORBIDITY

Modified Kaplan/Feinstein Index

Please refer to instruction manual for instructions on how to use the MKFC Index and additional information about the categories.

Scoring:

0 = No problem.
1 = Slight decompensation.
2 = Moderate decompensation.
3 = Severe decompensation.
8 = Partial information, score could not be assigned.

System	Score
1. Cardiovascular	
2. Respiratory	
3. Gastrointestinal	
4. Renal	
5. Endocrine	
6. Neurological	
7. Psychiatric	
8. Rheumatologic	
9. Immunological	
10. Malignancy	
11. Substance Abuse	
12. Body Weight	
MKFC Index*	

* The highest score from any one category. For example if Cardiovascular = 3, Respiratory = 3 and Substance Abuse = 1 then the MKFC Index is 3. Possible scores are 0, 1, 2, 3 or 8 for “could not be assigned”.

Record the type of health professional and the date of the first appointment that the patient had for relevant symptoms.

Medical Practitioner	**Date**		
	wk	**mm**	**yy**
GP/Family doctor			
Dentist/			
Dental Hygienist			
Otolaryngologist			
Other ________________			

APPENDIX E: Instructions to Participants

University Health Network

Queen's UNIVERSITY

Dear Participant.

Thank you for taking the time to participate in our research.

Enclosed you will find the following:

- Instructions, a bull's eye diagram and a blank list to help you identify the people you talk to when you feel unwell and the people you talked to about the problems you were having.
- Instructions and a calendar to help you remember the first time you felt or noticed something was going "wrong" with the inside of your mouth, throat, ear, neck or jaw.

We would like you to ask as many friends and family members as you want to assist you in filling out the bull's eye diagram and remembering the appropriate dates for the calendar. A research assistant will call you within two days to answer any questions you may have regarding the contents of this package or the instructions provided.

If you have any questions or comments, please do not hesitate to call us at one of the telephone numbers provided below.

Sincerely,

John Queenan
Research Coordinator
Queen's Cancer Research Institute
10 Stuart Street, Level 2
Kingston, ON

Toronto contact: Colleen Simpson: (416) 416-946-4501 ext 4729

Kingston contact: John Queenan: (613) 533-6000, ext. 78568

APPENDIX F: Life History Calendar

Instructions:

We would like you to go through an exercise to help you remember who you talked to about the sensations or changes that were happening in your mouth, neck or head and a calendar to help you remember when these things started to happen.

On the next page there are two charts, one called "**Mouth Related Sensations or Changes Calendar**" and the other called "**Months of the Year**". On the chart called "**Mouth Related Sensations or Changes Calendar"** there are six months along the top of the calendar marked Last Month, Previous Month 1 and etc…For these months I will be asking you about the things that are listed along the left hand side of the calendar starting with "**Problems**" and ending with the date that you first had an appointment with a doctor, dentist or other health professional. Under the months we have provided 4 further divisions each representing the four weeks of each month.

Before we start the interview I would like you to do the following:

- Write today's date next to "**Today's Date**" on the "**Mouth Related Sensations or Changes Calendar".**
- Using the "months of the year" chart as a guide, fill in the names of the months under the appropriate heading of the **Sensations/Changes** and Medical Visit Calendar. For example, if this month is December then last Month will be November and "Previous Month 1" will be October.
- Using a pencil, write "**memorable events"** such as your birthday, a loved ones birthday, public holiday or any recent memorable event or vacation on the appropriate week and month. The space is limited so you can use abbreviations such as "J's BD" instead of "John's birthday" or "SBS" instead of "Super Bowl Sunday".
- Think back to the first time you felt or noticed something was going "wrong" with your ear, neck, jaw, throat or the inside of your mouth.
- Using a pencil mark with an X under the appropriate week of the month that you first noticed a particular symptom. You can erase and redo if you think that you have made a mistake. Take as much

time as you need. Use the memorable events that you marked on the calendar as a guide to help you pinpoint the appropriate week.

After you have finished think about when you visited a doctor, dentist or another health professional about the things that were happening in your ear, neck, jaw, throat or the inside of your mouth.

REMEMBER: ***you can use as much help as you want from your family and friends as you would like***

Months of the Year											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Mouth Related Sensations or Changes Calendar																								
Today’s date:	**Last Month**				**Previous Month 1**				**Previous Month 2**				**Previous Month 3**				**Previous Month 4**				**Previous Month 5**			
	W1	**W2**	**W3**	**W4**	**W1**	**W2**	**W3**	**W4**	**W1**	**W2**	**W3**	**W4**	**W1**	**W2**	**W3**	**W4**	**W1**	**W2**	**W3**	**W4**	**W1**	**W2**	**W3**	**W4**
Memorable Events:																								
Sensations/Changes																								
Lesion/ulcer/sores:																								
Top of tongue																								
Bottom of tongue																								
Side of tongue																								
Roof of mouth																								
Gum																								
Floor of mouth																								
Pain																								
Ear																								
Mouth																								
Neck																								
Difficulty Swallowing																								
Painful Swallowing																								
Lump in neck																								
Other:																								
First visit with a:																								
Family Doctor																								
Nurse																								
Dentist																								
Dental Hygienist																								
Specialist																								
Other:																								

NB: The original was presented to the patient on legal sized paper set to landscape format.

