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Assessing waiting times in the clinical trajectory of patients with lung cancer

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Assessing waiting times in the clinical trajectory of patients with lung cancer

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RÉSUMÉ

Le cancer du poumon a une incidence et une létalité parmi les plus hautes de tous les cancers diagnostiqués au Canada. En considérant la gravité du pronostic et des symptômes de la maladie, l'accès au traitement dans les plus brefs de délais est essentiel. Malgré l'engagement du gouvernement fédéral et les gouvernements provinciaux de réduire les délais de temps d'attente, des balises pour les temps d'attente pour le traitement d'un cancer ne sont toujours pas établis. En outre, le compte-rendu des indicateurs des temps d'attente n'est pas uniforme à travers les provinces. Une des solutions proposées pour la réduction des temps d'attente pour le traitement du cancer est les équipes interdisciplinaires. J'ai complété un audit du programme interdisciplinaire traitant le cancer du poumon à l'Hôpital général juif (l'HGJ) de 2004 à 2007. Les objectifs primaires de l'étude étaient : (1) de faire un audit de la performance de l'équipe interdisciplinaire à l'HGJ en ce qui concerne les temps d'attente pour les intervalles critiques et les sous-groupes de patients ; (2) de comparer les temps d'attente dans la trajectoire clinique des patients traités à l'HGJ avec les balises qui existent ; (3) de déterminer les facteurs associés aux délais plus longs dans cette population. Un objectif secondaire de l'étude était de suggérer des mesures visant à réduire les temps d'attente. Le service clinique à l'HGJ a été évalué selon les balises proposées par le British Thoracic Society, Cancer Care Ontario, et la balise pan-canadienne pour la radiothérapie. Les patients de l'HGJ ont subi un délai médian de 9 jours pour l'intervalle «Ready to treat to first treatment», et un délai médian de 30 jours pour l'intervalle entre le premier contact avec l'hôpital et le premier traitement. Les patients âgés de plus de 65 ans, les patients avec une capacité physique diminuée, et les patients avec un stade de tumeur limité étaient plus à risque d'échouer les balises pour les temps d'attente.

Mots-clés : temps d'attente, le cancer du poumon, le traitement du cancer, les équipes interdisciplinaires, qualité des soins, points de repère, évaluation de performance, « critical pathways »

ABSTRACT

Lung cancer is among the most lethal and the most diagnosed cancers in Canada. Given the poor prognosis and symptom burden of the disease, timely access to treatment and quality care are essential. In spite of government commitments to reduce waiting times in cancer care, national clinical benchmarks for cancer care have yet to be established, and waiting time reporting by provinces is inconsistent. One of the proposed strategies for reducing waiting times in cancer care is the use of interdisciplinary teams. I undertook an audit of the interdisciplinary pulmonary oncology program at the Jewish General Hospital from 2004 to 2007. The primary objectives of this study were: (1) to audit the performance of the interdisciplinary pulmonary oncology service at the Jewish General Hospital with respect to waiting times for key intervals and subgroups of patients; (2) to compare waiting times in the clinical trajectory of lung cancer patients seen at the Jewish General Hospital with existing waiting time guidelines; (3) to determine those factors associated with longer waiting times in this population. A secondary objective was to suggest measures to be considered in order to reduce waiting times. The JGH's lung cancer service was compared against benchmarks developed by the British Thoracic Society, Cancer Care Ontario, and the pan-Canadian waiting time benchmarks for radiation oncology. Patients waited a median of 9 days from the time they were ready to treat until their first treatment, and a median of 30 days from their first contact with the pulmonary service until their first treatment. Patients over age 65, those with early-stage disease and those with good performance status were less likely to meet the recommended guidelines.

Key words: waiting times, lung cancer, cancer treatment, interdisciplinary teams, quality of care, guidelines, performance evaluation, critical pathways

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LIST OF ACRONYMS AND ABBREVIATIONS

ASIR	Age-standardized incidence rate
BTS	British Thoracic Society
BC	British Columbia
CBCN	Canadian Breast Cancer Network
CCO	Cancer Care Ontario
CGA	Comprehensive Geriatric Assessment
CIHI	Canadian Institute for Health Information
CT	Computerized axial Tomography
DTT	Decision to Treat
ECOG	Eastern Cooperative Oncology Group
ICC	Interdisciplinary Cancer Conference
JGH	Jewish General Hospital
MCC	Multidisciplinary Cancer Conference
MDC	Multidisciplinary Clinic
MDT	Multidisciplinary Team
MRI	Magnetic Resonance Imaging
MTOC	Multidisciplinary Thoracic Oncology Clinic
NSCLC	Non-small cell lung cancer
PCI	Prophylactic cranial irradiation
PET	Positron Emission Tomography
PQLC	Programme québécois de lutte contre le cancer
PS	Performance Status

RAMQ	Régie de l'assurance maladie du Québec
RTT	Ready to Treat
SCLC	Small cell lung cancer
SLCSG	Swedish Lung Cancer Study Group
T-N-M	Tumor-Node-Metastasis
TTD	Time to Diagnosis
TTT	Time to Treatment
WTA	Wait Time Alliance

For my family,
near and far,
immediate and extended,

and

For anyone who has had to
navigate themselves or a loved one
through a frightening diagnosis
and an unpredictable course
of treatment.

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SECTION 1:

INTRODUCTION, OBJECTIVES, AND CONCEPTUAL FRAMEWORK

INTRODUCTION

Lung cancer is among the most lethal and the most diagnosed cancers in Canada (Canadian Cancer Society, 2007). Depending on the stage and severity of symptoms, treatment for lung cancer may involve surgery, radiation therapy, or chemotherapy, or a combination of these modalities. Consequently, diagnosing and treating lung cancer involves a variety of specialists and requires close monitoring and coordination (Riedel, Wang, McCormack, Toloza, Montana et al., 2006). Given the poor prognosis and symptom burden of the disease, timely access to treatment and quality care are essential.

Managing the care and treatment of lung cancer patients requires a comprehensive strategy that ensures early-stage patients are given the best chance of survival, and late-stage patients are given symptom relief with minimal delay. Managing waiting times is therefore an essential element of quality care in lung cancer.

DEFINITION OF THE PROBLEM & OBJECTIVES

Waiting times in all areas of the Canadian health care system have been the subject of public pressure and scrutiny for several years (Canadian Breast Cancer Network, 2008). Waiting time benchmarks for cancer care are among the priority areas targeted for development by the federal and provincial governments as part of the Ten-Year Plan to Strengthen Health Care announced in 2004 (Sullivan, 2006a;

Winget et al., 2007)[1]. In spite of government commitments to reduce waiting times in cancer care, there remains a lamentable shortage of research, reporting, and collaboration (Sullivan, 2006a; Winget et al., 2007). National clinical benchmarks for cancer care have yet to be established, and waiting time reporting by provinces is inconsistent and un-standardized (Canadian Institute for Health Information, 2006; Canadian Breast Cancer Network, 2008).

Furthermore, relatively little is known about waiting times for the treatment of lung cancer in Canada, particularly among patients with advanced stages of disease who represent the majority of cases. Although waiting time reductions are being pursued across all tumor types, the impact of these efforts in the lung cancer population will be especially important given the rapid progression of the disease and the role of timely treatment on symptom palliation and tumor control (Billing & Wells, 1996; O'Rourke & Edwards, 2000; Bozcuk & Martin, 2001; Jensen, Mainz, & Overgaard, 2002; Koyi, Hillerdal, & Brandén, 2002b; Moody, Muers, & Forman, 2004; Myrdal et al., 2004).

One of the proposed strategies for reducing waiting times in cancer care is the use of interdisciplinary teams. A recent meta-analysis revealed that there is clear evidence suggesting that interdisciplinary team improves practice patterns and decision-making in the management of lung cancer patients (Coory, Gkolia, Yang, Bowman, & Fong, 2008). Although the benefits of interdisciplinary teams to the management of lung cancer may seem intuitive, there is a shortage of evidence to corroborate this stance (Coory et al., 2008). Interdisciplinary teams have not been

[1] The other four priority areas targeted by the provinces in 2004 for waiting time reduction were cardiac care, joint replacement, cataract surgery, and diagnostic imaging (Canadian Intergovernmental Conference Secretariat, 2004).

widely or systematically adopted in Canada, nor has their performance been evaluated in relation to waiting times.

The Jewish General Hospital in Montreal has been operating an interdisciplinary lung cancer program for over ten years. The primary objectives of this study were: (1) to audit the performance of the interdisciplinary pulmonary oncology service at the Jewish General Hospital with respect to waiting times for key intervals and subgroups of patients; (2) to compare these waiting times with existing waiting time guidelines; (3) to determine those factors associated with longer waiting times in this population. A secondary objective was to suggest measures to be considered in order to reduce waiting times.

The JGH's lung cancer service was compared against benchmarks developed by the British Thoracic Society (BTS) (1998), Cancer Care Ontario (CCO) (2006), and the pan-Canadian waiting time benchmarks for radiation oncology (Ontario Ministry of Health and Long-Term Care, 2005). These particular sources were used in order to assess the performance of the JGH's service in a variety of contexts:

- Assessing against the lung cancer-specific BTS guidelines will situate the JGH within the treatment of lung cancer in the international community.
- Assessing against the Cancer Care Ontario guidelines will allow the comparison of the JGH's service against the only generalized, comprehensive cancer benchmarks that have been set in Canada.
- Assessing against the pan-Canadian benchmarks for radiation oncology will allow a comparison of how well the JGH service fares

against the only Canada-wide waiting time goal for cancer care.

WHY EXAMINE WAITING TIMES IN LUNG CANCER?

Waiting times in cancer care have been described as the "canary in the mine" of Canada's health care system (Sullivan, 2006a). They reflect the quality and continuity of clinical services and the capacity of the system to manage demands. Examining waiting times is particularly critical for lung cancer, given the aggressive nature of the disease and the devastating symptoms that many patients experience. The recent attention to waiting times by the federal and provincial governments and the nascent interest in establishing benchmarks for care underline the importance of assessing the current state of affairs and identifying areas that require special attention.

Waiting times can be assessed along a patient's entire course of illness, from detection of first symptoms to completion of treatment and discharge from hospital (Moody et al., 2004). Assessing the waiting time at each phase of a patient's course of illness will focus on the quality of different facets of the health care system. For instance, the waiting time between detection of first symptoms and first visit to a generalist includes elements such as effectiveness of health promotion and access to a family physician, while also reflecting individual characteristics such as patient education, perceptions of the health care system, and fears (Moody et al., 2004). Examining waiting times from first specialist visit to treatment reflects the quality of clinical services in a hospital setting and the capacity of the centre to handle demands (Sullivan, 2006a). While this phase represents only a fraction of the

waiting a patient will do over the course of his or her illness, it is a critical period in the management of the illness. Accordingly, this phase has been the subject of several studies and standards related to waiting times.

Assessing waiting times in lung cancer at a single centre is clearly not representative of the system across Canada, across Québec, or even in the city of Montréal. However, it does illustrate a microcosm of the provision of cancer services in an interdisciplinary context. It presents a more detailed view of the strengths and weaknesses of clinical services and identifies areas of improvement. Moreover, the results of the analysis of the strengths and weaknesses of clinical services and the comparison of clinical performance against established guidelines may not be limited to the Jewish General Hospital. Lessons learned may be useful to other hospitals within the city, the province, or within Canada. Furthermore, a comparative analysis of the timeliness of care is a contribution to the improvement of the quality of patient care, and is a useful tool for policy makers and health-care providers (Winget et al., 2007).

The number of Canadians diagnosed with cancer has been growing steadily, and is likely to continue to do so for the foreseeable future (Canadian Cancer Society, 2007). Having a sense of the current state of affairs and direction for the future is critical to ensuring that all patients, regardless of where they are in Canada, are receiving the treatment that they require within a reasonable delay.

CONCEPTUAL FRAMEWORK

The conceptual framework serving as the basis of the analysis is the critical pathways approach. Critical pathways are well-established in the medical

community as a management tool to define the sequence and timing of key actions in a patient's care plan (Pearson, Goulartfisher, & Lee, 1995). Critical pathways are concerned with improving the quality of care and reducing unnecessary variations in patient treatment. Although similar to clinical practice guidelines, critical pathways differ in that they are primarily process-oriented and systematic, and deviations from the process may therefore highlight inefficiencies in patient care. Clinical practice guidelines, on the other hand, are consensus statements that are developed to assist clinicians in making decisions regarding patient care (Every, Hochman, Becker, Kopecky, & Cannon, 2000). Although clinical practice guidelines are often used in conjunction with critical pathways, many of the components of critical pathways have not been tested in clinical trials and are therefore not covered in guidelines (Every et al., 2000).

The classic interpretation of a critical pathway is the sequence in a process that takes the longest time to complete, thus contributing the most to the overall time (Pearson et al., 1995). They originated from management processes in industry used to identify variations and rate-limiting steps that hampered production. Critical pathways were adapted for use in the medical community beginning in the 1980s, primarily as a nursing tool (Pearson et al., 1995; Every et al., 2000). As Pearson and colleagues (1995) outline, the goals of critical pathways in health care differ from the industrial model. **Table 1** summarizes the main objectives of critical pathways in health care.

Table 1: Goals of critical pathways in health care

1. Selecting a "best practice" when practice styles vary unnecessarily.
2. Defining standards for the expected duration of hospital stay and for the use of tests and treatments.
3. Examining the interrelations among the different steps in the care process to find ways to coordinate or decrease the time spent in the rate-limiting steps.
4. Giving all hospital staff a common "game plan" from which to view and understand their various roles in the overall care process.
5. Providing a framework for collecting data on the care process so that providers can learn how often and why patients do not follow an expected course during their hospitalization.
6. Decreasing nursing and physician documentation burdens.
7. Improving patient satisfaction with care by educating patients and their families about the plan of care and involving them more fully in its implementation.

Adapted from Pearson et al.(1995) and Every et al. (2000)

A critical pathways approach is a particularly appropriate method for examining waiting times for treatment. As described by Every and colleagues (2000), one of the functions of a critical pathway is its role as a series of time-associated actions. The actions examined in the present study are points along a lung cancer patient's clinical trajectory, including first consultation with a specialist, diagnosis, staging, and initiation of treatment. These actions are divided into intervals that contribute to the overall waiting time from first consultation to first treatment. The critical pathways approach is additionally suited to this analysis because of its emphasis on multidisciplinary involvement and on the use of benchmarks. Since critical pathway processes are not often the subject of rigorous

scientific study, benchmarks and best practices are often used to measure success (Every et al., 2000).

There are many factors that may influence a patient's waiting time at any interval along their clinical trajectory. This study will examine some well-documented factors, namely the stage of disease and urgency of treatment, the complexity of the diagnostic process, the complexity of the treatment plan, scheduling and referrals, and the patient's overall fitness for treatment (Moody et al., 2004; Salomaa, Sallinen, Hiekkanen, & Liippo, 2005; Canadian Institute for Health Information, 2006; Sullivan, 2006a; Devbhandari, Soon et al., 2007). These factors reflect larger organizational issues such as the capacity of the treatment facility to handle demands, both in terms of human and physical resources.

In the context of this study, the critical pathways framework will be used primarily as a tool to identify rate-limiting steps in the clinical trajectory of lung cancer patients. Framing waiting times in terms of a critical pathway is an acknowledgement of the importance of decreasing unnecessary variation in patients' treatment experiences, and it assists in focusing attention on the quality of care. A caveat to this is the wide variation in patient needs and experiences, which cannot and should not be captured in a critical pathway. Achieving a balance between harmonizing patient care and respecting individual needs and preferences is the primary challenge with critical pathways (Pearson et al., 1995; Every et al., 2000).

In the context of this study, the concept of critical pathways will be the basis of the analysis. Intervals in the clinical trajectory of lung cancer patients will be broken down into time-associated actions, much in the way a critical pathway would

be organized, in order to highlight inefficiencies. The entire clinical trajectory of a lung cancer patient in the hospital setting, from first consultation with a specialist to initiation of treatment, will be divided into segments representing the important stages in the care of the patient. The segment in the trajectory that takes the longest amount of time to complete is the critical pathway. The identification of the critical pathway will lead to an assessment of how this rate-limiting step can be altered in order to reduce the its timeline, and in turn, reduce the overall timeline of the clinical trajectory.

PLAN

This first section has outlined in brief the issue, objectives and justification of this study, as well as defining a conceptual framework for the methodology and analysis of the results. The following section will provide context and further detail for the topics of lung cancer, waiting times, and multidisciplinary teams in cancer care. Section 3 will describe in detail the methodology of the study, including the sample, data collection, time interval calculation, and statistical analysis. Following the methodology section is an article entitled *Waiting times in the clinical trajectory of patients with lung cancer*, which forms the main analytic component of this text. The article is complemented by an analysis section that discusses the contribution of this research to current knowledge, and reflects on its limitations and areas of further study. Annex 1 includes diagrams of detailed clinical trajectories and Annex 2 includes further results from the waiting time analysis.

SECTION 2:

LUNG CANCER, WAITING TIMES, AND INTERDISCIPLINARY TEAMS

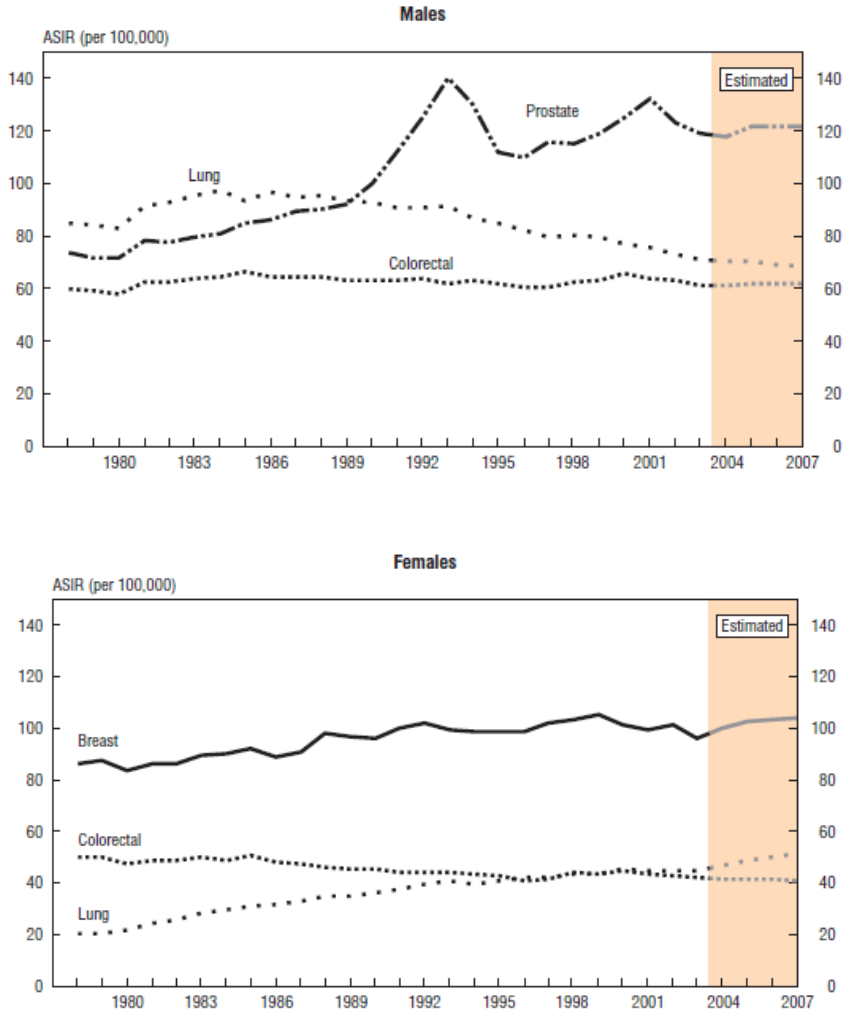
THE BURDEN OF LUNG CANCER IN CANADA

Lung cancer is the leading cause of cancer death among Canadian men and women. It has held this unenviable status since the early 1990s, outpacing the mortality rates of breast, prostate, and colorectal cancers. In 2007, an estimated 23,300 cases were diagnosed and 19,900 deaths resulted from lung cancer (Canadian Cancer Society, 2007).

