

Report 2 / Rapport 2
Due Date / Date Limite: October 14 Octobre 2005

Request for Applications (RFA): Toward Canadian Benchmarks for Health Services Wait Times – Evidence, Application and Research Priorities

Appel de demandes: Établir des points de repères canadiens concernant les temps d'attente dans les services de santé - Preuves, application et priorités de recherche

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TITLE OF YOUR RESEARCH GRANT / TITRE DE VOTRE SUBVENTION DE RECHERCHE: Determining Acceptable Waiting Times for the Surgical Treatment of Solid Organ Malignancies – A Systematic Review			
CO-PRINCIPAL INVESTIGATORS AND CO-INVESTIGATORS: List all co-principal investigators and co-investigators and their university (or other) affiliation. Additional space/pages may be used if required. Describe briefly significant changes, if any that have occurred (e.g. include changes to the research team, list new co-investigators, collaborations, collaborations that are no longer in place, etc.). CO-CHEERCHEURS PRINCIPAUX ET CO-CHEERCHEURS : Énumérez tous les co-chercheurs principaux ainsi que les co-chercheurs et leur affiliation universitaire (ou autre). Vous pouvez ajouter des pages au besoin. Décrivez brièvement les changements importants qui sont survenus, s'il y a lieu (p. ex. changements à l'équipe de recherche, liste des nouveaux co-chercheurs, nouvelles et anciennes collaborations, etc.). <table><tr><td>Donna Turner Epidemiologist Epidemiology and Cancer Registry CancerCare Manitoba</td><td>Steven Latosinsky Department of Surgery Faculty of Medicine University of Manitoba</td><td>Tom Noseworthy Department of Community Health Science Faculty of Medicine University of Calgary</td></tr></table>	Donna Turner Epidemiologist Epidemiology and Cancer Registry CancerCare Manitoba	Steven Latosinsky Department of Surgery Faculty of Medicine University of Manitoba	Tom Noseworthy Department of Community Health Science Faculty of Medicine University of Calgary
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Report Two: Critical Evaluation of the Literature

A) Summary of Research Results:

Objective One: Relationships between patient characteristics health services wait times and mortality, health status or quality of life.

- The majority of identified studies monitored patient waiting times and were not designed for the establishment of benchmarks.
- No compelling evidence was found that waiting for cancer surgery impacted negatively on clinical outcomes from the cancer.
- Of the articles reviewed, 49% did not have a strong methodology reported and 80% were not generalizable to other settings.
- 49% of the articles were graded C for level of evidence.
- 6 articles examined health status in relation to waiting times.
- 10 studies looked at reducing waiting times through changes to the referral process and patient management or flow.

Objective Two: Wait time benchmarks that are currently used nationally or internationally and research evidence (if any) that has been used to support them.

- The Canadian Society of Surgical Oncology (CSSO) has stated that for the average patient with cancer, the time from completion of diagnostic tests to definitive surgery should not exceed 2 weeks. This benchmark was established solely on the basis of expert opinion, with no other supporting evidence.
- Two studies assessing compliance with the CSSO standard found only 32.5% of cancer patients in Ontario and 44% of breast cancer patients in Alberta met the 2 week rule.
- Some studies found waiting time varied by type of cancer suggesting not all cancer can be treated the same with one universal benchmark.
- A study based in BC examining a breast cancer screening program found targets set by a Canadian Breast Cancer Initiative could be met by improving processes such as facilitated referral.
- 100% of the identified benchmarks were established solely on the basis of expert opinion, considered level D evidence.

Executive Summary:

Study Quality

A critical review of the literature is important because if waiting time studies are used as evidence to set benchmarks then the quality of those studies needs to be evaluated to ensure benchmarks are based on well planned thorough studies with results that can be generalizable to larger populations. The results of the systematic review found studies to be of poor quality reporting limited findings.

Of the 172 articles identified in the original search process, only 24% qualified for the critical evaluation. Overall, 49% of the articles reviewed did not report a strong methodology. Also, 80% of the articles were not generalizable to other settings or geographical areas. In addition, the level of evidence for 49% of the articles were graded at a C level. Specifically, when assessed for a clear plan to explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time, 41% of the studies failed.

The definitions of waiting times are crucial for comparing studies but are often very poorly described, raising serious questions about the quality of the literature evaluated and the results reported. Without a clear explanation of waiting lists, studies cannot be accurately compared and summarized. When documenting waiting time, reviewers found that studies were measuring different delays at different times with different patients.