APPENDIX F: Study Interview Questionnaire

Questionnaire

CANCER RESEARCH INSTITUTE
DIVISION OF CANCER CARE
AND EPIDEMIOLOGY

PRESENTATION, SYMPTOM AND SOCIAL NETWORK

Refer back to the calendar you received. If you have not been able to find the time to go through the calendar we can take some time and fill it out over the phone.

1 Were the problems in your ear, neck, jaw, throat or the inside of your mouth first detected as part of a routine medical check up, dental check up or denture refit?

Yes **No** **Don't Know**

If "no" or "don't know "skip to Question 3. If "yes" proceed to Question 2 then skip to the Network Section on page 7.

1 When did a doctor, dentist or dental hygienist notice that there was a problem in your ear, neck, jaw, throat or the inside of your mouth?

Medical Practitioner	**Date**		
	wk	**mm**	**yy**
GP/Family doctor			
Registered Nurse			
Dentist			
Dental Hygienist			
Otolaryngologist			
Other ___________________			

1 About when did you first see a doctor, dentist or dental hygienist for the problems in your ear, neck, jaw, throat or the inside of your mouth?

Medical Practitioner	**Date**		
	wk	**mm**	**yy**
GP/Family doctor			
Registered Nurse			
Dentist			
Dental Hygienist			
Otolaryngologist			
Other ___________________			

1 What made you decide that you should see a doctor, nurse, dentist or dental hygienist for the problems in your ear, neck, jaw, throat or the inside of your mouth?

Prompts:

Was it the problems that you were experiencing in your ear, neck, jaw, throat or the inside of your mouth?

Did someone recommend that you see a doctor?

1 What was the first problem that you noticed in your ear, neck, jaw, throat or the inside of your mouth and about when did you first notice this problem?

Allow the patient to self report then scan the list below to find the most appropriate category. Reconfirm the choice of category (ies) with the patient.

What other problems did you notice? About when did these problems start?

If patient remembers month but cannot remember week then leave blank and impute "2" during data entry.

Symptom	**Date**		
	wk	**mm**	**yy**
Lesion/lump on top of tongue			
Lesion/lump on bottom of tongue			
Lesion/lump on side of tongue			
Lesion/lump on roof of mouth			
Lesion/lump on gum			
Lesion/lump on floor of mouth			
Pain in ear			
Pain in mouth			
Pain in throat			
Difficulty swallowing			
Painful swallowing			
Neck mass/lump			
Other (please state):			

1 When the problems in your mouth, ear, throat or neck first appeared do you recall what you said to yourself about what could be going on or what you made of them?

Prompts:

- Did you just try to ignore them?
- Did you forget about them?
- Did you tell yourself to wait to see if they would go away?
- Did you decide that they probably meant you had some sort of illness or disease?
- Other?

1 Do you recall how worried you felt at the time the problems in your mouth, ear, throat or neck first appeared? How urgently you felt you needed to investigate the symptoms?