Its five-year relative survival is among the lowest of all cancers, ranking with pancreatic, esophageal and liver cancers in terms of lethality (Canadian Cancer Society, 2007). Aside from being one of the deadliest cancers, lung cancer is largely preventable. Approximately 90% of patients diagnosed with lung cancer are smokers or former smokers. The remainder may have had occupational exposure to carcinogenic agents, although there is some evidence to suggest that genetics play a role in the development of lung cancer in never-smokers (Toh et al., 2006).

Given that the link between tobacco smoke and lung cancer is well established, most public health efforts to control lung cancer have been focused on smoking cessation and prevention. As a result of prevention activities, smoking rates among Canadian youth have dropped by more than half in the last 40 years (Health Canada, 2004). Further evidence of this success can be seen in the plateau of lung cancer incidence rates among men and the recent slowdown of lung cancer incidence rates among women (Canadian Cancer Society, 2007). **Figure 1** shows the trend in incidence rates for selected cancers among men and women since 1978.

Figure 1: Age-standardized[2] incidence rates (ASIR) for selected cancers, 1978-2007



From Canadian Cancer Statistics 2007 (Canadian Cancer Society, 2007)

Today's lung cancer incidence rates reflect the smoking habits of individuals twenty to thirty years prior. The incidence of lung cancer began to decline in men in the late 1980s, which reflected a drop in male smoking rates in the mid-1960s.

[2] Rates are standardized to the age distribution of the Canadian population in 1991.

Incidence rates among women are currently thought to be leveling off, which reflects the decline in female smoking in the mid-1980s (Canadian Cancer Society, 2007).

In spite of the continuing progress being made in smoking prevention and cessation, and the correlative reductions in lung cancer incidence and mortality, it remains among the most diagnosed cancers in Canada (Canadian Cancer Society, 2007). Consequently, the management of lung cancer remains a major public health challenge. For those individuals who are diagnosed with the disease, high-quality and timely care is essential to increasing survival and improving their quality of life.

LUNG CANCER: SYMPTOMS AND DETECTION

In spite of ongoing research efforts to identify one, a reliable and cost-effective screening tool for lung cancer does not yet exist (Welch et al., 2007). Without a screening program, patients and general practitioners are charged with identifying symptoms and abnormalities that may indicate a malignancy. However, the symptoms of lung cancer are not unique to the disease and thus may be challenging to identify. Patients who develop lung cancer often have comorbidities with similar symptom profiles, such as chronic obstructive pulmonary disease (COPD), emphysema, and chronic bronchitis (Koyi et al., 2002b). The most common lung cancer symptoms include persistent cough, shortness of breath, unexplained weight loss, night sweats, fatigue, loss of appetite, and hemoptysis (National Cancer Institute, 2007a, 2007b). These symptoms are often undetectable until the cancer is at an advanced stage (Moody et al., 2004). As a result, the majority (approximately

80%) of lung cancer is diagnosed at a later stage of disease, for which curative treatment is not available (Koyi et al., 2002b; Birring & Peake, 2005). Curative surgical resection provides the most favourable five-year survival rates, but is only feasible in the earliest stages of lung cancer (Jensen et al., 2002; Myrdal et al., 2004; Salomaa et al., 2005).

Lung cancer is classified into two types: small-cell and non-small cell. These designations refer to the distinctive histological features of the cancers. Clinical and radiological features of small cell and non-small cell also differ, as do treatment options. However, diagnosis and staging of either small cell or non-small cell lung cancer is achieved using the same procedures: biopsy, chest x-ray, CT scan and PET scan (National Cancer Institute, 2007a, 2007b). Histological confirmation is required for a definitive diagnosis of lung cancer.

NON-SMALL CELL LUNG CANCER: STAGING AND TREATMENT

Non-small cell lung cancer (NSCLC) can be further divided into subtypes, including adenocarcinoma, squamous carcinoma, and large cell carcinoma (National Cancer Institute, 2007a). Upon diagnosis of NSCLC, patients are staged according to TNM criteria (Tumor, Nodes, Metastasis) as either Stage I, II, III or IV according to the severity of their disease (Mountain, 1997). **Table 2** and **Figure 2** outline the TNM staging criteria and explain the salient features of the T, N and M descriptors. The TNM status of each patient determines their stage of disease, which ranges from IA to IV (least severe to most severe). Accurate staging of patients is essential to

determining their treatment options and overall prognosis. Based on their stage, patients can then be assigned to one of three categories: early stage, locally advanced, and advanced metastatic disease (National Cancer Institute, 2007a).

Table 2: **Staging criteria based on T-N-M classification**

Stage	Primary Tumor (T)	Regional Lymph Nodes (N)	Distant Metastasis (M)
IA	T1	N0	M0
IB	T2	N0	M0
IIA	T1	N1	M0
IIB	T2	N1	M0
	T3	N0	M0
IIIA	T3	N1	M0
	T1, T2, T3	N2	M0
IIIB	T4	N0, N1, N2	M0
	Any T	N3	M0
IV	Any T	Any N	M1

Adapted from Mountain(1997)

Figure 2: Key TNM descriptors

Primary tumor (T)
T1: Tumor ≤3 cm in greatest dimension, surrounded by lung or visceral pleura, without evidence of invasion into the main bronchus
T2: Tumor with any of the following features of size or extent:
>3 cm in greatest dimension
Involves main bronchus, ≥2 cm distal to the carina
Invades the visceral pleura
T3: Tumor of any size that directly invades any of the following: chest wall, diaphragm, mediastinal pleura, parietal pericardium; or tumor in the main bronchus ≤2 cm distal to the carina, but without involvementof the carina; or associated atelectasis or obstructive pneumonitis of the entire lung
T4: Tumor of any size that invades any of the following: mediastinum, heart, great vessels, trachea, esophagus, vertebral body, carina; or tumor with a malignant pleural or pericardial effusion, or with satellite tumor nodule(s) within the ipsilateral primary-tumor lobe of the lung

Regional lymph nodes (N)
N1: Metastasis to ipsilateral peribronchial and/or ipsilateral hilar lymph nodes, and intrapulmonary nodes involved by direct extension of the primary tumor
N2: Metastasis to ipsilateral mediastinal and/or subcarinal lymph node(s)
N3: Metastasis to contralateral mediastinal, contralateral hilar, ipsilateral or contralateral scalene, or supraclavicular lymph node(s)

Distant metastasis (M)
M0: No distant metastasis
M1: Distant metastasis present

Adapted from Mountain(1997)

Early stage patients are those with operable disease, confined to Stages I-II, and in select cases, IIIA. These patients can be treated with surgery, or surgery combined with adjuvant chemotherapy where indicated. Early stage patients have the most favourable prognosis. Patients with locally advanced or regionally advanced disease (Stages IIIA and IIIB) can be treated, in some cases, with surgery followed by chemotherapy or radiation therapy, or with combined chemotherapy-radiotherapy. Patients with distant metastases (Stage IV) have the most ominous prognosis, and depending on their symptoms and other comorbidities, may be offered chemotherapy or radiotherapy to palliate symptoms. Those patients with a poor performance status (PS), deemed not physically strong enough to tolerate treatment, are monitored and offered supportive care (National Cancer Institute, 2007a).

SMALL CELL LUNG CANCER: STAGING AND TREATMENT

Small-cell lung cancer (SCLC) is more aggressive than NSCLC: without treatment, median survival for SCLC is only two to four months from the time of diagnosis (National Cancer Institute, 2007b). However, SCLC responds more readily to chemotherapy and radiation therapy than NSCLC. The staging of SCLC does not follow the TNM criteria; rather, SCLC is bisected into limited stage disease and extensive stage disease (National Cancer Institute, 2007b).

Patients with limited stage disease have a tumor that is confined to one lung, the mediastinum, or regional lymph nodes. Median survival for these patients is 16 to 24 months with treatment (National Cancer Institute, 2007b). Combination

chemotherapy (two or more drugs) is the treatment of choice for limited stage SCLC. Patients often receive concurrent high-dose radiation to the chest, and may also receive prophylactic cranial irradiation (PCI) if they achieve a complete response to chemotherapy (National Cancer Institute, 2007b).

The majority (70%) of patients with SCLC have extensive stage disease at the time of diagnosis. These patients have distant metastases, and thus a shorter prognosis. Median survival for patients with extensive stage disease is 6 to 12 months with treatment, and long term disease-free survival is rare (National Cancer Institute, 2007b). Current treatment options for extensive stage disease include combination chemotherapy, and where indicated, palliative radiation therapy to distant metastases, particularly brain and bone (National Cancer Institute, 2007b).

FACTORS AFFECTING PROGNOSIS

While survival has improved for many solid tumours in the past twenty years, the prognosis for lung cancer has remained stagnant (Moody et al., 2004; Birring & Peake, 2005). This is due mainly to the key prognostic indicators for lung cancer, which include stage, performance status, histological type, comorbidities, and the time between first symptom and first treatment (Moody et al., 2004). This latter factor is of particular interest because it can be improved, whereas most of the former factors cannot be modified. Timely access to services may potentially facilitate the diagnosis of lung cancer at an earlier stage of disease, providing more options for treatment and a more favourable clinical outcome (Moody et al., 2004).

A number of factors influence the time from first symptoms to the first treatment. Moody (2004) presents four pertinent intervals: between first malignant change and first symptom; between first symptom and presentation; between first presentation and confirmation of diagnosis; and between diagnosis and staging/treatment. With respect to treatment delays, the two former intervals can be divided into patient delays and the latter two intervals into hospital delays. It is the latter two intervals, the hospital delay, that are the subject of this study, since these two intervals relate directly to the quality of care in a hospital setting and not to the patient's own delay in seeking treatment (Myrdal et al., 2004).

WAITING TIMES

Waiting times have become a focus of attention and investment because they are a reflection of the status of health care delivery in Canada, which includes aspects such as long-term planning, accessibility, and capacity (Sullivan, 2006a). Waiting times are influenced by a number of factors, including the burden of disease, the availability of specialists, availability of space and other resources, and urgency of treatment (Canadian Institute for Health Information, 2006). Waiting times for treatment are primarily an indication of the quality and continuity of health care services (Sullivan, 2006b). In Québec, the Programme québécois de lutte contre le cancer (PQLC) lists waiting times as the first of the key performance indicators of a cancer program (1997):

> **Indicateurs de performance**
> - Délais entre le moment du diagnostic et le début du traitement.
> - Incidence des complications thérapeutiques: postopératoires, postradiothérapie et

postchimiothérapie.
- Survie sans évidence de récidive.
- Survie globale.
- Taux de mortalité.

Waiting times are more than simply a performance indicator. Although evidence linking survival to waiting times is limited, research indicates that waiting times can impact patient health (Canadian Institute for Health Information, 2006). With respect to cancer care, lengthy waiting times are correlated with psychosocial morbidity for many tumour types (Simunovic et al., 2001; Ristvedt & Trinkaus, 2005a; Lyckholm, 2006), and there is some evidence to suggest that a patient's anxiety is reduced once he begins treatment (Montazeri, Milroy, Hole, McEwen, & Gillis, 1998).

As outlined in the following sections, however, the literature is contradictory regarding the impact of waiting times on the progression of disease and the effect of delays on prognosis. Particularly in the lung cancer literature, there is no definitive evidence that longer waiting times are linked to shorter survival. In fact, some studies have shown that patients with more advanced disease, and therefore a more limited prognosis, have shorter waiting times than their early-stage counterparts (Salomaa et al., 2005; Gould, Ghaus, Olsson, & Schultz, 2008). This is thought to be related to the increased symptom burden that accompanies an advanced disease stage. If there is no firm link between longer waiting times and poorer health outcomes, why is there an impetus to examine, and ultimately shorten, waiting times?

One important factor is access to health care. Canada's health care spending, now at 10.7% of GDP, is at a record high (Canadian Institute for Health Information,

2008). In spite of this unprecedented spending, there remain limits to the capacity and access to the public health care system for many taxpayers. This puts the onus on politicians and policymakers to reduce lengthy waiting times and improve access for all Canadians. However, before 2004, there was no national waiting times reporting mechanism, which made the measurement and reduction of waiting times impossible (Canadian Institute for Health Information, 2006). Efforts began in 2004 to determine the waiting times for various key procedures as a first step towards reducing them.

In 2004, the First Ministers of Canada agreed to a ten-year plan to strengthen health care (Canadian Intergovernmental Conference Secretariat, 2004). Specifically, they committed to improving access to care and reducing waiting times in several key areas, including joint replacement, cardiac care, sight restoration, diagnostic imaging, and cancer care. In order to meet this commitment, the First Ministers agreed to collect information from provinces on existing waiting times in order to create "comparable indicators of access to health care", and also pledged to establish "evidence-based benchmarks for medically acceptable wait times" (Canadian Intergovernmental Conference Secretariat, 2004). The provinces committed to establishing and reporting on waiting time benchmarks for cancer treatment including surgery, radiation therapy and systemic therapy by the end of 2005 (Canadian Institute for Health Information, 2006). The original deadline passed with only modest progress, in the form of national radiation therapy benchmarks (Canadian Intergovernmental Conference Secretariat, 2004), and piecemeal

reporting of waiting time indicators (Canadian Institute for Health Information, 2006).

In terms of cancer care, the First Ministers' promise to establish evidence-based benchmarks has proven difficult to fulfil. Medically acceptable waiting times refer to the maximum interval within which a patient is treated without an adverse effect on his health (Wait Time Alliance for Timely Access to Health Care, 2005). However, there is a dearth of reliable evidence on the impact of treatment delay on survival in all types of cancer, given the ethical impossibility of running a randomized controlled trial to assess its impact. As a result, the best available evidence is from retrospective studies, which do not permit the control of certain key factors such as stage at diagnosis (Liberman, Liberman, Sampalis, & Mulder, 2006). Furthermore, cancer is not a single entity. Even within a particular tumor site, cancers grow differently within individuals; the risk of treatment delay is not uniform among all patients or for all cancers (Canadian Institute for Health Information, 2006). Determining evidence-based benchmarks for waiting times in cancer care is therefore extremely challenging.

Consequently, the evidence on waiting times in cancer care in Canada is limited, both in assessing the wait at various institutions and in determining its impact on survival. Most provinces have begun to publish their own waiting times data; however, since there is no consensus on the intervals being examined, most provinces start measurements at different points along the care trajectory (Canadian Institute for Health Information, 2007; Winget et al., 2007). This makes inter-

provincial comparisons challenging in addition to complicating the comparison of individual centres to provincial norms.

Guidelines

In spite of the challenges inherent in establishing waiting time guidelines, several organizations have proposed recommendations for waiting times in the clinical trajectory of cancer patients. The British Thoracic Society (1998) and the Swedish Lung Cancer Study Group (Myrdal et al., 2004) have proposed specific recommendations for lung cancer, whereas Cancer Care Ontario (2006) and the Wait Time Alliance (2007) have made general recommendations for all cancer types. Furthermore, the First Ministers have agreed to a pan-Canadian radiation oncology benchmark (Ontario Ministry of Health and Long-Term Care, 2005; Canadian Institute for Health Information, 2006; Wait Time Alliance for Timely Access to Health Care, 2007). In all cases, these recommendations have been made based on the expertise of practitioners and their clinical judgment, rather than on evidence from clinical studies. The Canadian recommendations are clinical performance benchmarks rather than medically acceptable or ideal waiting times (Cancer Care Ontario, 2006; Wait Time Alliance for Timely Access to Health Care, 2007). **Tables 3-7** outline the waiting time recommendations from the various organizations.

Table 3: Recommendations of the British Thoracic Society

Interval	Time (days)
Time to Diagnosis (TTD)	14
Time to Treatment (TTT)[Ω]	
Surgery	28
Chemotherapy	7
Radiotherapy	14/28[ϕ]

[Ω]: from date of decision to treat to treatment

[ϕ]: 14 days for palliative treatment and 28 days for radical treatment where complex planning is required.

The recommendations of the British Thoracic Society were published in 1998 in order to provide guidance to respiratory physicians in the management of lung cancer. They were produced in light of several national reports on the status of cancer care in the United Kingdom and represented an opportunity for the BTS to contribute to improved patient care. The recommendations are based on "considered clinical opinion" (British Thoracic Society, 1998) and, where possible, published scientific evidence. The guidelines include not only recommendations on waiting times, but provide a comprehensive picture of lung cancer management standards, from first presentation through death and bereavement (British Thoracic Society, 1998). The recommendations of the BTS with respect to waiting times have been cited in a number of international studies, which will be discussed below.

Table 4: Recommendations of the Swedish Lung Cancer Study Group

Interval	Time (days)
TTD	28
TTT	
Surgery	14
Chemotherapy	14
Radiotherapy	14

80% of patients are recommended to be seen within this time interval

The Swedish Lung Cancer Study Group made its waiting time recommendations in a study published by Myrdal and colleagues (2004), reporting on the effect of delays on the prognosis of patients with NSCLC. Its recommendations relate only to the two intervals outlined above. Their recommendations have been assessed in several studies, as outlined below.

Table 5: Recommendations of Cancer Care Ontario

Interval	Time (days)
Referral to Consult	
Surgery	--
Chemotherapy	7(II)/14(III)
Radiotherapy	7(II)/14(III)
Consult to Decision to Treat (DTT)	
Surgery	14
Chemotherapy	--
Radiotherapy	--
Ready to Treat (RTT) to treatment:	
Surgery	(II)14/(III)28
Chemotherapy	(II)7/(III)14
Radiotherapy	(II)7/(III)14

Cancer Care Ontario published its target waiting time recommendations in 2006. The recommendations cover all cancer types and are prioritized based on the judgment of the physician. Priority is determined by the urgency of the case and the aggressiveness of the tumor (Cancer Care Ontario, 2006). The notations (II) and (III) refer to priority levels, with level II being more urgent than level III. Cancer Care Ontario recommends that ninety percent of patients be seen within these time intervals.

The target waiting times were created to monitor the relationship between demand and capacity to provide services, and as such were not intended to represent medically acceptable waiting times. Multidisciplinary committees were used to determine target waiting times for each of the priority categories and each of the treatment modalities. The Decision to Treat (DTT) and Ready to Treat (RTT) dates are usually the same, unless there is a planned wait. A planned wait is any wait that is not related to a system access issue and can include patient waits such as travel or personal business, or physician waits such as a delay for a medical reason (Cancer Care Ontario, 2006).