The lack of standardized and reliable data prevents healthcare providers and governments from making informed decisions. As a result, study findings must be examined carefully and not taken as evidence to help inform decision makers with setting benchmarks.

To date, a review of the literature has shown little evidence of deterioration in medical condition while waiting. No strong evidence was found that waiting for cancer surgery impacted negatively on clinical outcome from the cancer. To further investigate the relationship between waiting times and health outcomes, 185 additional articles have been ordered to be reviewed.

While only some studies examined waiting and health outcomes directly, many examined how patients and referrals are managed in the system suggesting there is good evidence that reduced waiting times can be achieved through system changes.

Only a few studies investigated key variables related waiting times for cancer patients which yields little evidence to frame benchmarks or to set targets within the health care system (See Figure 1).

Overview of Benchmarks:

A review of the benchmarks identified in the studies revealed the following:

- 1) No consistent benchmark for a specific cancer site or patient characteristic was observed.
- 2) Most benchmarks were simple targets set for a specific waiting time interval. A few, however, included complex stratifying systems based on patient urgency, such as in Saskatchewan.
- 3) Some benchmarks were quite broad and others specific to individual diagnostic conditions or patient treatments.
- 4) The waiting time interval used in benchmarks varied and did not match the waiting time measures examined in the literature.
- 5) The deviations in referral pathways noted in some studies made comparing standard waiting times to benchmarks difficult.
- 6) The variation in diagnosis pathways raised questions about the application of a universal benchmark for all types of cancer.
- 7) Some studies found waiting time varied by type of cancer, suggesting not all cancers should be given the same benchmark.
- 8) Most studies comparing patient waiting time data to an existing benchmark did not meet the time frame mandated.
- 9) None of the benchmarks cited in the literature were found to be based on a level of evidence higher than a grade of D (Expert Opinion).
- 10) None of the benchmarks clearly indicated the involvement of patients in the process of defining acceptable waiting times.

In lessons learned from the United Kingdom, which has been dealing with the same waiting time problems and related political pressure, real change has come from improving the health system.

Identifying and improving efficiency in the system will do more to improve waiting times and patient satisfaction than benchmarking. Through initiatives such as the “one stop breast clinic,” there is good evidence that reduced waiting times can be achieved through system changes.

Report Two: Critical Evaluation of the Literature

Goal:

The goal of this research project was to provide an in-depth summary of the issues and evidence supporting specific benchmark waiting times in solid organ malignancies treated by surgery.

The project was a systematic review and assessment of the literature regarding benchmark waiting times of patients with solid organ malignancies treated by surgery. Based on a comprehensive search strategy, the project was broken into three research stages.

Background:

The first stage of the project was completed and the results reported on July 22, 2005. In Stage One, a search of the literature was conducted with the help of a medical librarian. The search focused on identifying references pertaining to cancer, surgery, and waiting times.

In total, 172 articles and 8 reports were identified from relevant databases including Medline, PubMed, CINAHL, and ProQuest. References obtained from this initial search were then reviewed by the principal investigator (a surgeon with a strong clinical interest in cancer) for relevance to the project's aim and assigned a relevance rating. Highly relevant articles were then reviewed to identify cancer waiting time benchmarks and the grade of evidence supporting each benchmark.

In this first stage, few Canadian benchmarks were observed in the literature. While more international benchmarks were found, only expert opinion was identified as the source for the establishment of the identified benchmarks.

From this initial review, one important question emerged. If the literature contained little or no discussion of benchmarks or the evidence compiled to support them, *what did the literature on cancer waiting times tell us? Specifically, did the literature reveal any relationships between waiting times and patient health outcomes?*

B) Research Results – Objective 1

Stage 2 of the research project focused on synthesizing the research evidence regarding the relationship between patient characteristics and health services waiting times according to a number of key outcomes.

Purpose

The purpose of Stage 2 of the project was to:

- To review the available evidence on cancer waiting time benchmarks in both randomized and non-randomized controlled trials.
- To identify practical and clinically established waiting time measures with respect to impact on mortality, quality of life, and the surgical treatment of cancer.
- To assess the completeness of existing reviews and audits on cancer waiting time benchmarks and how applicable their conclusions are to the health care system in Canada.
- To compare the appropriateness and effectiveness of evidence-based cancer waiting times as a part of quality patient care.