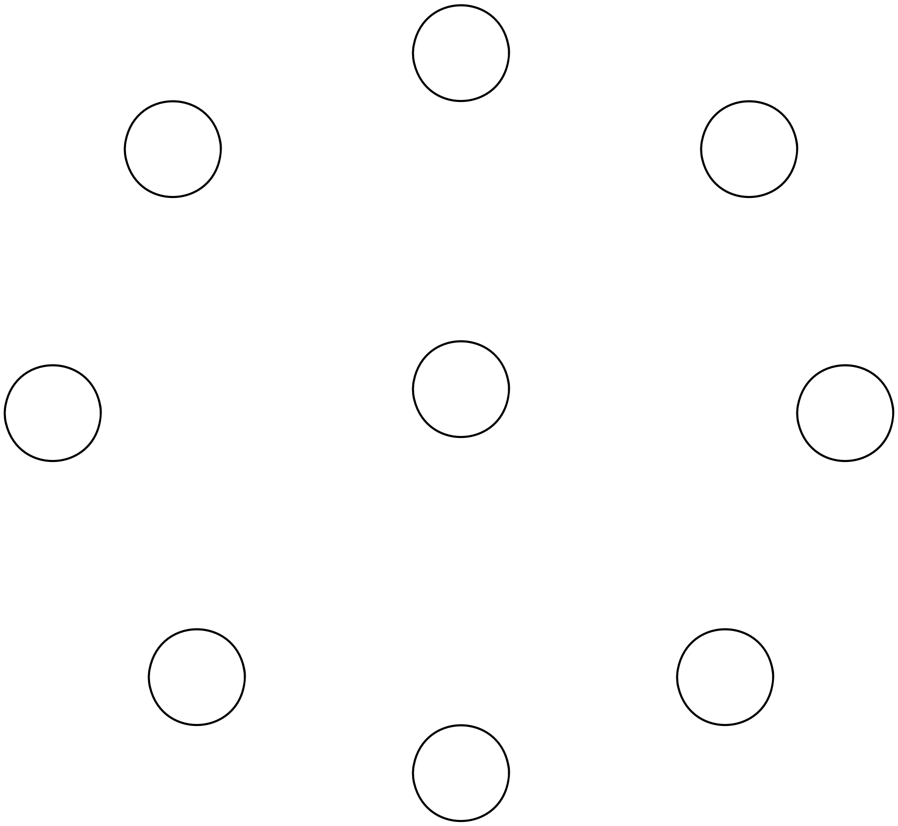
NETWORK SECTION

Now I would like you to think about the people you talk to when you feel ill and anyone you talked to about problems in your mouth, ear, throat or neck before you saw a doctor, nurse, dentist, dental hygienist. It would be helpful for you to refer to the social network map that was provided to you by Colleen or John at the cancer clinic. If you have not had any time to prepare we can go through this exercise over the phone.

Refer to the bull's-eye diagram with all of the people you would normally talk to about when you are not feeling well.

How many people did you identify? ______

Write the patients initials in the center circle and the initials of all of people they identified in each of the peripheral circles. Ask the patient if each of these people knows one another and draw a line connecting them if they do.



Did you mention or discuss the problems in your mouth, ear, throat or neck with anyone *before* you met with the doctor, nurse, dentist, or dental hygienist?

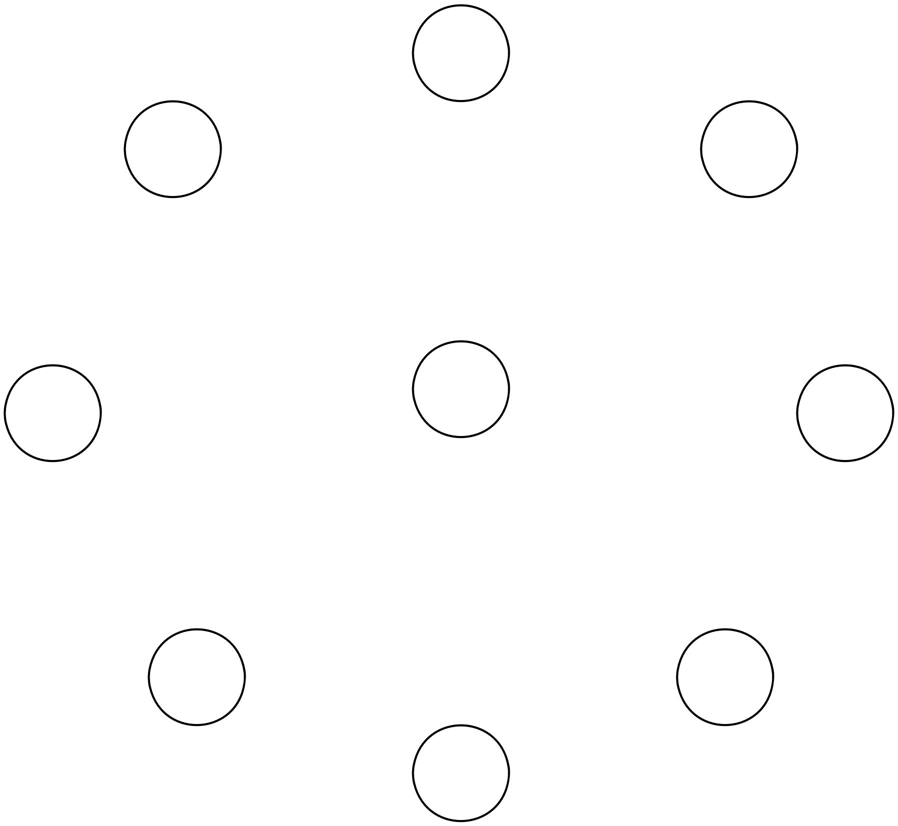
Yes No (circle one).

If Yes please refer to the network map
If No skip to next section.

Now refer to the list of people you actually talked to regarding the problems in your mouth, ear, throat or neck before you met with a doctor, nurse, dentist or dental hygienist.

How many people are on that list? ______

Write the patients initials in the center circle and the initials of all of people they identified in each of the peripheral circles. Ask the patient if each of these people knows one another and draw a line connecting them if they do.