Table 6: Benchmarks of the Wait Time Alliance (WTA)

Interval	Time (days)
Initial referral to consultation to radiation oncology	14
Decision to treat to initiation of radiation treatment	14

The Wait Time Alliance for Timely Access to Health Care is comprised of several national medical specialty societies including the Canadian Association of Nuclear Medicine, the Canadian Association of Radiation Oncologists, and the Canadian Medical Association, among many others. Since 2005, the Wait Time Alliance has monitored and reported on progress toward establishing waiting time benchmarks in the five priority areas defined by the First Ministers. They have recommended waiting time benchmarks not only for the five priority areas, but also

for other specialty areas and procedures (Wait Time Alliance for Timely Access to Health Care, 2005, 2007). The only benchmark set for cancer care, however, is for radiation oncology. There is no indication of progress toward other benchmarks for cancer treatment.

Table 7: pan-Canadian benchmarks for Radiation Oncology

Interval	Time (days)
Ready to treat to initiation of treatment	28

In 2005, the First Ministers of Canada agreed to a common goal of treating radiation patients within 4 weeks of being ready to treat (Ontario Ministry of Health and Long-Term Care, 2005). This is the only common benchmark that has been established for cancer care to date; however, progress towards this benchmark is being reported by nearly all provinces and territories (Canadian Institute for Health Information, 2007).

Canadian evidence on waiting times in lung cancer

Canadian studies assessing waiting times in lung cancer have focused predominantly on early-stage surgical patients and radiotherapy treatment. Johnston and colleagues (2004) examined the waiting time for radiotherapy in a mixed cancer population in Nova Scotia between 1992 and 2000. They found that the median time from cancer diagnosis to radiation treatment for lung cancer patients was 6 weeks. They found no association between waiting time and age in the lung

population, although they did find an association between shorter waiting time and more advanced disease (Johnston et al., 2004). The authors explained this finding by noting that patients with lung cancer generally require palliative radiation as they are usually in a more advanced disease stage. Palliative radiation is less complex and requires less planning than curative radiation, as the objective is immediate relief of pain. The authors also noted that the majority of lung cancer patients in the study were inpatients at the time of referral and therefore were processed more rapidly than their ambulatory counterparts (Johnston et al., 2004).

Liberman and colleagues (2006) examined patients who had undergone surgical resection for NSCLC between 1993 and 2002 at the Montreal General Hospital. Case records were linked to RAMQ data to obtain dates of physician visits. The authors found that the mean time between first contact with a thoracic surgeon and surgery was 104 days, which they characterized as "excessively long" (Liberman et al., 2006). They attributed this partly to the delays in access to diagnostic tests such as CT scans and bronchoscopy, and to the delays between the multiple visits patients are required to make in order to complete all preoperative tests. The authors suggest that a multidisciplinary lung clinic allowing patients to access all of the required specialists at once and allow more rapid access to diagnostic services would partially alleviate the long wait (Liberman et al., 2006).

Berthelet and colleagues (2006) examined the waiting times for treatment of patients with limited stage SCLC between 1991 and 1999 at a BC Cancer Agency centre. They found that the median time from abnormal chest x-ray to initiation of chemotherapy was 47 days, and the median time from diagnosis to initiation of

chemotherapy was 27 days. They compared the time intervals to clinical outcomes and found no statistical correlations between treatment intervals and clinical outcomes. Although they did not comment on the association between prompt treatment intervals and the nature of the treatment environment, the authors did mention that the cohort was treated by "a consistent group of oncologists working in a site-specific multidisciplinary setting" (Berthelet et al., 2006).

International evidence on waiting times in lung cancer

The international literature on lung cancer waiting times has focused primarily on the effect of delays on survival, with particular attention paid to early-stage resectable lung cancer. In a meta-analysis, Jensen and colleagues (2002) examined the evidence on the rate of tumour growth in lung cancer and its relation to treatment delay. They concluded that the evidence related to the prognostic impact of delays is contradictory. One study reported a rapid increase in tumour doubling time, which rendered certain patients ineligible for curative radiotherapy. This is consistent with other studies that have demonstrated that tumour growth is exponential. However, other studies reported that delays had no effect on lung cancer stage (Jensen et al., 2002).

Other studies (Billing & Wells, 1996; Bozcuk & Martin, 2001; Koyi et al., 2002b; Myrdal et al., 2004; Salomaa et al., 2005; Rolke, Bakke, & Gallefoss, 2007) originating from Sweden, Finland and the United Kingdom have concluded that delays in various points along the care trajectory (including patient-induced and hospital-induced delays) do not negatively impact survival. In fact, two studies

found that patients with a shorter delay have a poorer prognosis (Myrdal et al., 2004; Salomaa et al., 2005). The researchers concluded that patients with more severe symptoms and more advanced disease at presentation are treated more quickly, and therefore have a shorter delay.

Although the authors did not find evidence indicating a link between treatment delay and shorter survival, they did suggest that there is an intuitive benefit to reducing treatment delay. In particular, they highlighted the effect of delays on patient quality of life. They further concluded that the waiting times observed in their centres were unacceptably long.

INTERDISCIPLINARY TEAMS IN CANCER CARE

Several international studies have concluded that a multidisciplinary approach should be pursued in order to reduce waiting times in lung cancer (Bozcuk & Martin, 2001; Jensen et al., 2002; Koyi, Hillerdal, & Brandén, 2002a; Myrdal et al., 2004; Salomaa et al., 2005). Several bodies governing the treatment of lung cancer have also advocated using multidisciplinary patient management, including the British Thoracic Society and the American College of Chest Physicians (British Thoracic Society, 1998; Alberts, Bepler, Hazelton, Ruckdeschel, & Williams, 2003). A multidisciplinary approach is becoming an increasingly popular strategy in order to coordinate patient care by the various specialists involved in the treatment of all types of cancer. However, multidisciplinary cancer clinics and conferences have not been widely or systematically adopted in the Canadian health care system (Wright, De Vito, Langer, Hunter, & Expert Panel on Multidisciplinary Cancer Conference Standards, 2006).

Many of the aforementioned studies (Billing & Wells, 1996; Bozcuk & Martin, 2001; Jensen et al., 2002; Koyi et al., 2002b; Myrdal et al., 2004; Salomaa et al., 2005; Liberman et al., 2006) conclude that in order to reduce waiting times, a multidisciplinary approach should be pursued. Multidisciplinary teams have been recommended in order to manage the care of patients and to coordinate the various specialists involved in the treatment of all types of cancer (Riedel, Wang, McCormack, Toloza, Montana et al., 2006). This approach has been advocated by a number of organizations involved in the treatment of lung cancer, including the British Thoracic Society, the American College of Chest Physicians, and Cancer Care Ontario (British Thoracic Society, 1998; Alberts et al., 2003; Wright et al., 2006).

There are a variety of characterizations of a multidisciplinary team in the literature. A multidisciplinary team has been described as:

> A group of people of different health-care disciplines, which meets together at a given time to discuss a given patient and who are each able to contribute independently to the diagnostic and treatment decisions about the patient. (Fleissig, Jenkins, Catt, & Fallowfield, 2006)

A multidisciplinary approach to cancer care "involves collaboration between team members and treatment planning, and is more likely to be patient-centered and to provide psychosocial support and access to clinical trials." (Houssami & Sainsbury, 2006)

In a document supported by the American College of Chest Physicians, Alberts (2003) defines multidisciplinary teams, and clinics, as follows:

> Many groups have attempted to coordinate care through multidisciplinary management conferences and multi-disciplinary clinics. In the latter, physicians from several

> specialties conduct clinics in the same location at the same time. In addition to streamlining the workup and treatment planning, multidisciplinary conferences and clinics provide a forum for collegial exchange of professional opinions. The team approach and consensus development enables the consulting physician to convey a clear and consistent management opinion to the patient.

A multidisciplinary team will either work in a clinical setting, or meet regularly at a multidisciplinary cancer conference (MCC), or both. *Multidisciplinary clinics* are held at regular intervals in one location where various specialists will see patients with a particular type of cancer (Alberts et al., 2003; Ruhstaller, 2006). *Multidisciplinary cancer conferences* refer to meetings held at regular intervals that implicate specialists involved in the treatment of a particular type or group of cancers. The specialists attending the meeting are variously involved in the diagnosis, staging, and treatment of the patients being discussed (Fleissig et al., 2006; Ruhstaller, 2006).

There are divergent criteria for the composition of a multidisciplinary team in cancer care. According to the Programme québecois de lutte contre le cancer, a regional interdisciplinary team specializing in a particular tumor site must consist of a nurse specialized in oncology, a medical oncologist, a physician, a pharmacist specialized in oncology, a psychologist specialized in oncology, a social worker specialized in oncology, a radiation oncologist, a radiologist, a pathologist, a surgeon specialized in the tumor site, a dietitian specialized in oncology, rehabilitation specialists, and a representative from palliative care services (Direction de la lutte contre le cancer, 2005). According to Fleissig (2006), the composition of a multidisciplinary team will vary according to the tumor site, but

may include “surgeons, diagnostic and therapeutic radiologists, histopathologists, medical and clinical oncologists, nurse specialists, and palliative-care physicians.”

Multidisciplinary teams may impact waiting times both positively and negatively. A multidisciplinary approach to the treatment of cancer is thought to improve the speed and continuity of patient care by facilitating communication among specialists, which ultimately reduces intervals between consultations and treatments. It is also thought to increase the likelihood that each patient receives the appropriate treatment for his condition, given that a variety of specialist opinions are solicited during the diagnostic and treatment pathway (Newman et al., 2006). It has also been suggested that multidisciplinary one-stop clinics reduce the number of visits required by each patient during the diagnostic work-up phase (Fleissig et al., 2006). Regular multidisciplinary meetings improve the coordination of patient care by encouraging efficient treatment planning and referral among specialists, and reducing the likelihood of duplicate exams being performed. All of these elements are thought to improve clinical outcomes for patients (Fleissig et al., 2006).

Compared to independent treatment decisions by the primary oncologist, the presentation and discussion of each patient’s case in MCCs may lead to lengthier waiting times. However, in complicated cases multidisciplinary discussion of treatment has been shown to be beneficial to the patient’s overall treatment plan (Newman et al., 2006).

There are divergent criteria for the composition of a multidisciplinary team in cancer care. According to the Programme québecois de lutte contre le cancer, a regional interdisciplinary team specializing in a particular tumor site must consist of

a nurse specialized in oncology, a medical oncologist, a physician, a pharmacist specialized in oncology, a psychologist specialized in oncology, a social worker specialized in oncology, a radiation oncologist, a radiologist, a pathologist, a surgeon specialized in the tumor site, a dietitian specialized in oncology, rehabilitation specialists, and a representative from palliative care services (Direction de la lutte contre le cancer, 2005). According to Fleissig (2006), the composition of a multidisciplinary team will vary according to the tumor site, but may include "surgeons, diagnostic and therapeutic radiologists, histopathologists, medical and clinical oncologists, nurse specialists, and palliative-care physicians."

Although the majority of current literature uses the term "multidisciplinary", the term "interdisciplinary" is the term adopted by the PQLC, which it is promoting as a target for cancer care in Québec (Direction de la lutte contre le cancer, 2005):

> En oncologie, le travail interdisciplinaire vise essentiellement à accroître la qualité des soins aux personnes atteintes de cancer et aux proches (la cible commune) en combinant l'expertise unique de chacune des professions. L'équipe interdisciplinaire ne se résume donc pas à un regroupement permanent d'un ensemble de spécialistes effectuant des tâches en série (ce qui correspondrait davantage au concept de multidisciplinarité), mais exige en plus une synthèse et une concertation entre les points de vue qui s'intègrent en un tout cohérent.

Just as the evidence surrounding the role of delays in lung cancer survival is unclear, so is evidence of the benefit of multidisciplinary teams. Although the introduction of multidisciplinary teams (MDTs) in lung cancer has been shown to reduce waiting times from the initial consultation to treatment (Deegan et al., 1998), to increase the number of patients receiving chemotherapy (Forrest, McMillan,

McArdle, & Dunlop, 2005), and to improve survival (Forrest et al., 2005), MDTs have also been demonstrated to have no beneficial impact on the timeliness of diagnostic and treatment decisions (Riedel, Wang, McCormack, Toloza, Montano et al., 2006). However, the studies in question are small in scale and the methodological design in Riedel's study (2006) is questionable. The analysis of non-multidisciplinary team management was done following the closing of a multidisciplinary clinic. The infrastructure from the multidisciplinary clinic remained in place, namely the weekly multidisciplinary meetings and the electronic database. The authors admit that the impact of these features on the non-multidisciplinary clinic is not negligible.

Changes in patient management using multidisciplinary teams have occurred in parallel with other major changes in cancer treatment including improved treatment options, better detection of cancer, and the adoption of evidence-based guidelines for treatment (Fleissig et al., 2006). Consequently, it is difficult to ascribe success to a single aspect of this multifaceted change.

THE INTERDISCIPLINARY PULMONARY ONCOLOGY PROGRAM AT THE JEWISH GENERAL HOSPITAL

The interdisciplinary Pulmonary Oncology Program at the Jewish General Hospital incorporates professionals from oncology, pulmonary medicine, nursing, thoracic surgery, pathology, radiology, radiation therapy, dietetics, psycho-oncology and physiotherapy into deciding the care plan for each newly diagnosed lung cancer patient. It is centered on a weekly interdisciplinary meeting, wherein all the

aforementioned professionals discuss new and ongoing cases, and the care plan is decided by consensus.

Each patient has a primary pulmonary oncologist and a nurse assigned to their care, and all major treatment decisions are discussed in the weekly interdisciplinary meeting. Each patient's treatment plan or any ongoing treatment issue is summarized in a letter that is included in the patient's chart and sent to other professionals involved in the patient's care, such as their family physician. Patients are seen for follow-up by their pulmonary oncologist-nurse team in one of several weekly clinics, and are referred to other members of the interdisciplinary team as required or requested.

There are various points of entry to the pulmonary oncology program for patients with a suspected or known lung cancer. Patients may either be directly referred from a general practitioner, other pulmonologist or oncologist, other referring hospital, or self-referral by the patient requesting a second opinion with possible transfer of care. **Annex 1a** outlines the trajectory of an average patient seen in the pulmonary oncology program. A simplified version of Annex 1 will be used in Sections 3 and 4. **Annex 1b** outlines the trajectory of early-stage patients who have received curative surgery prior to visiting the pulmonary oncology clinic.

The majority of patients referred by general practitioners with a suspected diagnosis are done so on the basis of physical findings, and/or history with an abnormal chest-x-ray sometimes following several courses of ineffective antibiotic therapy. Some have already had a CT scan performed. The remainder of those referred either by specialists within the hospital, or those from other centers and

regions, will more commonly already have more advanced imaging (CT scan, MRI, PET scan) and diagnostic testing performed prior to referral.

Patients with a possible lung cancer or known diagnosis receive interdisciplinary care very early on in the referral process or hospital interaction. This may occur at the first visit or admission, or after the patient is presented at the interdisciplinary meeting where their case is assigned to a nurse specializing in oncology. The referred patient is presented at the interdisciplinary cancer conference where all facets of their case are discussed, a plan is formulated and a nurse assigned if not already involved. Patients are followed throughout their illness trajectory and wherever their needs place them. Patients with lung cancer may be admitted to hospital on many occasions to manage complications of treatment and illness. When admitted, their primary physician and nurse, who interact directly with the admitting team and provide continual support to the patient and family, see the patient on a regular basis.

For the purposes of this study, the team at the Jewish will be referred to as interdisciplinary, as defined by the PQLC. However, given that interdisciplinary is not a term of art, and given that multidisciplinary is the term most often seen in the scientific literature on this topic, interdisciplinary and multidisciplinary will be used interchangeably to refer to a group of professionals from various specialties working collaboratively in the diagnosis, treatment, and care of patients with cancer.

SECTION 3:

METHODOLOGY

STUDY DESIGN

This study is an audit of clinical performance of a lung cancer program at a single centre. The study was designed as such in order to identify strengths and weaknesses in clinical service delivery, and to identify areas of future focus. In order to complete this preliminary audit in a timely manner, information was collected from the existing patient database managed by the pulmonary oncology division. Institutional approval was granted for the use of the database.

INCLUSION AND EXCLUSION CRITERIA

The cohort consists of patients with primary lung cancer seen by the interdisciplinary team at the Jewish General Hospital (JGH) in Montreal, Québec, between January 1, 2004 and December 31, 2007. Patients without a confirmed histological diagnosis of lung cancer, patients with a diagnosis of primary cancer other than NSCLC or SCLC, patients transferred to the JGH after having begun treatment at an outside facility, and patients who were seen in second opinion and who returned to their referring facility were excluded from the study. These patients were excluded in order to maintain the focus on the provision of services within the pulmonary oncology program at the JGH. Excluding outside factors and ensuring a focus on the clinical performance within the JGH enhances the internal validity of the study.

Since this study examines the quality of clinical services at a single centre, its external validity is limited. However, the time intervals employed for the analysis, particularly the R-FT interval, were designed to be comparable to provincial,

national and international guidelines. As such, the waiting times achieved at the JGH can be compared to the waiting times at any other hospital in Quebec or across Canada, provided that the other sites are using the same reporting criteria. Moreover, this study may prove useful to other sites by describing a model of interdisciplinary management, and by highlighting both the successes and areas of improvement for the pulmonary oncology program.

DATA COLLECTION

The pulmonary oncology program maintains an approved database containing demographic, diagnostic and treatment information for all patients, which is transcribed from patient charts. All of the data used for this retrospective study was extracted from the pulmonary oncology database, with the approval of the Research Ethics Committee at the Jewish General Hospital.

VARIABLES

Demographic variables

The demographic variables extracted from the database are listed in **Table 8**.

Dates and Time Intervals

The time intervals examined in this study were chosen in order to create indicators comparable to existing guidelines. A description of the dates of certain key points along a patient's clinical trajectory and the time intervals calculated from those dates is described in **Table 9**. **Figure 3** outlines the trajectory of a typical lung

cancer patient seen at the Jewish General Hospital. Refer to **Annex 1a** to view a more detailed clinical trajectory. Further explanation of time intervals is provided following Table 9.

Table 8: Patient characteristics

Variable	Type	Description
Sociodemographic		
Gender	Categorical	
Date of birth	Date	
Proximity to hospital	Categorical	<20km, 21-50km, 51-100km, >100 km
Patient status	Categorical	New patient, recurrent disease, second opinion
First contact with pulmonary	Categorical	Referral from GP or specialist, referral from Emergency Department, in-hospital consultation
Age at diagnosis	Continuous, Categorical (<65, 65-75 >75)	Calculated by subtracting date of birth from date of diagnosis
Diagnosis		
Diagnosis	Categorical	NSCLC or SCLC
Date of diagnosis	Date	Date of diagnostic procedure leading to diagnosis
NSCLC subtype	Categorical	Adenocarcinoma, squamous cell carcinoma, large cell BAC, mixed, undifferentiated
Stage	Categorical	NSCLC: I through IV SCLC: limited or extensive)
ECOG Performance Status (see note 1)	Categorical	0-3 Performance status was assessed at the patient's first consultation with a pulmonary physician
Smoking status	Categorical	Smoker (continues to smoke or quit less than one month) Ex-smoker Never-smoker (<100 cigarettes over lifetime) Smoking status was assessed at the patient's first consultation with a pulmonary physician

Treatment		
First treatment	Categorical	Chemotherapy, Radiation, Surgery, Supportive care
Treatment received	Categorical	Double agent chemotherapy, single agent chemotherapy, palliative radiation, definitive radiation, etc.