Method

To continue the systematic review, Stage 2 focused on the critical evaluation of the relevant studies found in Stage 1.

Critical Evaluation Framework

As stated by Dobbins et al. (2001), a systematic review “combines the results of primary studies by searching for, appraising and synthesizing findings of primary studies in a systematic way.” In order to effectively review the studies, a critical evaluation framework was constructed to appraise and synthesize the literature.

First, an assessment of the scientific quality of the research methodology and study findings was incorporated into the framework. Then, the framework was structured to record waiting times in relation to a number of dimensions including patient characteristics and outcomes. Consequently, the framework used for the critical evaluation had three parts; study quality, dimensions of waiting time, outcomes of waiting time.

1) Study Quality

Assessing the quality of studies is a key component of a systematic review, as “the conclusions we derive from a systematic review....depend on the quality of the included studies” (Hunt, 1997). Given the importance of evaluating the evidence provided in the studies found in the literature, quality was assessed in a number of areas.

General Methodological Quality

The main elements comprising the critical evaluation were derived from the framework developed by the United Kingdom National Health Service (NHS) evaluating waiting time audits (Lewis, 2005).

While the framework used by the NHS provided a comprehensive list of items to review in evaluating study quality, the timelines of this stage of the project demanded a simple, scaled down version. With a focus on simplicity and still maintaining scientific rigor, additional sources were consulted in order to examine the vital components and the documentation required in systematic reviews (Creswell, 1994; Elwood, 1998; McKibbin, 1999).

From these sources and the NHS report, three key questions were synthesized:

- Q1) Did the study report source of patient information, patient selection method, and sample size?
- Q2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time?
- Q3) Was there enough information provided to follow the process of analysis and assess the author's conclusions?

These Yes/No questions provided an inclusive and straightforward way to rate the value of the findings from each article. A well conducted study reporting important methodological information would receive “yes” for all three questions or 3 out of 3. Studies with moderate designs would receive “yes” for two of the three questions (2/3), while weak studies of low quality would have one “yes” or less (1/3 or 0/3).

Specific Design Elements Impacting Waiting Time Assessment

The three questions listed above provide a simple general review of how a study was conducted. Additional elements of quality, however, needed to be captured as the specific issues directly related to the overall value of waiting time study findings. As Greenhalgh (1997) notes, “one of the tasks of a systematic reviewer is to draw up a list of criteria, including both generic (common to all research studies) and particular (specific to the field) aspects of quality”. For example, Greenhalgh (1997) notes the importance of assessing study bias, study error, and generalizability. As a result, five additional items were selected.

The additional Information items selected to be document were:

- **Selection bias** – Are there differences between the eligible population and the participant population that affects in the inferences in the study (Internal bias)?

Selection bias are study design factors that can drive the results and portray an inaccurate outcome.

For example: Duff et al., (1997) in a study on rectal cancer patients reported the waiting times of 65 patients out of 104 patients in a clinical audit without indicating the criteria for choosing the 65 patients. As a result, the waiting times reported may have been biased by this selection criterion.

- **Application of Results** – How generalizable are the results to the target population?

In many cases, the studies failed to represent the target population being examined due to the size of the sample or the sample of participants and conclusions could not be generalized.

For example: Marshak et al., (2004) looked at the patients with advanced laryngeal cancer treated by surgery followed by radiotherapy. While the authors found delay in post operative treatment was not a significant predictor of survival, in total only 44 patients were investigated.

- **Methodology design** – Was the study prospective or retrospective?

The goal of this item was to determine if the studies in the literature measuring waiting times was balanced between these study approaches or if there was a tendency to use retrospective over prospective designs. Prospective studies offer the opportunity to analyze all patients entering the system and follow their treatment process. Often retrospective studies are based on administrative health databases that involve complex patient selection which reduces the application of the results and increases study bias.

For example: Mayo et al., (2001) studied women with breast cancer in Quebec. The study reported waiting times for women 20 or older undergoing an invasive procedure. The study excluded women if consecutive procedures were separated by more than 5 months to remove 6 month follow up cases in the database. As a result, the waiting times reported could not be applied to all women with breast cancer due to database constrictions.

- **Environmental factors** - What factors are affecting sample bias (External bias)?

Even with a well-designed study, changes in resources, number of surgeons participating, health policy, or unexpected events affects, time of year, can affect the meaning that can be drawn from the findings.