What did the first person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other________________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the second person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other________________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the third person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other_______________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

If there are more than three people use the additional sheets supplied at the back of this questionnaire

6. Still thinking about the time interval between when you first noticed the problems in your mouth, ear, throat or neck first appeared and when you had your first contact with a doctor, nurse, dentist or dental hygienist: Did you do anything to investigate information about this problem on your own, like looking on the internet, consulting a book or going to a library?

   Yes No Don't Know/Don't Remember (circle one)

   a. If yes what did you do?

7. Now, take a moment and think about the time interval *before* you first noticed the problems in your mouth, ear, throat or neck: At that time, were you aware of the signs and symptoms of oral cancer?

   Yes No Don't Know/Don't Remember

COPING STYLE SECTION

We are interested in how you usually respond when you are feeling unwell.

There are ten questions in this next section. The possible answers to these questions are “I usually don’t do this at all”, I usually do this a little bit”, I usually do this a medium amount”, and “I usually do this a lot”.

There are lots of ways to try to deal with feelings of illness. This section of the questionnaire asks you to indicate what YOU generally do and feel, when YOU are unwell. Obviously, different illnesses bring out different responses, but think about what you USUALLY do when you are ill.

Circle one number on each line.	**I usually don’t do this at all**	**I usually do this a little bit**	**I usually do this a medium amount**	**I usually do this a lot.**
8. I give up the attempt to feel better.	1	2	3	4
9. I just give up trying to feel better.	1	2	3	4
10. I reduce the amount of effort I’m putting into feeling better.	1	2	3	4
11. I admit to myself that I can’t deal with it and stop trying to do something about it.	1	2	3	4
12. I daydream about things other than feeling unwell..	1	2	3	4
13. I refuse to believe that the illness has happened.	1	2	3	4
14. I say to myself “this illness isn’t real”	1	2	3	4
15. I sleep more than usual.	1	2	3	4
16. I go to the movies or watch TV to think about the illness less.	1	2	3	4
17. I turn to work or other activities to take my mind off things.	1	2	3	4

We are also interested in the support that you received from other people.

There are eight questions is this section and the possible answers to these questions are “none of the time”, “a little of the time”, some of the time”, most of the time” or “all of the time”.

People sometimes look to others for information or other types of support when they are ill. At the time you first started to notice the problems in your mouth, ear, throat or neck first and when you had your first contact with a doctor, nurse, dentist or dental hygienist. How often were the following kinds of support available to you?

Circle one number on each line.	**None of the time**	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**
18. Someone you could count on to listen to you when you need to talk	1	2	3	4	5
19. Someone to give you information to help you understand a situation	1	2	3	4	5
20. Someone to give you good advice about a crisis	1	2	3	4	5
21. Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
22. Someone whose advice you really wanted	1	2	3	4	5
23. Someone to share your most private worries and fears with	1	2	3	4	5
24. Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
25. Someone who understands your problems	1	2	3	4	5

LIFESTYLE AND DEMOGRAPHIC SECTION

We would like to ask you a few lifestyle and personal questions including ones about whether you smoke or drink alcohol   Please be assured that all information collected in this interview will be held in the strictest of confidence. If you do not want to answer any of these questions please feel free to tell me and we will simply skip to the next question..

A. Smoking:

26. Have you ever smoked cigarettes?

Yes ☐

No ☐

If you answered "No" please skip to section *B. Alcohol.*

27. At what age did you begin to smoke cigarettes?

Age ☐

28. How many cigarettes did you usually smoke per day?

Number of cigarettes ☐

29. Do you still smoke cigarettes?

Yes ☐

No ☐

If "Yes" please skip to section *B. Alcohol.*

30. At what age did you stop smoking cigarettes?

Age ☐

B. Alcohol: When we use the phrase "a drink" we mean either:

One bottle or can of beer or
One glass or pint of draft or
One glass of wine or a wine cooler or
One straight or mixed drink with one and a half ounces of hard liquor.

31. During the past 4 weeks have you had a drink of beer, wine, liquor or any other alcoholic beverage?

Yes	☐
No	☐

If you answered "no" please skip to section *C: Demographics.*

32. During the past 4 weeks, how often did you drink an alcoholic beverage? Please mark only one box.

Less than one per month	☐
Once a month	☐
2 to 3 a month	☐
Once a week	☐
2-3 per week	☐
4-6 times a week	☐
Every day	☐
Don't know	☐
Refuse to answer	☐

33. If male: How many times in the past 4 weeks have you had 5 or more drinks on one occasion?

Number of times ☐

34. If female: How many times in the past 4 weeks have you had 4 or more drinks on one occasion?

Number of times ☐

35. In the past 4 weeks, what is the highest number of drinks you had on one occasion?

Number of drinks ☐

C: Demographics

36. What do you consider to be your primary racial or ethnic background? (Please mark only one box).

White or Caucasian	☐
Aboriginal	☐
Chinese	☐
South Asian	☐
Black	☐
Filipino	☐
Latin American	☐
Southeast Asian	☐
Arab	☐
West Asian	☐
Other: ____________________	☐

37. Were you born in Canada? Please mark only one box:

Yes	☐
No	☐

If the answer to Q37 was "yes" skip to Q39.