Table 9: Date and Time interval variables

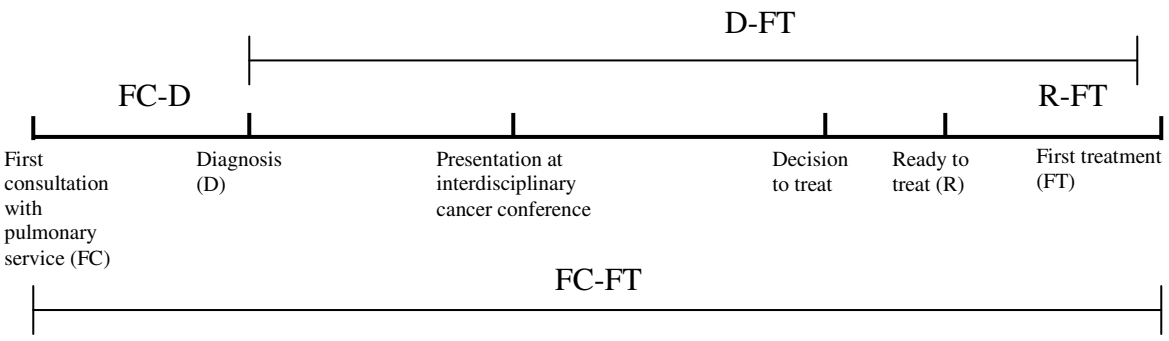
Variable	Type	Description
Date of first contact	Date	Date of first consultation with the pulmonary service, either in the pulmonary outpatient clinic, emergency department, or in-hospital
Date of first treatment	Date	Date of initiation of first treatment, either chemotherapy, surgery, or radiation. Patients receiving supportive care are not given a date of first treatment
Date of first meeting	Date	Date of the first discussion of the patient's case at the interdisciplinary cancer conference (ICC)
Decision to treat (DTT) (see note 2)	Date	Date of the decision to initiate treatment, made in the interdisciplinary cancer conference. If this date is unavailable, the date of the decision as noted by the treating physician in the patient's chart
Ready to treat (RTT) (see note 2)	Date	Date of the patient's readiness to begin treatment, after any planned delays are over
Date of death	Date	Date of death from cancer-related causes
FC-D	Continuous	Interval between first consult with pulmonary and diagnosis
D-FT	Continuous	Interval between diagnosis and initiation of first treatment
D-DT	Continuous	Interval between diagnosis and decision to treat.
R-FT	Continuous	Interval between ready to treat and first treatment
FC-FT	Continuous	Interval between first consultation with pulmonary service and initiation of first treatment.

Note 1: The Eastern Cooperative Oncology Group (ECOG) Performance Status is a scale that is used to assess how cancer affects the daily activities and function of the patient. It is assessed by the treating physician and is used to determine treatment options and prognosis (Oken et al., 1982).

Note 2: Decision to treat (DTT) is the date of the interdisciplinary meeting in which a consensus decision on treatment was made. If this date is unavailable, it is the date the primary physician noted the treatment decision in the patient's chart. For surgical patients not seen in the pulmonary outpatient clinic prior to surgery, DTT is the date of the first visit to the thoracic surgeon. In line with the Cancer Care Ontario reporting system, the Ready to Treat (RTT) date is generally the same as the DTT, except in cases where there is a planned treatment delay for a personal or medical reason, for instance for travel or while the patient is recovering from an invasive diagnostic procedure (Cancer Care Ontario, 2006).

The results for the following intervals are presented in Section 4.

Figure 3: Clinical trajectory of typical lung cancer patient



Interval FC-D: From first consultation to diagnosis

Patients may have their first consultation with the pulmonologist either in the outpatient clinic, emergency department, or in-hospital. The date of diagnosis was considered the date that the successful diagnostic procedure was performed, rather than the date it was reported.

Interval R-FT: From ready to treat to first treatment

This interval represents the period after all of the staging procedures had been completed, the decision to treat had been made, and any planned delays were completed. During this period the patient's treatment is scheduled (in consultation with the patient) and any pre-treatment investigations are completed.

Interval D-FT: From diagnosis to first treatment

This interval includes all staging procedures, treatment decisions, and treatment scheduling.

Interval FC-FT: From first consultation to first treatment

This interval includes the entire clinical trajectory of the patient at the treatment facility, referred to as the Hospital delay in other published reports (Myrdal et al., 2004; Devbhandari, Soon et al., 2007; Rolke et al., 2007). Patients were classified according to the first treatment they received in order to assess the waiting period for each particular service. In the small number of cases where the patient received multimodality first treatment, for example concurrent

chemotherapy/radiotherapy, the patient was classified according to the date that the first treatment that was initiated. The number of patients receiving multimodality therapy was too small to assess its effect independently.

The results for the following intervals are presented in Annex 2.

Interval D-ICC: From diagnosis to presentation at interdisciplinary cancer conference

Patient cases were presented at the weekly interdisciplinary cancer conference where each new patient's treatment plan was discussed. They may have been presented multiple times during the staging period in complicated cases. This interval measures the time from diagnosis to the initial presentation at the interdisciplinary cancer conference.

Interval ICC-DTT: From initial presentation at interdisciplinary cancer conference to decision to treat

Decision to Treat (DTT) was defined as the date of the interdisciplinary meeting in which a consensus decision on treatment was made. For most patients, the treating pulmonary oncologist was the pulmonologist and he was present at the meeting in which the DTT was made. In the few cases where the treatment decision was not made at the interdisciplinary meeting, it was the date the primary pulmonologist noted the treatment decision in the patient's chart. For surgical

patients not seen in the pulmonary outpatient clinic prior to surgery, DTT was the date of the first visit to the thoracic surgeon.

Interval DTT-R: From decision to treat to ready to treat

The RTT date was usually the same as the DTT date, except in cases where there was a planned treatment delay. Planned delays may have been for personal or medical reasons, for instance for travel or while the patient was recovering from an invasive diagnostic procedure(Cancer Care Ontario, 2006).

Tumor histology

Analysis of waiting time intervals was done separately for patients with SCLC and NSCLC. Given the distinct clinical features of NSCLC and SCLC and the varying responses to treatment based on histology, a suspicion of SCLC based on imaging or paraneoplastic features should prompt a more rapid workup and staging. Therefore it was necessary to examine clinical intervals for these groups of patients separately.

Comparison with existing guidelines

In order to compare the service at the JGH with Cancer Care Ontario priority guidelines (Cancer Care Ontario, 2006), patients were classified according to diagnosis and treatment modality. Patients were separated according to histologic type as described above. The radiation therapy was also classified into palliative and curative categories as per the CCO guidelines.

For instance, patients receiving chemotherapy were prioritized according to diagnosis; SCLC patients received a priority II classification whereas NSCLC patients received a priority III classification. Patients receiving radiotherapy were prioritized according to the type of treatment they received; patients receiving palliative radiotherapy received a priority II classification, whereas patients receiving radiotherapy that required complex planning (ie. radical or combined chemotherapy-radiation therapy) received a priority III classification.

Patients were classified according to the first treatment they received in order to assess the interval within which a particular service was provided. In the few cases where the patient received multimodality first treatment, for example concurrent chemo/radiotherapy, the patient was classified according to the date of the first treatment that was initiated. Therefore a patient who received chemotherapy prior to the initiation of their radiotherapy was classified as having chemotherapy as their first treatment.

GUIDELINES USED FOR COMPARISON

Pertinent sources were required in order to fulfil the objective of assessing waiting times achieved at the Jewish General Hospital against existing guidelines. As there are a number of recommendations in existence, and even more in development, the selection of appropriate guidelines required a judicious approach. Justification for the use of each set of guidelines is set out below.

British Thoracic Society guidelines

This set of guidelines was chosen because it is specific to the diagnosis, staging, and treatment experience of lung cancer patients. Furthermore, the BTS guidelines have been assessed by a number of other international studies(Salomaa et al., 2005; Riedel, Wang, McCormack, Toloza, Montana et al., 2006; Rolke et al., 2007; Gould et al., 2008), which provides a point of comparison in the scientific literature for our population relative to other lung cancer services around the world.

Cancer Care Ontario guidelines

This set of guidelines was chosen because it is the only comprehensive set of guidelines for cancer treatment in existence in Canada. It is the only set of guidelines that provides waiting time intervals for all treatment modalities, namely chemotherapy, radiation therapy, and surgery. Assessing the service at the Jewish General Hospital against guidelines developed in Canada is an essential exercise, given the growing movement towards establishing benchmarks for waiting times across the country, and also given their relevance to the healthcare experience in Canada. Since there are no comprehensive pan-Canadian guidelines in existence, Cancer Care Ontario's were chosen.

Pan-Canadian benchmarks for radiation therapy

This benchmark was chosen because it is the only one that has been adopted across the country. Although provinces and territories are moving towards

comprehensive waiting time guidelines, progress has been slow. To date, the only agreement has been on radiation therapy waiting times. Assessing the service at the JGH against this benchmark is valuable, as it situates the JGH's performance against what is expected across Canada.

The remaining recommendations discussed in Section 2, those of the Swedish Lung Cancer Study Group (SLCSG) and those of the Wait Time Alliance (WTA), were not chosen for comparison for several reasons. Firstly, the SLCSG guidelines were not as well studied as the BTS guidelines in the literature, and given that both the BTS and SLCSG guidelines were international guidelines specific to lung cancer, the latter were not chosen in order to avoid redundancy and because they were less well known than the BTS guidelines. The WTA guidelines were not chosen because they, like the pan-Canadian guidelines for radiation therapy, addressed waiting times for radiation therapy in Canada. Given that the pan-Canadian guidelines were adopted by all the provinces and thus represent an official commitment to waiting times, whereas the WTA guidelines do not, they were not chosen for comparative purposes. However, both the SLCSG and WTA guidelines are briefly discussed in Section 5.

FOCUS GROUP

A focus group composed of oncologists, pulmonary physicians, nurses, respiratory technicians, and other allied health professionals (n=26) was conducted on June 19, 2008. The interdisciplinary group was asked their opinion on appropriate waiting times for each of the intervals described above, as well as an

estimate of the length of each interval for patients seen at the JGH. They were then presented with the results of a preliminary analysis of each of the intervals. The group was also asked their opinion of the utility of existing benchmarks and guidelines in the clinical management of lung cancer patients. Results of the focus group discussion can be found in **Annex 2**.

STATISTICAL ANALYSIS

Means, medians and interquartile ranges (IQR) were used to summarize the patient characteristics and time interval variables. Patients achieving negative intervals, for example -5 days from first consultation to diagnosis, indicating a deviation from the trajectory outlined in Figure 1, were excluded from the calculation of mean and median waiting times for the interval in question. For each of the CCO and BTS comprehensive treatment guidelines, patients were assigned the binary variable (0=no, 1=yes) according to whether they were seen within the recommended waiting period for their treatment modality for the R-FT interval. Tests of independence were conducted to determine the level of contingency between BTS and CCO results. The characteristics of patients falling within and outside recommended guidelines were first examined in univariate analysis using Pearson χ^2 tests. Variables examined included age, histological diagnosis, stage, first consult, first treatment, and ECOG performance status. Multiple logistic regression analysis was used to identify waiting time predictors. Patients were dichotomized as above, according to whether they were seen within recommended guidelines. The same variables used in univariate analysis were used as covariates. A

p-value of <0.05 was considered significant. Odds ratios and 95% CI were calculated for each of the variables in the model. All analysis was performed using SPSS software.

SECTION 4:

ARTICLE:
WAITING TIMES IN THE CLINICAL TRAJECTORY OF PATIENTS WITH LUNG CANCER

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WAITING TIMES IN THE CLINICAL TRAJECTORY OF PATIENTS WITH LUNG CANCER

Abstract

Background: National waiting time guidelines for all types of cancer treatment have not yet been developed in Canada. This study was performed to compare the waiting times achieved at the Jewish General Hospital (JGH) in Montreal, Québec with existing guidelines from Ontario and Britain, and to determine the predictors of longer waiting times among lung cancer patients at the JGH.

Methods: 473 patients diagnosed with non-small cell lung cancer (NSCLC) and small cell lung cancer (SCLC) between 2004 and 2007 were included in the cohort. Patients were classified according to the date of first treatment (chemotherapy, radiotherapy, surgery, or supportive care). Waiting time distributions were calculated for patient subgroups. Waiting times were compared to existing guidelines from the British Thoracic Society and Cancer Care Ontario, as well as national radiotherapy benchmarks, in order to determine the proportion of patients meeting recommendations. Multiple logistic regression was used to determine factors associated with the waiting times of patients not meeting guidelines.

Results: Patients with SCLC had significantly shorter waiting times than patients with NSCLC. Adherence to guidelines varied substantially according to treatment and among the guidelines studied. Patients aged 65 to 75 were 1.9 times less likely than patients under 65 to meet BTS guidelines; patients with early stage disease, and patients with NSCLC were 1.9 and 2.1 times less likely, respectively, to meet the BTS guidelines for waiting time treatment.

Conclusions: A large proportion of patients undergoing chemotherapy and surgery are seen within recommended waiting times. There were weaknesses in achieving recommended waiting times for radiation therapy, as well as weaknesses in treating elderly patients, patients with early-stage disease and patients with good performance status within recommended guidelines. Any reductions in waiting times should be balanced against the need for thorough investigation and staging of each patient prior to initiating treatment.

Introduction

Lung cancer is the leading cause of cancer death in North American men and women, accounting for an estimated 23,300 incident cases and 19,900 deaths in Canada and 213,000 incident cases and 160,000 deaths in the United States in 2007 (American Cancer Society, 2007; Canadian Cancer Society, 2007). The management of the patient with suspected lung cancer requires staging by means of appropriate imaging and tissue confirmation, usually by bronchoscopy performed by a pulmonary specialist. Following this the patient is referred to a medical oncologist, radiation oncologist, specialized pulmonary oncologist or thoracic surgeon depending on the stage and perceived initial treatment. Given the poor prognosis and symptom burden of the disease, timely access to treatment and quality care are essential to the well being of these patients.

Treatment delays in all areas of the Canadian health care system have earned a great deal of public attention in recent years (Wait Time Alliance for Timely Access to Health Care, 2005; Canadian Institute for Health Information, 2006; Canadian Breast Cancer Network, 2008). Waiting time targets for cancer care are among the priority areas currently being developed by the federal and provincial governments (Sullivan, 2006a; Winget et al., 2007). However, there is a shortage of research, reporting, and collaboration on waiting times in cancer care (Sullivan, 2006a; Winget et al., 2007), which might provide guidance to provincial agencies in establishing standards for medically acceptable treatment times. Consequently, waiting time guidelines are based on management targets rather than on clinical evidence (Cancer Care Ontario, 2006; Schaafsma, 2006; Sullivan, 2006a), and

provincial reporting is un-standardized and inconsistent (Canadian Institute for Health Information, 2006).

Relatively little is known about waiting times for the treatment of lung cancer in Canada, particularly among patients with advanced stages of disease who represent the majority of cases. Although efforts to reduce waiting times are being pursued irrespective of cancer type, the impact of waiting time reduction in lung cancer will be especially important given the rapid progression of the disease and the role of timely treatment on symptom palliation and tumor control (Billing & Wells, 1996; O'Rourke & Edwards, 2000; Bozcuk & Martin, 2001; Jensen et al., 2002; Koyi et al., 2002b; Moody et al., 2004; Myrdal et al., 2004).

The use of interdisciplinary teams, comprised of the previously mentioned specialists along with other allied health professionals, has been proposed as a strategy to reduce waiting times. Such teams in the management of breast cancer patients have led to improved outcomes in treatment delays and patient satisfaction (Gabel, Hilton, & Nathanson, 1997), and there is some evidence to suggest that interdisciplinary management of lung cancer patients is equally beneficial (Deegan et al., 1998; Conron et al., 2007; Devbhandari, Bittar et al., 2007).

The interdisciplinary pulmonary oncology program at the Jewish General Hospital incorporates professionals from oncology, pulmonary medicine, nursing, thoracic surgery, pathology, radiology, radiation therapy, dietetics, psycho-oncology and physiotherapy into deciding the care plan for each newly diagnosed lung cancer patient. It is centered on a weekly interdisciplinary meeting, wherein all the aforementioned professionals discuss new and ongoing cases, and the care plan is

decided by consensus. Each patient has a primary pulmonary oncologist and a nurse assigned to their care, and all major treatment decisions are discussed in the weekly interdisciplinary meeting. The pulmonary oncology program maintains an electronic database consisting of a demographic, clinical and pathological profile of each patient.

The objectives of this study were: (1) to audit the performance of the interdisciplinary pulmonary oncology service at the Jewish General Hospital with respect to waiting times for key intervals and subgroups of patients; (2) to compare waiting times with existing guidelines; and (3) to determine those factors associated with longer waiting times in this population.

Since comprehensive cancer care waiting time guidelines remain in the development stage in the majority of provinces, the guidelines used in this analysis to evaluate the performance of the pulmonary oncology program were those established by the British Thoracic Society (BTS), Cancer Care Ontario (CCO), and pan-Canadian guidelines for radiation oncology (British Thoracic Society, 1998; Cancer Care Ontario, 2006; Wait Time Alliance for Timely Access to Health Care, 2007).

The recommendations of the British Thoracic Society were published in 1998 in order to provide guidance to respiratory physicians in the management of lung cancer. The recommendations are based on “considered clinical opinion” (British Thoracic Society, 1998) and, where available, published scientific evidence. The recommendations of the BTS with respect to waiting times have been cited in a

number of international studies (Salomaa et al., 2005; Riedel, Wang, McCormack, Toloza, Montana et al., 2006; Rolke et al., 2007; Gould et al., 2008).

Cancer Care Ontario presented its target waiting time recommendations in 2006. The recommendations cover all tumor types and are prioritized based on the judgment of the physician. Priority is determined by the urgency of the case and the aggressiveness of the tumor (Cancer Care Ontario, 2006). The notations (II) and (III) refer to priority levels, with level II being more urgent than level III. Cancer Care Ontario recommends that ninety percent of patients be seen within these time intervals.

In 2005, the First Ministers of Canada agreed to a common goal of treating radiation patients within 4 weeks of being ready to treat (Ontario Ministry of Health and Long-Term Care, 2005). This is the only common benchmark that has been established for cancer care in Canada to date; however, progress towards this benchmark is being reported by nearly all provinces and territories (Canadian Institute for Health Information, 2007).

Methods

Inclusion and exclusion criteria

The cohort consisted of patients with primary lung cancer seen by the interdisciplinary team at the Jewish General Hospital (JGH) in Montreal, Québec, between January 1, 2004 and December 31, 2007. Patients without a confirmed histological diagnosis of lung cancer, those with a diagnosis of lung cancer other than non-small cell lung cancer (NSCLC) or small cell lung cancer (SCLC) were

excluded from analysis. Similarly, patients transferred to the JGH after having begun treatment at another facility, and those who were seen in second opinion and then returned to their referring institution were excluded from the study. These patients were excluded in order to maintain the focus on the provision of services within the pulmonary oncology program at the JGH.

Data Collection

All of the data used for this retrospective study was extracted from the pulmonary oncology electronic database. Institutional approval was granted by the Research Ethics Committee at the Jewish General Hospital for the extraction of data from the study period.

Proximity to hospital was calculated based on each patient's borough of residence, as declared on his or her hospital card. An approximate distance from the patient's place of residence was calculated and classified as within 20 km of the hospital, 21-50 km from the hospital, 51-100 km from the hospital, or greater than 100 km from the hospital.