38. How long, in years, have you resided in Canada? ________yrs

If response is less than a year then record time of residences as "<1 yr"

39. What is your marital status? Please mark only one box:

- Single ☐
- Married/Common Law ☐
- Separated ☐
- Divorced ☐
- Widowed ☐
- Other ☐

40. Which of the following best describes your living arrangements?

- Living alone ☐
- Living with spouse/partner ☐
- Living with children ☐
- Living with spouse/partner and children ☐
- Living with dependent adult family member ☐
- Living with non-dependent adult family member ☐
- Living with non-related adult ☐
- Other, please specify ______________________ ☐

41. What is your best estimate of your total household income (before taxes and deductions). Please mark only one box.

- Less than $20,000? ☐
- $20,000 to $30,000? ☐
- $31,000 to $40,000? ☐
- $41,000 to $60,000? ☐
- $61,000 to $80,000 ☐
- Greater than $80, 000 ☐

42. What is the highest level of education that you have attained? Mark only one box.

- Grade school ☐
- High school diploma ☐
- Trade certificate or diploma from vocational school or apprenticeship ☐
- Non-university certificate or diploma from a, community college or CEGEP. ☐
- University certificate below bachelors level ☐

Bachelor's degree (B.A., B.Sc., LL.B.) ☐
University degree or certificate above bachelors degree ☐

43. Are you a Dentist, Medical Doctor, Nurse or Dental Hygienist?

Yes No

44. Did you have a family physician at the time you were experiencing the changes in ear, neck, jaw, throat or the inside of your mouth?

Yes No Unknown *If "yes" skip to Q. 46.*

45. Have you ever had a family physician?

Yes No Unknown

46. Did you have dental insurance at the time you were experiencing the changes in your ear, neck, jaw, throat or the inside of your mouth?

Yes No Unknown

47. Did you have a regular dentist at the time you were experiencing the changes in ear, neck, jaw, throat or the inside of your mouth?

Yes No Unknown *If "yes" skip to Q. 49.*

48. Have you ever had a regular dentist?

Yes No Unknown

49. At the time you started experiencing changes in ear, neck, jaw, throat or the inside of your mouth did you have a recent denture refit?

Yes No Unknown

When people feel depressed it's hard for them to get going because they just feel tired and down.

50. Have you ever been diagnosed with depression?

Circle one: Yes No Unknown

51. Take a moment and think again about the time interval between when you first noticed the problems in your mouth, ear, throat or neck first appeared and when you had your first contact with a doctor, nurse, dentist or dental hygienist. During this time were you experiencing any stressful life events or pressures?

    Yes No Can't remember

    If "Yes" what was the source of the stress or pressure.

We would like your permission to contact one of the people you talked to about the problems in your mouth, ear, throat or neck. We would like to have the opportunity to ask them what they remember about the conversation that you had with them. We will only ask them what they said to you when you told them of the problems you were having in your mouth, ear, throat or neck. We will not discuss your health status or any personal information with them if they agree to talk to us.

Are you willing to allow us to contact one of them?

Yes No

If "yes" tell the patient that you will randomly select one of the patient's contacts.
Refer to the random number list and chose the next available random number to represent the contact that will be approached by the patient.

NB: Ask the patient not to talk to the contact about the conversation they had because we would like to collect the information as the contact remembers it.

If "No" tell the patient that the interview is concluded and then thank him/her for their time.

Record chosen order of contact: _____

We would like to talk to "contact no X". Would you ask them if they would allow us to contact them? We will call you back in two days to find out if they have granted us permission and to obtain a telephone number where they can be reached. If they have any questions or comments they can also call John Queenan at 613 -533-6000 ext. 78568 or Colleen Simpson at 416-946-4501 ext. 4729.

NB: If the named contact is living with the patient and is available to come to the phone then ask if they can offer their informed consent and be questioned at this time.

> REMINDER: Do not record any patient or network contact identifiable information on the questionnaire. Only the study ID number should appear on either the patient questionnaire or the network contact questionnaire.

This concludes the interview. Thank you for your time.

Network continued….
What did the _____ person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other_______________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the _____ person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other_______________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the _____ person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other________________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the _____ person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other_______________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

What did the _____ person you talked to say? What did they think was going on? Did they seem concerned or unconcerned? Use the space provided.

What is this person's relationship to you? (circle one)

Spouse

Child

Parent

Sibling

Cousin

Personal friend

Work Related Friend/Associate

Other________________

On a scale from one to five, one representing close or intimate and five representing distant. How close is your relationship with this person?

Close/Intimate.						Distant.
	1	2	3	4	5	

On a scale from one to five, one representing "not influential at all" and five representing "extremely influential". How much did this person influence your decision to see a medical doctor, dentist, or dental hygienist?

not influential at all						extremely influential
	1	2	3	4	5	

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

APPENDIX G: Network Contact Consent and Questions

Informed Consent Script.

Network Contact Name: ___________________________

Network contact Telephone number: _____________________

Instruction to Interviewer: To be read, verbatim, to the patients network contact after confirming that the person you are talking to is the same person that the patient referred you to.

We are inviting you to participate in a research study entitled “Patient and Social Network Related Diagnostic Delay in Oral Cavity Cancer”. The investigators are Dr. Jonathan Irish, Dr. Patti Groome, Dr. Deb Feldman-Stewart, Dr. Stephen Hall, Dr. Bill Mackillop, Dr. Brian O’Sullivan and Mr. John Queenan. The study is sponsored by the Canadian Institutes of Health Research (CIHR) and is being conducted by Queen’s University in collaboration with the Princess Margaret Hospital.

- We are conducting this research study because very little is understood about why so many patients are diagnosed with an advanced case of oral cancer.
- This study may uncover ways to shorten the length of time it takes for a patient to be diagnosed and improve survival for patients who have oral cancer.
- We know that oral cavity cancers can be detected early with an oral examination. Unfortunately, about 40% of patients in Ontario are diagnosed with advanced disease.
- The overall goal of the project is to investigate the reasons behind a late stage diagnosis. We would like to describe what patients thought was going on when they first noticed something was wrong with their ear, neck, jaw, throat or the inside of their mouth. We would also like to know who they told about these experiences, and what the people they told thought they should do.
- The results of our study could point to ways of shortening the length of time it takes for some patients to go to a doctor when they first notice particular changes.
- The information that we get from patients will be used to help us think of ways to decrease the number of patients who are diagnosed late and increase their chances of survival.

We have been given permission by (patient name) to ask you what you remember about what you said to (patient name) when they first told you that there was something out of the ordinary going on in their mouth, ear, throat or neck.

This interview should take from five to ten minutes. The information we get from you will be recorded on a form and transferred to a secure facility at Queen’s University in Kingston Ontario for processing and analysis. This form will not contain any identifiable personal information about you such as your name or phone number.

Please be aware that we will not be able to discuss (patient name’s) health status with you or discuss any other personal information with you if you agree to talk to us.

Additionally, if you decide not to participate your decision will not compromise, in any way, your own nor (patient name’s) present or future health care. We will also keep your answer confidential: we will not be informing (patient name) of the content of your answer nor will your answer be published in any reports. If you have any questions, concerns or would like to speak to the study team for any reason, please call: Dr. Jon Irish at 416-946-4501 Ext 2149 or Colleen Simpson at 416-946-4501 Ext 4729.

If you have any questions about your rights as a research participant or have concerns about this study, call Ronald Heslegrave, Ph. D., and Chair of the University Health Network Research Ethics Board (REB) or the Research Ethics office number at 416-946-4438. The REB is a group of people who oversee the ethical conduct of research studies. These people are not part of the study team. Everything that you discuss will be kept confidential.

Lastly, you may decide to end the interview and withdraw your consent at any time.

Are you willing to participate in this short interview?

Yes No

RA signature:______________ Date:_______________

Detach and store separately from the questionnaire.

Think back to the time that (patient name) first told you that there was something going on in their mouth, ear, throat or neck.

What did you tell them that you thought was going on?
Were you concerned or unconcerned?

Use the space provided.

Thank you for your time that is all the information that we needed.

APPENDIX H: Social Network Map

People You Talk To When You Feel Unwell

Instructions

To help you to remember the names of the people you talked to, we would like you to go through a short exercise.

On the next two pages you will find:

- A blank "bull's eye" diagram to help you think about who you talk to when you feel ill.
- A blank list to help you remember who you told about the problems with the inside of your mouth, throat, ear, neck or jaw.

Refer to the blank "bull's eye" diagram. Think about all of the people that you would normally tell that you are not feeling well.