Staging of patients was achieved using imaging (CT, PET scans) presented at the interdisciplinary cancer conference, and determined according to the current staging classification (Mountain, 1997).

Comparison with existing guidelines

Cancer Care Ontario recommends that priority levels for urgency of treatment are left to the judgment of the physician (Cancer Care Ontario, 2006). In

this study, patients were categorized as priority II if they were diagnosed as SCLC or if they required aggressive palliative radiation. Patients were assigned to priority III if they were diagnosed as NSCLC or if they required curative radiation involving extensive planning.

Time Intervals

Time intervals examined in this study were chosen in order to create indicators comparable to the guidelines being used. BTS and CCO guidelines recommend intervals for the period from referral to a specialist to first specialist consultation, as well as for the period from ready to treat to first treatment. As the systematic collection of referral data at the JGH began only in January 2006, this interval was not available for analysis for all study patients. Therefore, the first time point in this study was the first consultation with a pulmonary specialist. This study intended to examine the provision of pulmonary oncology services at the Jewish General Hospital and therefore did not consider earlier delays such as time from first symptom to first medical consultation. **Figure 1** illustrates the clinical intervals in the treatment trajectory.

Interval FC-D: From first consultation to diagnosis

Patients may have their first consultation with the pulmonologist either in the outpatient clinic, emergency department, or in-hospital. The date of diagnosis was considered the date that the successful diagnostic procedure was performed, rather than the date it was reported.

Interval R-FT: From ready to treat to first treatment

This interval represents the period after all of the staging procedures had been completed, the decision to treat had been made, and any planned delays were completed. During this period the patient's treatment is scheduled (in consultation with the patient) and any pre-treatment investigations are completed.

Interval D-FT: From diagnosis to first treatment

This interval includes all staging procedures, treatment decisions, and treatment scheduling.

Interval FC-FT: From first consultation to first treatment

This interval includes the entire clinical trajectory of the patient at the treatment facility, referred to as the Hospital delay in other published reports (Myrdal et al., 2004; Devbhandari, Soon et al., 2007; Rolke et al., 2007). Patients were classified according to the first treatment they received in order to assess the waiting period for each particular service. In the small number of cases where the patient received multimodality first treatment, for example concurrent chemotherapy/radiotherapy, the patient was classified according to the date that the first treatment that was initiated. The number of patients receiving multimodality therapy was too small to assess its effect independently.

Tumor histology

Given the distinct clinical features of NSCLC and SCLC and the varying responses to treatment based on histology, the analysis of waiting time intervals was done separately for patients with SCLC and NSCLC.

Statistical analysis

Means, medians and interquartile ranges (IQR) were used to summarize the patient characteristics and time interval variables. Patients achieving negative intervals, for example -5 days from first consultation to diagnosis, indicating a deviation from the trajectory outlined in Figure 1, were excluded from the calculation of mean and median waiting times for the interval in question. For each of the CCO and BTS comprehensive treatment guidelines, patients were assigned the binary variable (0=no, 1=yes) according to whether they were seen within the recommended waiting period for their treatment modality for the R-FT interval. Tests of independence were conducted to determine the level of contingency between BTS and CCO results. The characteristics of patients falling within and outside recommended guidelines were first examined in univariate analysis using Pearson χ^2 tests. Variables examined included age, histological diagnosis, stage, first consult, first treatment, and ECOG performance status. Multiple logistic regression analysis was used to identify waiting time predictors. Patients were dichotomized as above, according to whether they were seen within recommended guidelines. The same variables used in univariate analysis were used as covariates. A p-value of <0.05 was considered significant. Odds ratios and 95% CI were

calculated for each of the variables in the model. All analysis was performed using SPSS software.

Results

Patient characteristics

Five hundred and fifty-eight patients with a diagnosis of primary NSCLC or SCLC were seen by the pulmonary service at the Jewish General Hospital between January 1, 2004 and December 31, 2007. Eighty-five patients were excluded from the analysis. Fifty-six patients were excluded because they transferred their treatment to the JGH after having begun at another facility, and another 26 patients were excluded because they returned to their referring facility after seeking second opinion at the JGH. Three patients were excluded because their date of diagnosis occurred after closure of the study.

Table 1 shows the characteristics of the 473 patients included in the study. The mean age at diagnosis was 67(±11) years (range 31 to 94 years). There were no significant differences in the demographic features of SCLC patients as compared to NSCLC patients. Treatment information was available for 468 (99%) patients; of those, four patients refused treatment and follow-up, and three others died prior to receiving treatment.

Table 2 shows the treatments received by the remaining 461 patients. 401 (87%) patients received active treatment. Two hundred sixty-four (85%) patients with advanced stage (NSCLC Stage IIIB+/IV and SCLC EXT) received active treatment.

Waiting time intervals

Over the course of the study period (2004-2007) there was no significant change from year to year in the waiting time for each of the treatment intervals. As there were no significant differences over time in the number of patients consulted, proximity to hospital, length of waiting intervals, place of workup, and histology, the results from all years of the study were combined for the following analysis.

One-third (33%) of surgical patients were initially investigated by a thoracic surgeon, with a diagnosis made at the time of resection. These individuals were referred to the pulmonary oncology team following diagnosis, and therefore had a clinical trajectory that varied from most other patients. They were excluded from the calculation of all of the intervals except the interval R-FT.

As detailed below, the number of cases available for the analysis of waiting times varied between 297 and 371.

Interval FC-D: From first consultation to diagnosis

Of the 461 patients, 38 surgical patients referred to the pulmonary oncology service after their procedure, and 68 patients with a tissue diagnosis prior to their first visit with a JGH pulmonologist were excluded for having a negative interval. An additional 15 patients were excluded for missing data. The median waiting time from first consultation to diagnosis for the remaining 340 patients was 14 days (IQR 6-37 days). Eighty percent of patients had a diagnosis within six weeks of their first consultation with a pulmonologist. For patients with NSCLC (n=306) the median

time was 14 days (IQR 6-37 days) and for patients with SCLC (n=34) the median time was 8.5 days (IQR 4-19.5 days).

Patients referred by a family physician or specialist (n=227) waited a median of 20 days (IQR 7-45 days) for their diagnosis, whereas patients referred from the Emergency department (n=24) waited a median of 12 days (IQR 7-45 days), and patients seen in-hospital (n=88) waited a median of 6 days (IQR 2-11 days). Patients with advanced stage disease were significantly more likely to be first seen in consultation in-hospital ($p<0.000$).

Interval R-FT: From ready to treat to first treatment

Of the 461 patients, those receiving supportive care (n=60) were excluded from the calculation means and medians for this interval. A further 30 patients were excluded for missing data. The overall median time from ready to treat to initiation of treatment for all patients receiving active treatment (n=371) was 9 days (IQR 6-15). Two hundred sixty-seven (72%) patients were treated within 14 days of being ready to treat and 356 (96%) were treated within 30 days. Patients with NSCLC had a longer median waiting time of 9 (IQR 6-16) days (n=331) than patients with SCLC with a median waiting time of 6 (IQR 2-7) days (n=40). There was a significant difference in the mean R-FT intervals of patients receiving different treatment modalities. Patients receiving chemotherapy (n=171) had a significantly shorter mean waiting time at 10 days (95% CI 9-11 days) than patients receiving radiotherapy (n=96) with a mean of 14 days (95% CI 11-14 days) ($p=0.003$) and

patients receiving surgery (n=104) with a mean of 13 days (95% CI 11-15 days) (p=0.033).

Figure 2 demonstrates the median and IQR of Intervals FC-D and R-FT.

Figure 3 demonstrates the median and IQR of Intervals D-FT and FC-FT.

Interval D-FT: Diagnosis to first treatment

Of the 461 patients, those receiving supportive care (n=60), those with no tissue diagnosis prior to surgery (n=92) and those treated prior to a confirmation of their diagnosis (n=12) were excluded from analysis for reasons described previously. The overall median waiting time from diagnosis to first treatment (n=297) was 25 days (IQR 14-44 days). For patients receiving chemotherapy (n=175), the median waiting time was 25 days (IQR 14-42 days). For patients receiving radiation therapy (n=93), the median waiting time was 24 days (IQR 12.5-39.5 days). For patients receiving surgery (n=29), the median waiting time was 42 days (IQR 15-63 days).

For patients with NSCLC (n=258), the overall median waiting time for interval D-FT was 27 days (IQR 15-48 days). Patients with SCLC (n=39) waited a median of 12.5 days (IQR 9-24.5 days) for the D-FT interval.

Patients first seen in-hospital (n=61) had a shorter waiting time for D-FT, a median of 22 days (IQR 10.5-29 days), as compared to patients referred by their family physician or specialist (n=213), at 28 days (IQR 15-51 days). Patients seen in the Emergency department (n=20) waited a median of 26 days (IQR 14-39) for the D-FT interval.

Interval FC-FT: First consultation to first treatment

Of the 461 patients, patients receiving supportive care (n=60) and surgical patients not seen by the pulmonary service prior to their surgery (n=32) were excluded from this analysis. A further 12 patients were excluded for missing data. The overall median waiting time between first consultation to first treatment for all patients (n=357) was 30 days (IQR 20-57 days). Among patients receiving chemotherapy (n=172), the median waiting time was 29 days (IQR 20-49.5 days). Among patients receiving radiotherapy (n=102), the median waiting time was 31 days (IQR 19-56 days). Among patients receiving surgery (n=83), the median waiting time was 42 days (IQR 20-70 days).

Patients with NSCLC (n=314) waited a median of 33 days (IQR 21-61.5 days) for the FC-FT interval, whereas patients with SCLC (n=43) waited a median of 14 days (IQR 7-34 days).

There was no significant difference in the mean waiting times for FC-FT among patients receiving chemotherapy, radiotherapy, or surgery. There was a statistically significant ($p<0.05$) difference in the mean waiting times for FC-FT for patients seen in-hospital as compared to patients referred by a family doctor/specialist. Mean waiting times for patients seen in hospital (n=72) were 28 days (median 23 days IQR 10-32 days) versus 48 days (median 30 days IQR 21-63 days) for patients referred by a family doctor or specialist (n=262).

Adherence to waiting time guidelines

The proportion of patients seen within target waiting times for the R-FT interval set by Cancer Care Ontario, the British Thoracic Society, and the pan-Canadian benchmarks for radiation therapy are shown in **Table 3**. The percentage of patients adhering to waiting time guidelines varied by treatment modality and according to the criteria of each organization.

Patients receiving chemotherapy as their first treatment were classified according to their histological diagnosis; SCLC patients were priority II and NSCLC patients were priority III. Eighty-one percent of priority II patients received chemotherapy treatment within the 7-day period recommended by Cancer Care Ontario, with a median waiting time of 5 days. Seventy-one percent of priority III patients received treatment within the 14-day period recommended by CCO, with a median wait of 9 days.

Patients receiving radiation therapy as their first treatment were classified according to their disease stage. Patients receiving urgent palliative treatment were classified as priority II whereas patients receiving curative radiation were classified as priority III. Thirty-two percent of priority II patients were treated within the recommended waiting time of 7 days, with a median waiting time of 9 days. Thirty-three percent of priority III patients were treated within the 14-day period recommended by CCO, with a median wait of 22 days.

Patients receiving surgery were not classified separately according to urgency, and therefore all patients were considered priority III. Ninety-one percent

of patients were seen within the recommended 28-day period, with a median wait of 10 days.

Patients were not classified according to a priority system for comparison with British Thoracic Society guidelines. Sixty-nine percent of patients receiving chemotherapy as their first treatment were seen within the 7 working days recommended by the BTS, with a median wait of 8 days. Seventy-three percent of patients receiving palliative radiotherapy were seen within the 14-day period recommended by BTS, and seventy-one percent of patients receiving radical radiotherapy were seen within the recommended 28 days.

Ninety percent of patients receiving radiation therapy were seen within the pan-Canadian benchmark of 28 days.

Predictors of waiting times

Patients were classified according to whether the length of their wait in Interval R-FT was within the recommended guidelines of the BTS and CCO. The test for independence revealed a contingency of 74%. Only the comprehensive guidelines were examined in univariate and multiple logistic regression analysis in order to assess comparability of guidelines and to assess the role of treatment type on the adherence to guidelines. Since the radiotherapy benchmark focuses on a single treatment modality, it was not included in this analysis.

In univariate analysis, the variables age, stage, ECOG PS, first consult, first treatment and tumor histology were considered. Of those, age, stage, and first treatment were significantly associated with adherence to guidelines ($p<0.05$). In

multiple logistic regression analysis, those same variables were considered as covariates. **Table 4** outlines the OR (95% CI) for the variables in the model. The goodness-of-fit of the model was satisfactory ($p_{Hosmer\text{-}Lemeshow} = 0.98$). Patients with early stage disease and patients with better performance status were 1.9 and 2.1 times less likely, respectively, to meet the BTS waiting time guidelines for treatment. Patients aged 65-75 were 1.9 times less likely to meet BTS guidelines than patients under 65. Patients with SCLC were 2.9 times more likely than patients with NSCLC to meet BTS guidelines. Patients receiving chemotherapy as a first treatment were 4.3 times less likely than patients receiving surgery to meet BTS guidelines. Patients receiving radiotherapy as first treatment were 6.2 times less likely than patients receiving surgery to meet the BTS guidelines.

Discussion

Waiting times for treatment are an indicator of the quality and continuity of health care services (Schaafsma, 2006). Establishing and monitoring benchmarks for waiting times are important steps in ensuring that cancer patients receive timely and high-quality care. Although there is debate as to whether delays in treatment have any deleterious effects on survival, delays in treatment have been shown to have adverse effects on the psychological well-being of cancer patients (Montazeri et al., 1998; Simunovic et al., 2001; Ristvedt & Trinkaus, 2005b; Lyckholm, 2006).

This study demonstrated that the interdisciplinary pulmonary oncology service at the Jewish General Hospital actively treated a large proportion of its patients, including those with advanced lung cancer, within the waiting times

recommended by various agencies. Eighty-seven percent of JGH patients received active treatment, comparable to the 70-87% rate reported by other interdisciplinary teams (Deegan et al., 1998; Fleissig et al., 2006; Newman et al., 2006). Furthermore, eighty-four percent of advanced stage patients received active treatment. Patients with SCLC had significantly shorter waiting times as compared to patients with NSCLC, as did patients first consulted in-hospital compared to those first consulted in the outpatient clinic.

There are two main organizational elements that may explain the success rate of the pulmonary oncology program: the weekly interdisciplinary meeting and the patient management model. Although this study was not designed to measure the effect of interdisciplinary patient management on waiting times, the clinical context in which patients are seen should be noted. The weekly interdisciplinary meeting allows team members to review and discuss all new and ongoing cases, which facilitates communication and may speed the referral process for diagnostic and treatment procedures. Furthermore, discussion of challenging cases at a weekly meeting may lead to a faster diagnosis or treatment plan decision compared to sending the patient for a second opinion. The patient management model ensures that a nurse-pulmonary oncologist team is responsible for the care of each patient. A nurse pivot is assigned to navigate each patient through the diagnostic and treatment process. Having a primary point of contact and a patient resource may reduce delays associated with patient follow-up and scheduling.

Among the most commonly studied and most widely reported intervals is the interval from RTT to first treatment. This is an interval that should be easily

comparable across treatment facilities and provinces, since at this stage in the care trajectory all diagnostic tests have been completed and there should be minimal delays in initiating treatment. Delays at this stage would include managerial matters such as scheduling operating room time, planning for radiation therapy, scheduling chemotherapy or palliative radiation, or repeating outdated CT scans. Palliative radiation and chemotherapy treatment require less planning and thus entail fewer administrative delays than more complex curative procedures.

In the absence of comprehensive national recommendations for waiting times in cancer care, existing guidelines and benchmarks for RTT to treatment were achievable in the lung cancer population treated at the Jewish General Hospital. The interdisciplinary pulmonary service was particularly successful in meeting the Cancer Care Ontario guidelines for chemotherapy and surgery. The weakness of the interdisciplinary pulmonary service in relation to CCO guidelines was in the treatment interval for radiotherapy patients. Less than 40% of radiotherapy patients started their treatment within the recommended waiting time. This may be a result of the high demand for radiotherapy services across many tumor sites, whereas the provision of chemotherapy and surgical services are more specialized according to diagnosis (Hunter, 2003; Rolke et al., 2007). High demand for radiotherapy services and consequent delays in treatment is not a recent problem in Québec. In fact, lengthy waiting times for radiation therapy were responsible for cancer patients in the Montreal region being transferred to facilities in the United States in the late 1990s (Spurgeon, 1999).

In spite of its performance against the CCO guidelines, when compared

against the pan-Canadian benchmarks for radiotherapy, the interdisciplinary pulmonary service treats 90% of patients within the 28-day target. This discrepancy in the standards set for radiation treatment suggests that more work needs to be done to harmonize waiting time benchmarks in Canada. As more information on waiting times becomes available, more accurate and pragmatic benchmarks can be established (Wait Time Alliance for Timely Access to Health Care, 2007).

The British Thoracic Society guidelines were a valuable assessment tool, as they are specific to the lung cancer population and they have been referenced in a variety of studies assessing lung cancer services. The interdisciplinary service performed well according to the BTS guidelines, although the 7 working day timeline for chemotherapy was the least successful of all of the treatment modalities in terms of percentage of patients treated within the target time.

Although eighty-two percent of our patients over 65 years of age received active treatment, they were almost half as likely to be seen within the BTS guidelines than patients under 65. The results for patients over age 75 were not significant. There was no significant difference in performance status among patients over 65 as compared to their younger counterparts, nor was there a significant difference in treatment modalities for elderly patients. Consequently, the significant difference in waiting time and the significant number of elderly patients receiving supportive care points to a distressing tendency in the JGH's pulmonary oncology service. The option not to undergo cytotoxic or physically demanding treatment may be a personal choice more often taken by elderly patients, but a bias toward longer delays cannot be excluded in our population.

There is limited evidence in the literature to suggest that elderly patients routinely wait longer for treatment. However, it is well documented that elderly patients are not well represented in clinical trials and are more likely to receive supportive care only (Gridelli, 2007). There is some evidence to suggest that treatment and referral patterns also differ for elderly patients (Townsley, 2003). As cancer becomes increasingly a disease of the elderly, ensuring that older patients receive timely treatment is essential.

There may, however, be legitimate reasons for the longer delay for elderly patients. Hesitancy on the part of the physician, the patient, or the patient's family may delay the commencement of therapy ("Focus group," June 19, 2008). The risks to an older patient, notably in terms of toxicity, may be perceived to be greater, even in spite of a performance status that indicates suitability for treatment. A comprehensive geriatric assessment may provide a more nuanced picture of an elderly patient's ability to tolerate treatment (Extermann & Hurria, 2007). It takes into account other factors such as cognition, social support, and nutritional status, that traditional measures of functional status do not. Although this may add to the waiting time for elderly patients prior to their RTT date, it may avoid undue delays once a treatment decision has been made.

The shorter delay for patients with more advanced stage and poorer performance status is consistent with earlier studies (Salomaa et al., 2005; Gould et al., 2008). It was noted previously that patients with advanced stage are more likely to be symptomatic, therefore the need for rapid symptom palliation is greater. Furthermore, patients with earlier stage disease often have treatments that require

more complex planning, or are more difficult to stage, thus adding to the waiting time. Curative radiotherapy, for example, requires more complex planning than palliative radiotherapy, and surgical consultations prior to resection may lead to longer delays as compared to palliative radiotherapy or chemotherapy (Johnston et al., 2004; Salomaa et al., 2005).

The shorter waiting time for the R-FT interval for patients with SCLC is also consistent with previous studies (Salomaa et al., 2005; Rolke et al., 2007). Given the responsiveness of SCLC to chemotherapy, it is standard practice to initiate SCLC as soon as possible (Rolke et al., 2007). Furthermore, NSCLC patients are more likely to be referred to surgery or radiation therapy as a first-line treatment, which requires more planning and thus entails more administrative delays than administering chemotherapy to patients with extensive SCLC (Rolke et al., 2007).

However, changes to the treatment standard for limited stage SCLC now require that these patients receive concurrent chemotherapy and radiotherapy (Socinski, 2007). This may entail delays in initiating chemotherapy, as radiation requires more complex planning and scheduling. Given the importance of early initiation of chemotherapy and radiotherapy for the treatment of SCLC, this change in standard practice must be carefully monitored. Although early concurrent chemotherapy and radiation therapy (within the first 30 days of initiation of chemotherapy) is the treatment of choice for limited stage SCLC and stage IIIA NSCLC (Curran, 2006; Urbanic & Blackstock, 2006; Socinski, 2007), less than 45% of patients (9 of 22) received early radiation. This suggests a lack of capacity to manage the demand for radiation therapy among lung cancer patients, and may be

resulting in suboptimal treatment among early-stage patients.

Limitations

Both the BTS and CCO guidelines contain waiting time recommendations for the interval from family doctor referral to first consultation with a specialist. This information was not available for the study period. Until recently, referral data was not systematically collected in the department. However, as a result of this audit, more detailed information on referral path and dates are being collected and stored in our database. Better data reporting mechanisms are being implemented within the pulmonary oncology program that will facilitate performance audits. Information that is of particular interest for future prospective audits includes better data on the referral source and length of time from referral to first visit, the number of diagnostic procedures completed before tissue diagnosis is achieved, and the number of clinical studies enrolled in by each patient.

The retrospective design of this study did not provide details on the workup of patients prior to their diagnosis or treatment. For instance, a patient with suspected SCLC ultimately diagnosed with NSCLC may have had a shorter clinical trajectory given the higher priority for patients with SCLC. More detailed information on the suspected diagnosis or the planned treatment prior to staging would provide a more accurate picture of waiting times, given the changes to treatment plans over the course of the workup. A prospective approach would permit the collection and evaluation of this data.

This study was not designed to assess the role that the interdisciplinary team

played in the management of waiting times. However, the interdisciplinary team at the JGH may have played an important role in reducing referral delays among specialists, improving communication among specialists and between team members and patients, and in creating a treatment plan. Indeed, other groups have reported that interdisciplinary team management leads to improved communication and reduces referral delays among specialists (Deegan et al., 1998; Fleissig et al., 2006; Newman et al., 2006). The maintenance of a database has also been integral to our clinical service as it enables review for quality control purposes.

An important limitation of this study was in attempting to harmonize the experience of over 400 patients. Not all patients follow the same clinical trajectory, and attempting to create indicators that are representative of a large heterogeneous group was challenging. Consequently, the assessment of treatment intervals was complex. There were numerous patients with negative intervals that were excluded from analyses since their trajectory did not match the standard clinical picture. This reinforces the utility of the ready-to-treat to treatment interval, since at that point all investigations have been completed and the patient is simply waiting for treatment.

Finally, since this study examines the quality of clinical services at a single centre, its external validity is limited. However, the time intervals employed for the analysis, particularly the R-FT interval, were designed to be comparable to provincial, national and international guidelines. As such, the waiting times achieved at the JGH can be compared to the waiting times at any other hospital in Quebec or across Canada, provided that the other sites are using the same reporting criteria. Moreover, this study may prove useful to other sites by describing a model

of interdisciplinary management, and by highlighting both the successes and areas of improvement for the pulmonary oncology program.

Recommendations

Efforts must be made to ensure that patients receiving concurrent Day 1 chemotherapy and radiation therapy are planned and scheduled with minimal delays. Given the impact of early initiation of concurrent treatment on survival (Socinski, 2007), the timing of treatment is of utmost importance. Given the discrepancy in median waiting times for chemotherapy versus radiotherapy, the limiting factor for concurrent treatment is radiation therapy planning. Ensuring timely treatment for these patients may require additional resources both in terms of equipment and health professionals.

Elderly patients must receive the same timely treatment as their younger counterparts. Given that the waiting time experience of elderly patients cannot be explained by performance status or treatment modality, it is essential to address the treatment time discrepancy among elderly patients. It may be that there is some hesitancy on the part of physicians to offer treatment to elderly patients, even in spite of good performance status. A comprehensive geriatric assessment (CGA) may provide a more nuanced picture of an elderly patient's ability to tolerate treatment (Extermann & Hurria, 2007). Although this may add to the waiting time for elderly patients prior to their RTT date, it may avoid undue delays once a treatment decision has been made. This practice has already been adopted by the pulmonary oncology service at the JGH.

The guidelines examined in this study consider only the earliest and latest stages of a patient's trajectory, recommending waiting times from referral to a specialist to diagnosis, and then from RTT to treatment. However, considerable attention should be paid to the period between diagnosis and RTT. This period is composed of elements including staging, scheduling, and treatment planning. Considering the importance of these elements to a patient's overall clinical trajectory, efforts should be made to reduce this interval, even in (or perhaps because of) the absence of specific waiting time recommendations.

The value of consistent, standardized waiting time indicators and guidelines for cancer treatment in Canada cannot be overemphasized. Although there are challenges inherent in the collection and analysis of waiting times data across the country, consistent indicators and goals are a necessity. Collaboration of provincial cancer agencies and other groups may facilitate the development of useful waiting time indicators and benchmarks, which will provide regional cancer centres and smaller institutions with a single standard against which to measure the quality of their care.

Conclusions

The assessment of the clinical performance of the interdisciplinary pulmonary oncology program at the Jewish General Hospital identified several strengths and weaknesses. A large proportion of patients undergoing chemotherapy and surgery are seen within recommended waiting times. There were weaknesses in achieving recommended waiting times for radiation therapy, as well as weaknesses

in treating elderly patients, patients with early-stage disease and patients with good performance status within recommended guidelines. Future audits should be prospective and provide more detailed information on referral patterns and diagnostic testing. Any reductions in waiting times should be balanced against the need for thorough investigation and staging of each patient prior to initiating treatment.

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Figure 1: Clinical intervals in the treatment trajectory of lung cancer patients

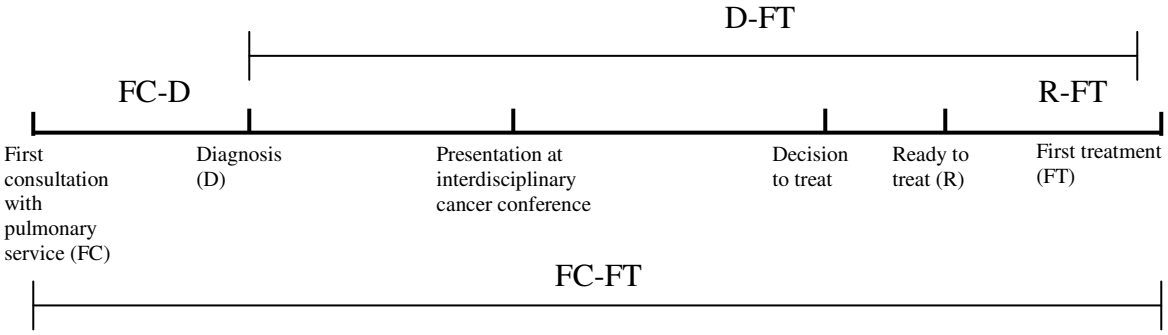


Table 1: Patient characteristics

	Frequency (N=473)	Percent (%)
Year of Diagnosis		
2004	104	22
2005	141	30
2006	129	27
2007	99	21
Male	245	52
Female	228	48
Age (years)		
< 65	193	42
65-75	155	34
> 75	113	24
Smoking Status		
Smoker	162	50
Ex-smoker	229	36
Never-smoker	63	14
Missing data	19	
Diagnosis		
NSCLC	427	90
SCLC	46	10
NSCLC Subtype		
Adenocarcinoma	226	53
Squamous carcinoma	72	17
Undifferentiated	53	12
Bronchoalveolar carcinoma	41	10
Large cell	32	7
Mixed	3	1
NSCLC Stage		
IA-IB	71	17
IIA-IIB	32	7
IIIA	36	9
IIIB	48	11
IIIB pleural effusion	33	8
IV	203	48
SCLC Stage		
LTD	8	19
EXT	35	81
Missing data	7	
Proximity to hospital		
Within 20km	379	80
21-50km	70	15
51-100km	15	3
> 100km	9	2
First consult with pulmonary physician		
Outpatient referral from GP or specialist	336	74
In-patient consult	92	20
Referral from Emergency Department	25	5
Missing data	8	

Table 2: First Treatment

	Frequency (n=461)	
	NSCLC	**SCLC**
Treatment priority level		
II	**80**	**43**
III	**278**	**0**
Chemotherapy	**111**	**37**
Double Agent	*74*	*37*
Single Agent	*22*	*0*
TKI	*15*	*0*
Radiotherapy	**94**	**4**
Palliative	*80*	*4*
Curative	*14*	
Concurrent chemo-radiotherapy	**20**	**2**
Sequential chemo-radiotherapy	**12**	**0**
Thoracic surgery	**114**	**0**
Other surgery (resection of brain metastasis, stabilization of spine, etc.)	**7**	**0**
Supportive care	**59**	**1**

Table 3: Adherence to CCO, BTS and pan-Canadian waiting time guidelines

Interval R-FT (Ready to treat to first treatment) (n=371)	Target	JGH Median (days)	JGH Mean (days)	% JGH patients within target (n)
	Cancer Care Ontario (days)			
Chemotherapy				
Priority II	7	5	5	81 (36)
Priority III	14	9	11	71 (129)
Radiation therapy				
Priority II	7	9	11.5	32 (81)
Priority III	14	22	25	33 (22)
Surgery				
Priority II	14			
Priority III	28	10	14	91 (100)
	British Thoracic Society (days)			
Chemotherapy	7 working	8	9.5	69 (165)
Radiation therapy				
Palliative	14	9	11.5	73 (81)
Radical	28	22	25	71 (22)
Surgery	28	10	14	91 (100)
	pan-Canadian Benchmarks for Radiation Therapy (days)			
	28	11.5	14	90 (n=96)

Table 4: Crude and adjusted Odds Ratios of being seen within BTS-recommended waiting time intervals

N= 371	OR_{crude} (95% CI)	$OR_{ajusted}$ (95% CI)
Age		
<65	1.00*	1.00*
65-75	0.67 (0.40-1.11)	0.53 (0.30-0.94)
>75	0.54 (0.30-0.97)	0.55 (0.28-1.10)
Stage		
IA-IIIA, LTD	0.37 (0.22-0.60)	0.52 (0.29-0.95)
IIIB-IV, EXT	1.00*	1.00*
Diagnosis		
SCLC	1.83 (0.82-4.20)	2.95 (1.20-7.28)
NSCLC	1.00*	1.00*
ECOG Performance Status		
0-1	1.33 (0.74-2.37)	0.48 (0.25-0.91)
2-3	1.00*	1.00*
First consult		
Pulmonary oncology clinic	1.14 (0.63-2.06)	0.97 (0.49-1.95)
Emergency Department	0.77 (0.28-2.17)	0.88 (0.27-2.91)
In-hospital	1.00*	1.00*
First treatment		
Chemotherapy	0.20 (0.09-0.41)	0.23 (0.10-0.56)
Radiation	0.14 (0.07-0.30)	0.16 (0.07-0.39)
Surgery	1.00*	1.00*

* reference category

Figure 2. Intervals FC-D and R-FT

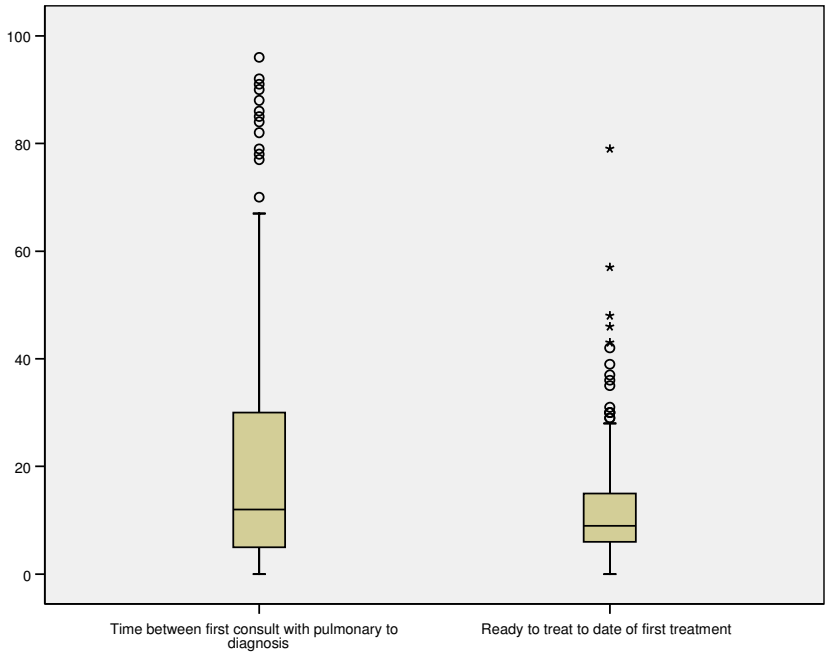
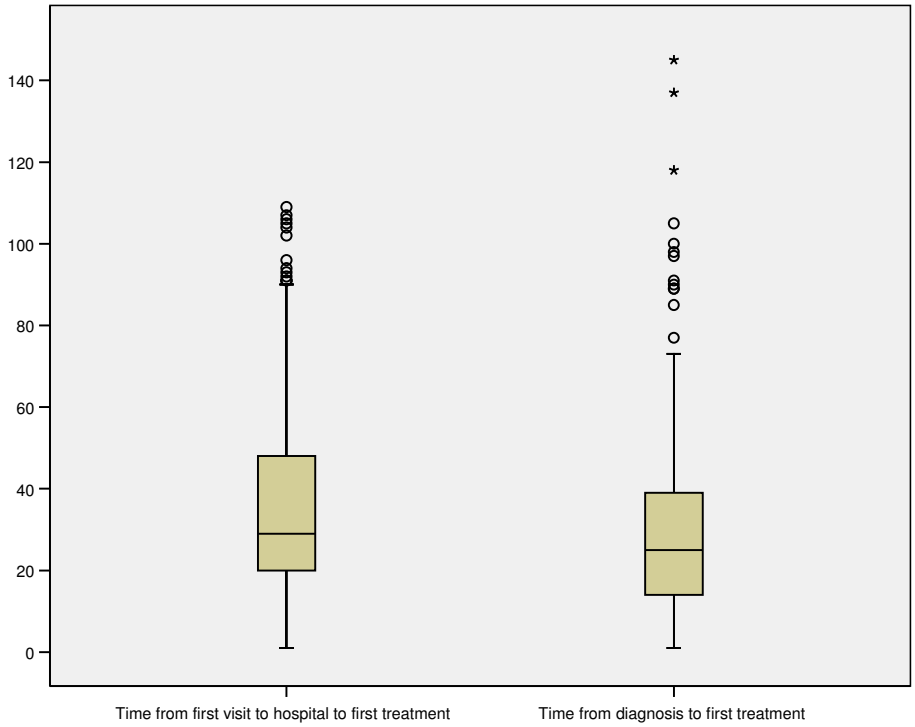


Figure 3. Intervals D-FT and FC-FT



SECTION 5:

DISCUSSION, STUDY CONTRIBUTION, AND CONCLUSIONS

DISCUSSION

Analysis of waiting time intervals and comparison with published studies

The overall median waiting time from first consultation with the pulmonary service and initiation of treatment was 30 days in this study. In previous lung cancer studies this interval was between 25 days and 49 days (Myrdal et al., 2004; Salomaa et al., 2005; Rolke et al., 2007). This situates the waiting times at the JGH at the lower end of waiting times among published reports.

To date there have been no published studies assessing clinical performance against Cancer Care Ontario waiting time guidelines, or against the pan-Canadian guidelines for radiation therapy. However, Ontario institutions have published their waiting time results online and provinces and territories have begun reporting on waiting time indicators in various regions (Cancer Care Ontario, 2008; Ontario Ministry of Health and Long-Term Care, 2008). In Québec, online reports indicate that over 80% of patients in the Montreal region are receiving radiation therapy within 28 days of being ready to treat. However, it is unclear how recent these data are and how they have been collected (Ministère de la santé et des services sociaux du Québec, 2008).

Winget (2007) examined the performance of cancer clinics in Alberta, Saskatchewan and Manitoba in relation to waiting time intervals agreed upon by the provinces' cancer agencies. The median waiting time from diagnosis to first radiation or chemotherapy treatment for lung cancer patients achieved by Alberta, Saskatchewan and Manitoba was 31, 41 and 36 days, respectively. The median waiting time for patients at the JGH for this same interval was 25 days. The

definitions used by Winget for date of diagnosis and date of first treatment are consistent with the definitions used in this study, and therefore these intervals are comparable. Although the waiting time at the JGH is shorter than the reported waiting times in the three provinces, the scale of these studies varies considerably and the provincial data are aggregates of all of the cancer centres in the province, whereas the JGH data represent waiting times at a single centre. However, creating comparable indicators and intervals against which to assess clinical performance is the first step in informing policy on quality of care for cancer (Winget et al., 2007).

The British Thoracic Society guidelines applied in Section 4 have been used as a comparative tool in a number of studies. Several international papers have compared the activities in their lung cancer clinics to recommendations from the BTS (Deegan et al., 1998; Riedel, Wang, McCormack, Toloza, Montana et al., 2006; Rolke et al., 2007).

Deegan (1998) assessed the BTS recommendation of patients receiving a firm diagnosis within 2 weeks of first being seen in his study cohort. In our population the median time from first consultation to diagnosis was 14 days. Fifty-eight percent of patients had a diagnostic procedure performed within 2 weeks of first being seen by a pulmonary specialist. In Deegan's cohort, 77% of patients received a diagnosis within 2 weeks of being seen. Deegan's cohort received a diagnosis in a more timely manner than the JGH population, although the size of the group being examined (n=81) was much smaller than the JGH's (n=340) and over a shorter time period (five months vs. four years). The waiting times of the JGH population for this interval may in fact be longer, since the date of diagnosis listed in

the database is the date that the procedure was performed, rather than the date it was reported or the date the patient received the diagnosis.