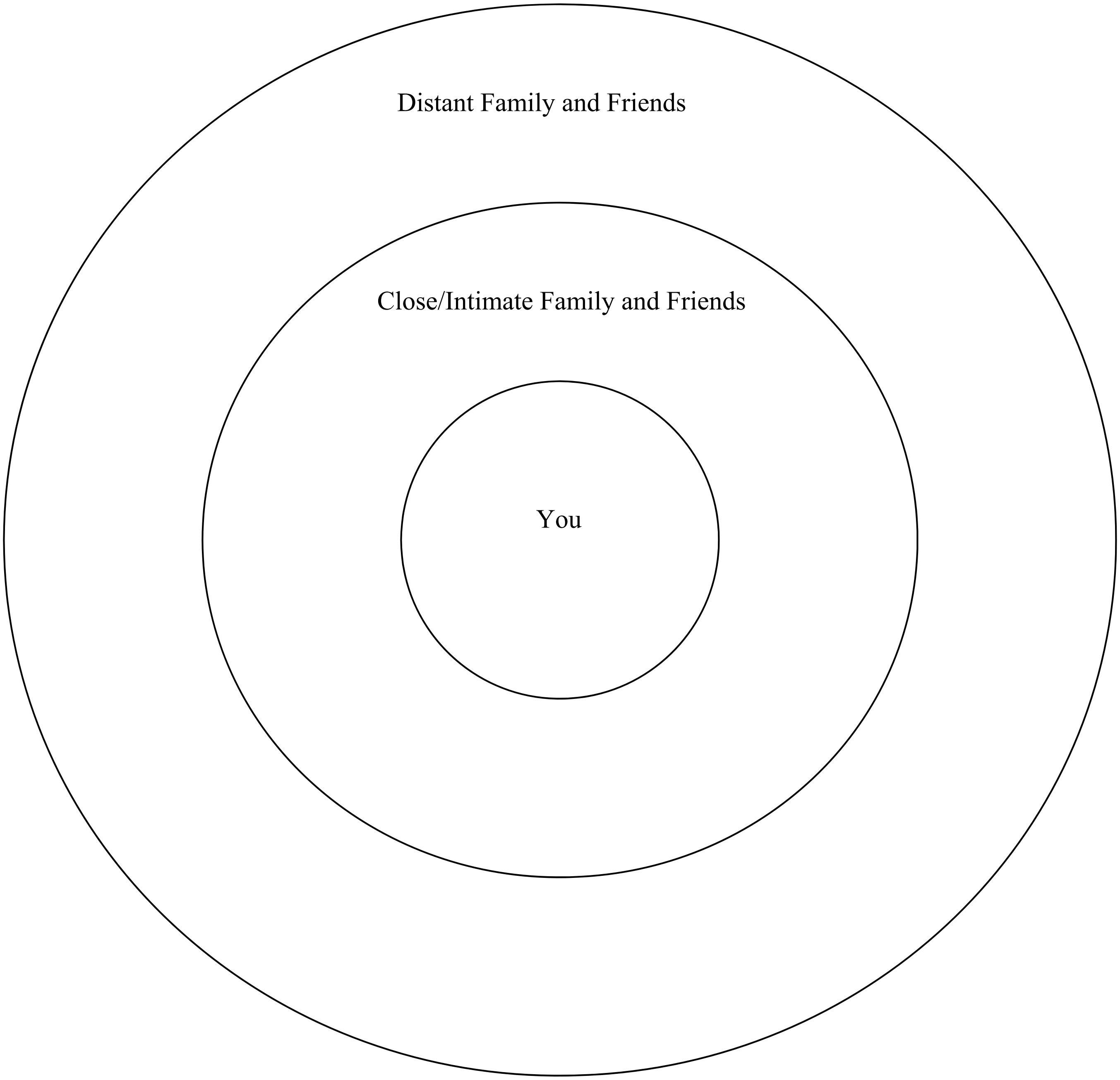
On the "bull's eye" diagram write the names or initials of all of the people you would normally tell that you are not feeling well in the appropriate circle.

For example, if you would talk to your son, daughter or your best friend when you feel ill write their names or initials in the same circle labeled "Close/Intimate Family and Friends". If you would confide in or ask advice from people that you have just met or people that you do not feel particularly close to, even if they are family, then write their names in the circle labeled "Distant Family and Friends".

After you have completed the diagram we would like you to write down the initials or names of only those people you actually talked to about the things that were happening in your ear, neck, jaw, throat or the inside of your mouth. We would also like you to place them in the order in which you talked to them. Use the list provided. We will also ask you if this person is a nurse, doctor, dentist or dental hygienist.

We will ask you to refer to the diagram and list during your telephone interview.

REMEMBER: ***you can use as much help as you want from your family and friends as you would like***


Distant Family and Friends
Close/Intimate Family and Friends
You

Take some time and think about who you *actually* talked to regarding the problems in your mouth, ear, throat or neck *before* you first went to see a doctor, nurse, dentist or dental hygienist about them.

Who was the first person you told?
Write their name or initials here ____

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

Who was the second person you told?
Write their name or initials here ____

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

Who was the third person you told?
Write their name or initials here ____

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

If you told more than 3 people use the spaces provided below.