Riedel (2006) retrospectively compared the outcome measures of a multidisciplinary thoracic oncology clinic (MTOC) to those of a non-MTOC at the same institution. The study examined two time periods, from first visit to any physician to date of diagnosis, and from date of diagnosis to initiation of treatment. The time from first visit to diagnosis in Riedel's study was 47 days (n=164) and 48 (n=89) days for MTOC and non-MTOC patients, respectively. In the JGH population, the time from first visit to diagnosis was 14 days (n=340). However, the definition of first visit in Riedel's study is the first visit to any physician for a cancer-related sign or symptom. Since the JGH data defines the first consult as the first contact with a pulmonary physician, this interval may be artificially short as compared to Riedel's cohort. The second interval, however, from diagnosis to first treatment, was measured using the same criteria in both studies. In Riedel's cohort, the median time from diagnosis to first treatment was 21 days (n=205) for MTOC patients and 23 days (n=89) for non-MTOC patients. In the JGH population, this interval was 25 days (n=297). Riedel concluded that since there was no significant statistical difference in the timeliness of care for MTOC patients versus non-MTOC patients, multidisciplinary clinics could not be said to affect the timeliness of care. However, Riedel's study examined the MTOC clinic prior to the non-MTOC clinic. Some of the infrastructure in place for the MTOC clinic, including a database and weekly multidisciplinary conferences, were maintained following the dissolution of the MTOC clinic. Riedel points to the maintenance of the weekly multidisciplinary

conference as a significant flaw in the methodology and subsequent conclusions that can be drawn from his study. Indeed, the continuing use of the weekly multidisciplinary conferences is an important limitation to his study and the classification of the second clinic as non-MTOC may be misleading, as it retains a key feature of multidisciplinary management.

Rolke (2007) assessed the performance of her Norwegian study cohort against the recommendations of the BTS and the Swedish Lung Cancer Study Group. She examined a number of intervals from the first symptom through to the first treatment. Intervals from Rolke's study which are comparable to the JGH population include the "specialist delay" from first contact with pulmonary consultant to dated diagnostic histology/cytology, and "hospital delay", from first contact with pulmonary consultant to first treatment. In Rolke's study, the specialist delay was a median of 8 days (n=448), whereas in the JGH population the delay was 14 days. The hospital delay in Rolke's population was a median of 25 days (n=310), whereas in the JGH population the hospital delay was 30 days (n=357). Although neither of those intervals is the subject of BTS recommendations, the overall hospital delay was the subject of the Swedish Lung Cancer Study Group's recommendations. They suggested that 80% of patients have a hospital delay of no more than 31 days. In Rolke's study, 62% of patients had a hospital delay of 31 days or less. In the JGH population, 51% of patients had a hospital delay of 31 days or less.

The waiting times in the clinical trajectory of patients at the JGH are keeping pace with reported waiting times in the international literature. While the JGH

waiting times lag behind for certain intervals, namely the period between first consultation and diagnosis, the median waiting time for the entire clinical trajectory is similar to other studies (Salomaa et al., 2005). Furthermore, between 60 and 90% of patients seen in the pulmonary service are receiving treatment within the BTS waiting time recommendations (see Section 4).

Critical pathways

Critical pathways are management tools used in hospital settings that set out timelines and sequences of events in a patient's clinical trajectory. Patients are assigned to critical pathways for a variety of medical procedures, particularly cardiac care and surgery (Pearson et al., 1995; Every et al., 2000; Smith & Hillner, 2001). Critical pathways are not presently employed as a clinical tool for the treatment of lung cancer patients at the Jewish General Hospital. For the purposes of this study, however, the critical pathways technique is used conceptually in order to identify the longest interval in a patient's trajectory, and thus to identify the interval that contributes most to the patient's overall waiting time.

According to results, the critical pathway for this study is the interval between first consultation with a pulmonary specialist and diagnosis, with an overall median of 14 days. This result is consistent with other studies, which have identified the first interval between consultation and diagnosis to be the lengthiest. Devbhandari (2007) has suggested that the longest delay occurs in the diagnosis and staging work-up period. A negative initial bronchoscopy, for example, requires that patients have further investigations in order to achieve a diagnosis. While this increase in the time to diagnosis is not necessarily the result of administrative or

managerial delays, but the result of a more complicated or challenging case, re-scheduling and re-performing bronchoscopy or other diagnostic procedures will nonetheless contribute to the overall waiting time. Although this study did not examine detailed information on the number of diagnostic tests or staging studies, delays resulting from repeated diagnostic procedures have been identified in previous studies (Devbhandari, Bittar et al., 2007; Devbhandari, Soon et al., 2007), and it is a plausible explanation for the waiting time in this interval at the Jewish General Hospital. Future prospective audits should consider this question in more detail.

Given the number of exclusions due to negative intervals in the study, and the subsequent reduction in *n* for the calculation of mean and median waiting times, it is clear that patients follow a variety of paths throughout their treatment trajectory. Every (2000) identifies this limitation by suggesting that the critical pathways approach examines the ideal patient rather than the experience of actual patients. Similarly, this study used an ideal patient approach by creating intervals based on a common trajectory, but one that does not represent the experience of all patients. Consequently, the utility of critical pathways as a conceptual tool, rather than a clinical one, is somewhat mitigated. This should not lead to the conclusion that treatment intervals must not be examined to seek improvements; rather, it is recognizing that a critical pathways approach may not be successful when clinical trajectories vary widely.

Alternatively, as Every (2000) concludes, critical pathways can serve as a screening test for inefficient care. In spite of the limitations of creating a single path

for assessing waiting time intervals, the critical pathways conceptual approach did allow for the identification of the rate-limiting step in the clinical trajectory of lung cancer patients. A next step for the pulmonary oncology service at the JGH may be to institute a clinical pilot of the critical pathways approach for one type of treatment, which may improve efficiency and decrease the median waiting time for that treatment modality.

Considering the challenges inherent in the critical pathways approach explored above, a more useful exercise for cancer care may be to examine the experience of patient subgroups. For instance, identifying and repairing the systematic disparate treatment of elderly patients may have as great an impact on clinical services as identifying a rate-limiting interval. Investigating the roots of this unequal treatment will require additional analysis and discussion among interdisciplinary team members in order to develop appropriate solutions. However, the exercise of identifying inefficiencies and systematic waiting time variations has been a valuable first step.

De Vries (2007) and colleagues are developing a critical pathways approach specific to elderly patients, which will maintain a patient-specific implementation procedure along with a particular focus on geriatric issues such as polypharmacy, co-morbidities and cognitive status. This approach may prove to be valuable in reducing waiting times for elderly patients as compared to their younger counterparts. As discussed in Section 4, the implementation of the geriatric assessment for patients over age 70 at the Jewish General Hospital may also assist in reducing the waiting time between ready-to-treat and first treatment. This

assessment has been in place for the lung cancer population since early 2007. A future audit could examine differences in waiting times for elderly patients prior to the introduction of the geriatric assessment versus waiting times following its introduction.

The detection of other systematic discrepancies among subgroups in the JGH population was more predictable, and for the most part not cause for a re-evaluation of clinical services. For instance, that SCLC patients should be treated in a timelier manner than NSCLC patients is expected and reassuring. Given that SCLC is more aggressive and more responsive to treatment, even a suspicion of SCLC prior to a tissue diagnosis merits a more rapid diagnostic and staging trajectory.

Waiting time intervals and the pertinence of guidelines

In assessing the performance of the pulmonary oncology program at the JGH against existing guidelines from Canada and beyond, there are two elements that merit further exploration: the lack of recommendations on waiting times for the middle stages of the patient's clinical trajectory, and the variation in waiting time recommendations that exists among the guidelines.

The two sets of comprehensive guidelines from the BTS and the CCO both make recommendations for the early stages of care, from referral to consultation with a specialist, and in the case of BTS, from consultation to diagnosis. They also make recommendations for the final stage of the trajectory, from ready to treat to initiation of treatment (see Figure 1 in Section 4 and Annex 1a for reference). The intermediate intervals, variously involving diagnosis, staging, and the creation of a

treatment plan, are not the subject of either organization's recommendations.

Given the challenges explored above in relation to critical pathways and the exclusion of patients with negative intervals, perhaps the omission of these intervals in the waiting time guidelines are an implicit recognition of the variation in a patient's care path. Although it is possible only to speculate as to why these intermediate intervals were not included in the expert recommendations on waiting times, it may be that the experts encountered difficulty defining waiting intervals for such a heterogeneous patient experience, taking into account delays in diagnostic imaging, scheduling of appointments, and planning treatment. However, omitting these intervals from recommendations risks allowing excessive variation in a patient's waiting time, since the only intervals under scrutiny occur at the beginning and the end of a patient's course. It would be valuable to have an overall "hospital delay" interval, such as the one proposed by the SLCSG (Myrdal et al., 2004), in order to define the optimal length of the entire clinical trajectory.

The guidelines used in this study to assess the performance of the pulmonary oncology program differ from one another, and, consequently, the performance of the pulmonary oncology program varies according to the various sets of recommendations. Most notably, the radiotherapy guidelines from the three different sources provide vastly different pictures of the performance of the pulmonary oncology service. According to the Cancer Care Ontario guidelines, thirty-two and thirty-three percent of palliative radiotherapy and curative radiotherapy patients, respectively, achieved the benchmark waiting times. When assessed against the British Thoracic Society guidelines, however, seventy-three and seventy-one percent

of those same palliative and curative patients, respectively, met the guidelines. When compared against the pan-Canadian guidelines, ninety percent of radiation therapy patients met the benchmark of 28 days from ready to treat to treatment.

How to explain the variation in the target times recommended by these different organizations? A focus group of clinicians at the Jewish General Hospital were asked their opinion on the value of the various benchmarks used in this study. The group concluded that the Cancer Care Ontario guidelines were overly general to apply to the lung cancer population, and therefore the guidelines were not perceived as particularly useful. The British Thoracic Society guidelines, however, were met with support. They were sufficiently specific to be useful, and they also reflected achievable targets for the pulmonary oncology service. The pan-Canadian guidelines were perceived as too lenient, even in light of the demands on the radiation oncology department from other tumor sites. The clinicians felt that a maximum waiting time of ten days to two weeks was ideal for both palliative and curative radiotherapy ("Focus group," June 19, 2008).

Indeed, the pan-Canadian benchmarks for radiation therapy have already been criticized by the Wait Time Alliance for being overly relaxed (Wait Time Alliance for Timely Access to Health Care, 2007). However, as described by the WTA, waiting time recommendations are fluid, especially in this seminal period of benchmark development. As data become more readily available and accessible, waiting time benchmarks will adjust accordingly (Wait Time Alliance for Timely Access to Health Care, 2007).

Given the variation in the recommended times for various treatments

suggested by the different organizations, and given that the Canadian government has not yet established comprehensive guidelines for cancer treatment, the next question is, what should be informing waiting time benchmark development in Canada? Is there an advantage to national clinical benchmarks? Currently, provinces are working independently to establish their own sets of indicators and benchmarks. As a result, indicators are not uniform across the country and therefore are difficult to compare against one another (Wait Time Alliance for Timely Access to Health Care, 2005; Canadian Institute for Health Information, 2006; Canadian Breast Cancer Network, 2008).

Furthermore, the design of benchmarks is piecemeal and the potential exists for waiting time standards to vary from province to province. It is important to ensure that the benchmarks being established are consistent across the country, while still considering the realities of resource allocation and capacity. Benchmarks must be consistent across the country in order to ensure that patients are receiving the same standard of care regardless of their province of residence. In order to achieve consistent benchmarks, indicators for waiting times must also be consistent. As Winget (2007) explains:

> […] production of standardized "wait-time" data across Canadian provinces will allow identification at the national level of problems which facilitate solutions and changes to current resource allocation and overall system improvements.

Not only will standardized waiting time indicators allow identification of problems, they are vital to informing policy makers in the creation of suitable benchmarks. Strengths and weaknesses in waiting time intervals can be identified, and best practices can be shared among provinces (Winget et al., 2007).

Assessing the performance of the JGH's pulmonary oncology service against the various guidelines also raises the question of whether unique benchmarks for various types of cancers should be developed, or whether all cancers should have the same set of benchmarks. According to the clinicians at the JGH, the guidelines established by the BTS are more useful than the generalized recommendations made by the CCO ("Focus group," June 19, 2008). In any case, considering the challenges inherent in establishing waiting time guidelines for cancer care, it is likely that general guidelines will precede specialized ones until enough evidence has been accumulated to be sufficiently specific.

A recent report from the Canadian Breast Cancer Network (2008) highlights the difficulties in reducing waiting times in cancer care in Canada. The report, issued in January 2008, addresses some of the key factors that hinder the creation of waiting time benchmarks and the ensuing reduction in waiting times, with specific reference to the experience of breast cancer patients. Many of the factors identified by the CBCN, however, are the same challenges facing the lung cancer community.

For example, the CBCN identifies lacunae in the data reporting and a shortage of comparable measures on waiting times among the provinces and territories. This has also been identified in earlier reports by CIHI (2006) and the WTA (2005, 2007); however, the CBCN points out that as of 2008 it remains an issue and is limiting the advancement of knowledge with respect to waiting times in Canada. Furthermore, the report suggests that Canada lags behind with respect to the use of electronic medical records, limiting the speed and accuracy with which information can be disseminated. The report also highlights the lack of national

clinical benchmarks for breast cancer chemotherapy and surgery, an issue that is not limited to the breast cancer population. Finally, the report points to a shortage of health human resources and equipment, which affects the capacity to treat patients in a timely manner. All of these issues extend beyond the scope of breast cancer treatment and represent obstacles to the creation of waiting time guidelines and the subsequent reduction of waiting times for cancer care on a wider scale.

LIMITATIONS OF THE STUDY

Some of the limitations of this study have been explored in the article entitled *Waiting times in the clinical trajectory of patients with lung cancer* (refer to Section 4). Among the limitations of this study was the retrospective design of the study. Consequently, some information of interest was not available for analysis. In particular, the interval from the referral to first consultation with pulmonary was not available, nor were the number of diagnostic procedures necessary in order to obtain a tissue diagnosis for each patient. Furthermore, when comparing the pulmonary service against Cancer Care Ontario guidelines, proxies were created to establish indicators comparable to the priority system used by the CCO. Since this was done post-hoc, rather than a priori as recommended by the guidelines, the proxies were not entirely comparable to the CCO's priority system.

The primary limitation of this study is the reduction in *n* as a result of the exclusion of patients achieving negative intervals. The trajectory from first consultation to first treatment is representative of a typical patient; however, there are deviations from this trajectory so that for each of the intervals examined, a large

number of patients were excluded based on negative intervals. Although there will always be individuals who do not meet the target time for any number of reasons, and though the CCO guidelines acknowledge this reality by suggesting that 90% of patients should meet the benchmark, excluding patients achieving negative intervals reduces the aggregate used to calculate mean and median times. Consequently, this limits the strength of the conclusions that can be drawn regarding the performance of the pulmonary service. Fortunately, the cohort of patients seen over the four-year study period is large enough to mitigate this weakness somewhat.

Finally, this study is not designed to assess the impact of interdisciplinary teams on waiting times. Ideally, data would have been available prior to the institution of the interdisciplinary team in order to use a before-and-after model to assess performance in relation to waiting times. It is not possible using retrospective data to claim that the interdisciplinary team contributes to the waiting times achieved in this study population. However, the design of this study is similar to other published reports assessing waiting times in lung cancer achieved by an interdisciplinary team. These studies concluded that although they could not draw a conclusive link between interdisciplinary management and the waiting times achieved in the study, the interdisciplinary context in which the study took place was a contributing factor (Deegan et al., 1998; Conron et al., 2007; Devbhandari, Bittar et al., 2007; Rolke et al., 2007). Similar to these studies, the interdisciplinary environment at the JGH is part of the context in which this study took place. Furthermore, based on studies that have assessed waiting times in breast cancer patients and shown positive effects, there are some features linked to the success of

those clinics that are present in the pulmonary oncology service at the Jewish General Hospital.

Gabel and colleagues (1997) reported a significant reduction in the waiting time between diagnosis and treatment for patients seen in a multidisciplinary clinic. The features that characterized their multidisciplinary clinic were a cancer conference attended by a number of specialists involved in the diagnosis and treatment of breast cancer patients, wherein each case was reviewed radiologically and pathologically, and treatment options were discussed among all specialists. The MDC also included an educational component for patients and a same-day, one-stop clinic where patients were seen by the consultants present at the earlier multidisciplinary meeting.

Newman and colleagues (2006) describe changes to the management decisions of patients seen in second opinion by a multidisciplinary breast cancer conference. After review by specialists in surgery, pathology, and radiology, more than half of patients had changes made to their surgical treatment plan based on the interpretation of radiographic, pathologic, and/or clinical findings.

Much like the MDCs described by Gabel (1997) and Newman (2006), the pulmonary oncology program at the JGH relies on an interdisciplinary cancer conference to discuss all suspected cases of lung cancer and decide on a treatment plan for each patient. In fact, the ICC at the Jewish General Hospital has been presented by Cancer Care Ontario as a model for Ontario health care centres for the development and management of an interdisciplinary meeting (Hunter, 2006).

CONTRIBUTION TO THE BODY OF KNOWLEDGE

The momentum surrounding waiting times in Canada has been growing in the last five to ten years. Influential documents such as the Romanow Commission's Report on the Future of Health Care in Canada (2002) and the Supreme Court of Canada's decision on *Chaoulli v. Québec (Attorney General)*[3] have led the issue of waiting times in the Canadian health care system to take on new meaning. They created a stronger impetus to identify current practices and set benchmarks for the future, assisted in large part by public attention to the issue. Waiting times are particularly vital to cancer care, given the potentially life-threatening nature of the disease and the prevalence of various types of cancer in the population.

This study defines and situates the experience of patients at a single centre, in a teaching institution, in a major Canadian city. While this may limit its applicability in other contexts, it does provide a snapshot of clinical services in an interdisciplinary environment in a typical hospital in a large urban setting. In that respect, the lessons learned from the examination of waiting times and treatment intervals can be of use to similar institutions, and in some instances, it can provide a warning bell for hospitals across Canada. Particularly with respect to the treatment of elderly patients and radiotherapy waiting times, it is the responsibility of clinicians to assess whether a similar phenomenon is taking place in their healthcare setting.

In terms of assessing the adequacy of waiting times against benchmarks, the experience of the patients at the JGH is now situated with respect to international,

[3] 2005 SCC 35

pan-Canadian and provincial guidelines. This is important as it helps the drafters of guidelines to determine what is realistic and achievable. In Québec, the provincial government has only recently started collecting information on radiation waiting times. According to the government website, a future goal is to have all patients requiring oncological surgery to be treated within 4 weeks of ready to treat. The slow progress towards reporting current practices and in establishing waiting time goals belies the importance of the issue in Québec and in Canada. Having concrete and detailed evidence of current practices, even in a single setting, is a step towards better reporting and more realistic goals for waiting times in cancer care.

Most provinces and territories have started reporting on particular intervals of their cancer treatment waiting times, but critics have remarked that each province is starting the clock at a different point along the care trajectory (Canadian Institute for Health Information, 2006; Kondro, 2006). This makes the comparison of waiting times across Canada difficult. One of the goals in this study was to create indicators that are readily comparable with guidelines and, ultimately, with provincial performance indicators. Accordingly, the performance of the pulmonary oncology service is now situated in relation to radiation oncology benchmarks across the country. However, progress still must be made in order to achieve a clear picture of the status of waiting times for cancer care across Canada.

RECOMMENDATIONS TO THE JEWISH GENERAL HOSPITAL

The audit of clinical performance with respect to waiting times has generated a number of recommendations for the pulmonary oncology service. These

recommendations cover areas including radiation treatment, geriatric care, clinical management, and data collection. The recommendations concerning radiation therapy treatment and management of elderly patients have been articulated in Section 4; please refer to page 71.

Future audits should be conducted prospectively. This will ensure that the information of interest is systematically collected and other areas of interest can be identified before beginning the audit. For example, patient satisfaction information can be collected, along with referral dates and dates of first symptoms, visits to the family physician, and so on. A smaller but more thorough audit in the future would reveal if progress has been made on key areas identified in this study, for example the treatment of elderly patients, and could also provide insight into areas that were not available for this study.

The use of critical pathways as a clinical tool may assist in the reduction of waiting times for certain key intervals in a patient's trajectory. To assess their utility to the pulmonary oncology program, critical pathways could be introduced as a 3-month pilot project for the interval between first consultation and diagnosis for patients first seen in the pulmonary oncology clinic. As the longest interval identified in this study and the subject of an existing waiting time recommendation, this interval is a suitable focus for potential waiting time reduction. Given the positive response of the focus group to the BTS recommendations, the two-week waiting period could be used as a benchmark. Both the date of the procedure and the date the patient is apprised of the result should be recorded. Results from this study could be compared to the critical pathways results to ascertain whether the

critical pathway tool is providing meaningful reductions in waiting times for that interval.

Previous studies have reported on the value of a multidisciplinary clinic that combines the services of a number of specialists in one location. This minimizes the number of hospital visits for patients and reduces the waiting time between specialist visits (Deegan et al., 1998; Conron et al., 2007). This is not currently the practice of the pulmonary oncology program at the Jewish General Hospital. It may be an option for a redesign of the current pulmonary clinics, to exist in complement to the weekly interdisciplinary meeting. This one-stop clinic may assist in further reducing waiting times among pulmonary oncology patients.

AREAS OF FURTHER STUDY

This study has focused on the interval from first contact to first treatment, as well as intermediate intervals that comprise the total hospital delay. However, there are several other intervals that also require attention: the patient delay and the intervals following the initiation of a patient's treatment.

The patient delay is described as the time from first symptom to first contact with a pulmonary specialist (Moody et al., 2004). This includes intervals such as first symptom to first visit with a general practitioner, from general practitioner to referral to specialist, and from referral to specialist to first seen by specialist. All of these intervals point to critical stages in cancer care, including patient awareness of symptoms, access to family doctors, capacity of specialists to handle demands, and so on.

The literature suggests that one of the most important delays is the time from

first symptoms until first visit to a general practitioner (Moody et al., 2004). Regrettably, this information is not available for the cohort in this study. Furthermore, the focus of this study was on the functioning of the pulmonary oncology program at the JGH and as such was not concerned with the clinical trajectory prior to the first specialist visit. However, this delay remains an important area of research, especially considering the dearth of evidence in Canada, and should be the subject of a future study.

A patient's clinical trajectory does not end at the first treatment. Once first line treatment is completed, it is essential to ensure that patients are followed and continue to successfully navigate the health care system. Quality cancer care must be maintained from the beginning to the end of a patient's illness trajectory. At the JGH, a nurse pivot is assigned to each patient to ensure that they have a guide through every step of their illness. It must be clear that patients are not abandoned once they have completed their first line treatment. Regular follow-up and referral to other specialists and members of the interdisciplinary team must be pursued. Examining waiting times and treatment trajectories for patients after they have completed their first treatment is an important factor in ensuring quality care. Attention must also be paid to other treatments aside from chemotherapy, radiation, and surgery. Services such as psychological consultations, nutrition, physiotherapy, pain management, and all other quality-of-life care must also be provided in a timely manner. Determining the waiting time from referral to consultation would assist in the assessment of clinical performance for these services.

CONCLUSIONS

The results of the audit of waiting times for the pulmonary oncology service at the Jewish General Hospital are promising. Strengths and weaknesses in the service have been identified, and steps have already been taken to improve on certain aspects of service provision. This is facilitated to a large degree by a culture of continual research, quality assessment, collegiality and communication that exists within the pulmonary oncology program.

The objectives of this study were (1) to audit the performance of the interdisciplinary pulmonary oncology service at the Jewish General Hospital with respect to waiting times for key intervals and subgroups of patients; (2) to compare waiting times in the clinical trajectory of lung cancer patients seen at the Jewish General Hospital with existing waiting time guidelines; and (3) to determine those factors associated with longer waiting times in this population.

The audit of clinical performance of the pulmonary oncology service was greatly facilitated by the quality of the data that was available. In the continuing absence of electronic medical records across hospitals in Canada, the maintenance of an electronic patient database provided detailed, thorough, and high-quality data for this project. Maintaining such a database requires substantial financial and human resources, but the benefits in terms of ongoing quality assurance monitoring are plentiful, as evidenced in this study.

Comparing the waiting times achieved by the pulmonary oncology service against existing benchmarks and recommendations has provided a picture the JGH's performance and the quality of clinical services. In general terms, the pulmonary

oncology service is close to achieving, or has achieved, many of the benchmarks set out by the various organizations. Weaknesses have been identified, however, particularly in the area of radiation therapy. It is not clear which set of guidelines is the most useful, as each have their benefits and drawbacks, but the members of the interdisciplinary pulmonary oncology team felt that the recommendations of the British Thoracic Society were most pertinent to their practice.

The factors associated with longer waiting times in the patient population at the Jewish General Hospital are consistent with what is seen in the literature. In particular, early stage and better performance status are well-documented predictors of waiting times. Waiting times associated with age and treatment modality were not as commonly seen in the literature. The factors predicting longer waiting times in the population of lung cancer patients at the JGH have been communicated to the interdisciplinary team members and steps are being taken to address the weaknesses.

In broader terms, Canadians should expect the same standards of timeliness irrespective of their province of origin. Although waiting time benchmarks are the purview of the provinces, efforts should be made to ensure that standards are similar across Canada, and the indicators used to monitor those standards are comparable. Making performance indicators available to the public and reporting on progress is a vital step towards harmonization and reduction of waiting times across the country.

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ANNEX 1:

A. CLINICAL TRAJECTORY OF A TYPICAL PATIENT
B. CLINICAL TRAJECTORY OF A PATIENT SEEN BY A THORACIC SURGEON PRIOR TO BEING REFERRED TO A PULMONOLOGIST

Figure A-1: Clinical trajectory of a typical lung cancer patient

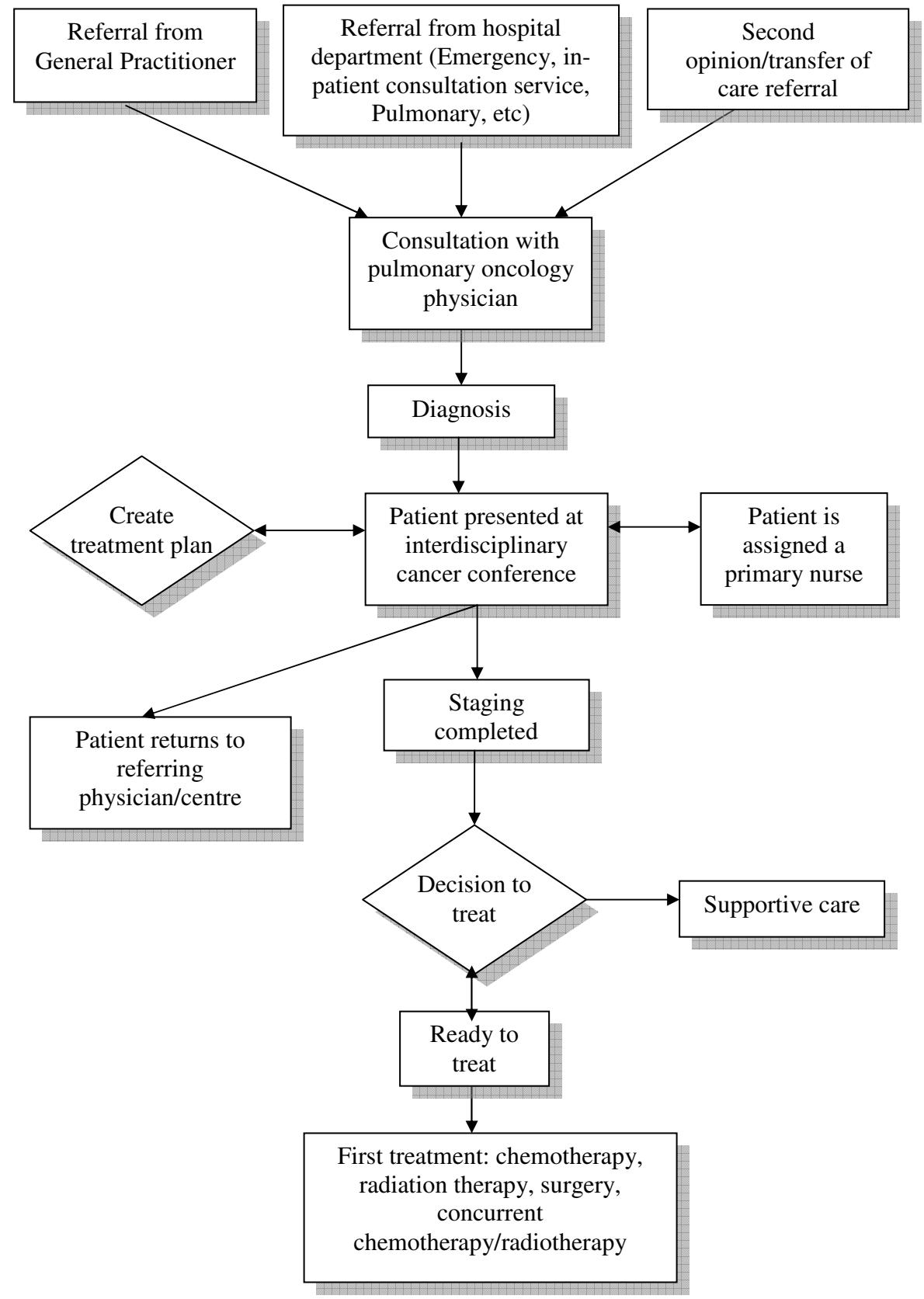
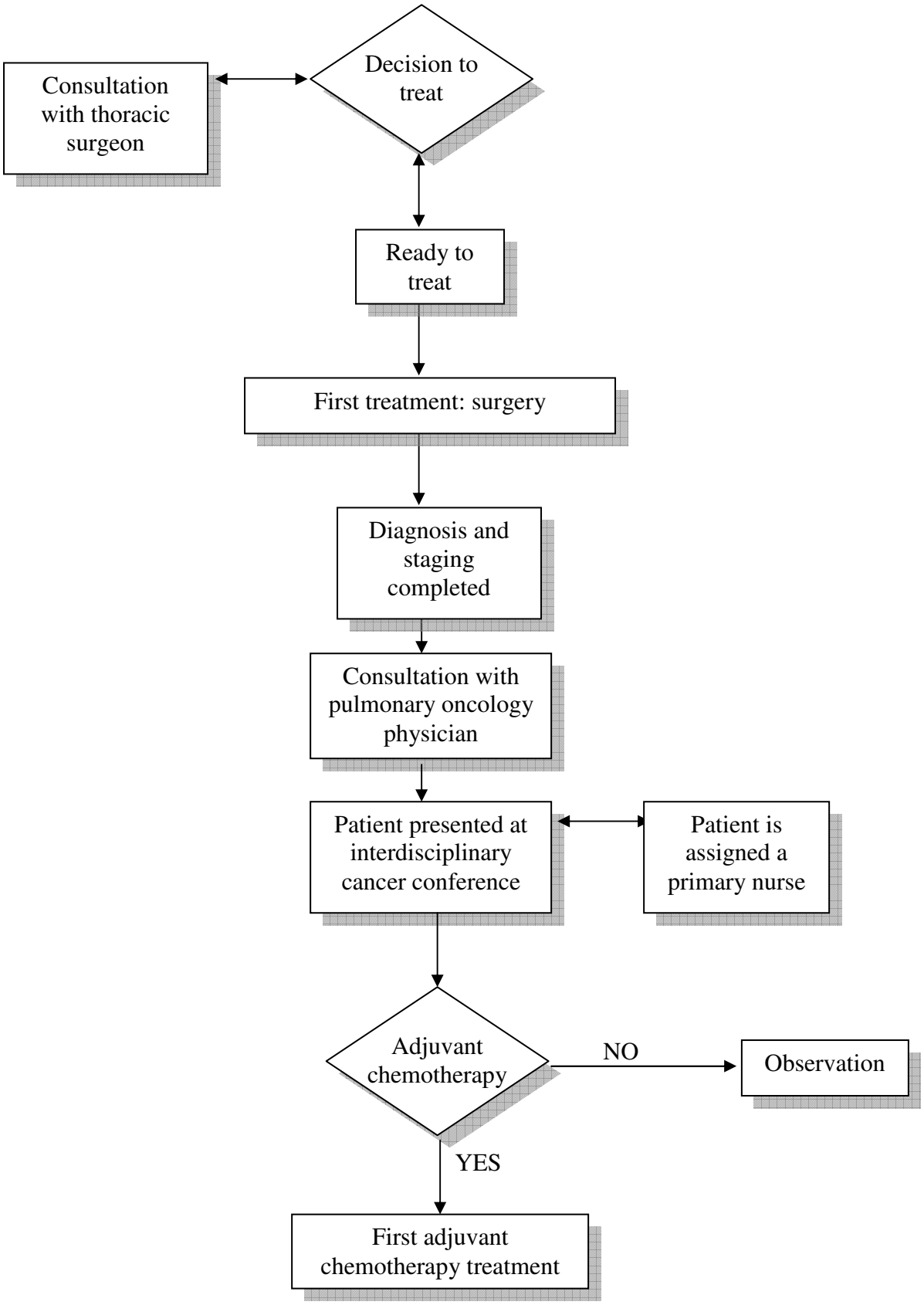


Figure A-2: Trajectory of patients seen by a thoracic surgeon prior to being referred to a pulmonologist



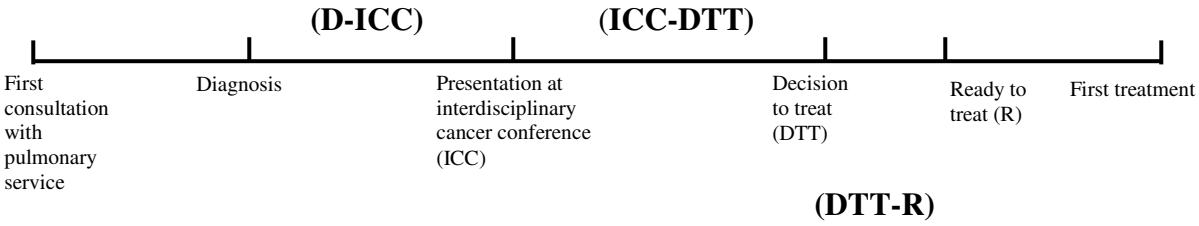
ANNEX 2:

FURTHER RESULTS

RESULTS

The results presented below complete the analysis of waiting time intervals presented in the article *Waiting times in the clinical trajectory of patients with lung cancer*, found in Section 4. Figure 1 from section 4 is reproduced below as Figure 5, with additional intervals identified.

Figure A-3: Clinical intervals in the treatment of lung cancer patients



Interval D-ICC: From diagnosis to presentation at interdisciplinary cancer conference

The median time from diagnosis to first presentation at the interdisciplinary conference was 13 days (IQR 6-27 days) (n=313). 32 patients were not presented at the ICC at any point during their treatment and therefore were excluded from the interval analysis. Fifty-three percent of these patients never presented at ICC were surgical patients, and ninety-seven percent of patients not presented to ICC were diagnosed in 2004 and 2005. The remainder of patients were excluded for negative intervals, that is, they received their diagnosis prior to being presented at the ICC. For patients with NSCLC (n=275) the median time was 13 days and for patients with SCLC (n=38) the median time was 11.5 days.

Interval ICC-DTT: From presentation at interdisciplinary cancer conference to decision to treat

The median time from first presentation at the ICC to decision to treat was 0 days (IQR 0-10 days) (n=272). Patients receiving supportive care (n=60) were excluded from the analysis. The remainder of patients excluded from the analysis due to negative intervals were patients who were referred to the pulmonary service following surgery, or who were seen in-hospital.

Interval DTT-R: From decision to treat to ready to treat

Ninety-six percent of patients were ready to treat on the same day as the decision to treat. The remaining 4% of patients had delays between their decision-to-treat date and their ready-to-treat date of 13-293 days. These are due to patient factors such as travel (2pts), initially refusing treatment (5pts), clinical deterioration (2pts), seeking second opinion before returning for treatment (1pt), or recovery from surgery (either a diagnostic thoracotomy or a surgery unrelated to their lung cancer) (5pts).

Table A-1 presents the results of the bivariate and multiple logistic regression analysis of patient adherence to CCO waiting time guidelines. In bivariate analyses, only age ($p<0.001$) and first treatment ($p=0.048$) were significantly correlated with adherence to CCO guidelines. In multiple logistic regression analysis, age and first treatment were once again significant. Patients aged 65-75 were 2.2 times less likely than patients under 65 to meet CCO guidelines. Patients over 75 were 2.6 times less

likely to meet CCO guidelines. Patients receiving chemotherapy as their first treatment were 3.6 times less likely than patients receiving surgery to meet CCO guidelines. Patients receiving radiotherapy as their first treatment were 25 times less likely than patients receiving surgery to meet CCO guidelines.

Table 1: Crude and adjusted Odds Ratios of being seen within CCO-recommended waiting time guidelines

N= 371	OR_{crude} (95% CI)	$OR_{adjusted}$ (95% CI)
Age		
<65	1.00*	1.00*
65-75	0.71 (0.43-1.18)	0.46 (0.25-0.86)
>75	0.37 (0.21-0.65)	0.39 (0.19-0.81)
Stage		
IA-IIIA, LTD	0.46 (0.29-0.72)	1.3 (0.69-2.50)
IIIB-IV, EXT	1.00*	1.00*
Diagnosis		
SCLC	0.56 (0.26-1.22)	1.72 (0.71-4.16)
NSCLC	1.00*	1.00*
ECOG Performance Status		
0-1	0.75 (0.44-1.28)	0.69 (0.36-1.34)
2-3	1.00*	1.00*
First consult		
Pulmonary oncology clinic	1.30 (0.73-2.30)	0.62 (0.29-1.30)
Emergency Department	0.65 (0.24-1.76)	0.46 (0.13-1.63)
In-hospital	1.00*	1.00*
First treatment		
Chemotherapy	(0.12-	0.28 (0.11-0.72)
Radiation	0.56)	0.04 (0.01-0.1)
Surgery	0.04 (0.02-0.10)	1.00*
	1.00*	

* Reference category

Focus group

The group suggested that an appropriate waiting time for the interval FC-D is 30-45 days and that patients at the JGH waited an average of 45 days. For the interval R-FT, the group suggested that an appropriate waiting time was within one week for chemotherapy patients, within 10 to 14 days for radiotherapy patients, and within 2 weeks for surgery patients. They estimated that these same times were the

average waits for patients at the JGH. The group suggested that an appropriate waiting time for the overall interval FC-FT for all patients is six weeks, and they estimated that this was the average for patients seen at the JGH.

When asked about the usefulness of the benchmarks and guidelines of CCO, BTS, and radiation therapy, the group concluded that the Cancer Care Ontario guidelines were overly general to apply to the lung cancer population, and therefore the guidelines were not perceived as particularly useful. The British Thoracic Society guidelines, however, were met with support. They were sufficiently specific to be useful, and they also reflected achievable targets for the pulmonary oncology service. The pan-Canadian guidelines were perceived as too lenient, even in light of the demands on the radiation oncology department from other tumor sites. The clinicians felt that a maximum waiting time of ten days to two weeks was ideal for both palliative and curative radiotherapy ("Focus group," June 19, 2008).