4th person ____

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

5th person ____

Is this person a nurse, doctor, dentist or dental hygienist? (circle one).

Yes No Don't Know

APPENDIX H: Confounder Analysis

Table 1: Relationship between patient related diagnostic delay and potentially confounding variables.

Candidate Variables	p
Continuous*	
Age	0.78
Smoking (pack-years)	0.27
Tumour Size	0.48
Categorical**	
Sex	0.52
Education	0.46
Family Dentist	0.95
Stress	0.28
Heavy Drinking	**0.10**
Stage	0.63
Avoidance coping	**0.16**

*Wilcoxon 2-sample test p-value
** chi square p-value.

Heavy Drinking and avoidance coping are both statistically significantly associated with waiting more than 1 month to took to seek help from an HCP.

Table 2: Effect of confounders on the risk of delay associated with no symptom urgency

Variables	Symptom Urgency OR* (95% C.I.)
Unadjusted risk of delay	7.0 (1.45, 33.76)
Adjusted risk of delay by:	
Heavy Drinking	6.51 (1.34, 31.68)
Avoidance coping	7.46 (1.54, 36.27)

*logistic regression calculated using urgency = no as the risk group and delay = yes as the outcome

No variables associated with a 10% change in the crude risk estimate.

Table 3: Effect of confounders on the risk of delay associated with lay consultancy.

Variables	Lay-consultancy OR*(95% C.I.)
Unadjusted risk of delay	0.81 (0.0.34, 1.95)
Adjusted risk of delay by:	
Heavy Drinking	0.85(0.35, 2.07)
Avoidance coping	0.82 (0.16, 3.15)

*logistic regression calculated using lay-consultancy = no as the risk group and delay = yes as the outcome

No variables associated with a 10% change in the crude risk estimate.

APPENDIX I: Power and Sample Size

STUDY POWER AND SAMPLE SIZE

We calculated power taking into consideration the needs of the Patient/network related diagnostic delay variable. Below we provide the two calculations and assumptions that were used. The first calculation is based on the original expectation of a sample size of 150. The second calculation is based on the actual sample size of 83. Power calculations comparing two means were calculated using OpenEpi [1].

Patient/Network Related Diagnostic Delay

Power for Comparing Two Delay Means: Expected Sample Size (n=150)			
Input Data			
Confidence Interval (2-sided)			
Ratio of sample size (Group2/Group1) [1]			
	Group 1	Group 2	Mean Difference [2]
Mean [3]	3	4	-1
Sample Size	101	49	
Standard Deviation [3]	1	1	
Variance	1	1	
Power based on Normal approximation method	99.99		
Power for Comparing Two Delay Means: Actual Sample Size (n=83)			
Input Data			
Confidence Interval (2-sided)			
Ratio of sample size (Group2/Group1) [1]			
	Group 1	Group 2	Mean Difference [2]
Mean	3	4	-1
Sample Size [3]	57	26	
Standard Deviation [3]	1	1	
Variance	1	1	
Power based on Normal approximation method	98.83		

Assumptions:

[1] We defined a “low number of consultants” group as consisting of as those patients with the lowest 40% of lay consultants. This cutoff is informed by the Alameda County Study [2], in which 32% of men over 49 and 48% of women fell into one of the two lowest social connection categories.

[2] Based on the results of Dr. Irish and Goldstein’s study in the same patient population, a mean delay of 3 months (SD = 1 month) in the entire sample is expected [3].

[3] We used the standard deviation of the entire sample from Dr. Irish and Goldstein’s study to estimate an expected difference between the two sample means.

Although we will have ample power to detect a statistically significant difference between **Lay-consultant network size** (when dichotomized) and **Patient/network related diagnostic delay** we would like to control for as many covariates as is reasonably possible. Kleinbaum et al offer guidance on sample size requirements when specifying a maximal model ($n \geq 10$) [4]. By allowing for one year of recruitment we will accrue a sample size of 150. A sample size of 150 will allow us to consider a maximal model containing up to 14 predictor variables and dummy variables.

REFERENCES

1. OpenEpi: Open Source Epidemiologic Statistics for Public Health. Version 2.3. 2009.

2. Berkman LF, Syme SL. Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. 1979 Am J Epidemiol 109 (2): 186-204.

3. Goldstein D, Jeremic G, Werger J, Irish J. Wait times in the diagnosis and treatment of head and neck cancer: comparison between wait times in 1995 and 2005-a prospective study. 2007 J Otolaryngol 36(6):336-43.

4. Kleinbaum DG, Kupper LL, Muller KE, Nizam A. Selecting the Best Regression Equation. *Applied Regression Analysis and other Multivariable Methods*. Boston: Duxbury Press, 1998: 386-422.