For example: During a study by Cromwell and Griffiths (2002) examining the implications of waiting list design for elective surgery patients, the study coincided with a state wide waiting list reduction program, impacting the waiting time comparisons that could be made between different patients groups.

- **Withdrawals/drop-outs** – Did the study track withdrawals and drop-outs or report what happened to them?

An important part of the picture is not just the waiting time of patients reaching treatment but the waiting time and process for all patients to derive a complete picture of the waiting time process and overall system issues.

For example: Sauven et al. (2003) in an assessment of a breast screening program over three years, collected the waiting time for women who needed either diagnostic or therapeutic surgery. In the article, the number of women tracked and the number of withdrawals or drop-outs were not provided. As a result, it is not clear who the yearly comparisons of waiting times reported in the study depict.

Study Populations

To answer these five additional questions, the review included an examination of the selection process. Specifically, the reviewers looked at the following study populations and sample groups:

- i. Target population
- ii. Source population
- iii. Eligible population
- iv. Sample Participants & Groups to be Compared

Arnesen et al., (2002) show an excellent example of this selection process in a study examining determinants of the waiting times for inpatient surgery. In a breakdown demonstrating the study sampling method, Arnesen et al (2002) report the source population (585 patients), eligible population (describing patients not excluded due to lack of questionnaire or 133 patients), final sample participants (452 patients) and a description of all withdrawals and drop outs (56 patients).

This is an important part of the review process because the selection of participants to be included in the study reveals study biases. Selection of participants also relates to how comparable the results are to other studies or other cancer populations.

Level of Evidence

Quality assessment was also based on the type of study conducted. Fletcher and Sackett as part of the Canadian Task Force on the Periodic Health Examination devised a ranking system to reflect the validity of the evidence or “level of evidence” provided by a study (Phillips, 1998).

Based on the levels of evidence, each study could then be given a grade to represent the value of the findings. Since 1998, the ranking system has evolved and is now used in many different aspects of health research. The ranking system used by the reviewers is show in Table 1.

Table 1
Levels of Evidence - Canadian Task Force
on the Periodic Health Examination

Level of Evidence	Grading Criteria	Grade of Recommendation
1a and 1b	Randomized Controlled Trial (RCT)	A
1c	Randomized Controlled Trial (All and None)	
2a	Systematic Review of Cohort Studies	B
2b	Individual Cohort Studies, or Low Quality RCT	
2c	Outcomes Research	
3a	Systematic Review of Case-Control Studies	
3b	Individual Case-Control Studies	C
4	Case-series or Non-RCT studies and Administrative Database Research.	
5	Expert Opinion	D

Together, the aspects of quality included in the framework provided a comprehensive review of the value of the evidence found in the articles.

2) Dimensions of Waiting Times

While the first part of the critical evaluation focused on how the study was conducted, the second part of the review related to documenting information reported in the study. The key information pieces recorded directly related to the purpose of the project including health system factors related to waiting times. Reviewers documented in the following areas:

- **Primary Cancer Site**
Listed the main cancer site such as breast, lung, and prostate.
- **Patient Characteristics**
Including age, gender, and co-morbidities information.
- **Tumor Factors**
Any descriptive wording including stages and type.
- **Surgeon Characteristics**
Including number of surgeons participating in the study and type of surgeons if not already recorded.
- **Patient Flow**
Information about patient processing through the health system from first contact to treatment and follow-up, including adjustments made to patient flow.
- **Patient Load**
Information about the relationship between the numbers of patients on a waiting list and resources in the system (e.g. compared to the number of surgeons).
- **Cancer Referral Process**
Information about patient referral process and effect of changes or improvements to the system.
- **Urgency**
Information about patient prioritising systems or other urgency indicators.
- **Measured Wait Time**
Any measured wait time reported including mean, median, and percentages.

- **Definition of Wait Time**

In order to synthesize the literature, the reviewers recorded the waiting time intervals found in the studies. To simplify the process, five pre-defined waiting time intervals were documented. These were.

1. T0 – Time from symptom to GP visit where a decision to refer to a surgeon is made.
2. T1 – Date of referral by GP to first appointment with surgeon.
3. T2 – Date of first appointment with surgeon to date decision to proceed with surgery is made.
4. T3 – Specialist diagnosis and decision to proceed with surgery is made to date of actual surgery.
5. T4 – Date of referral by GP to date of actual surgery date.

In cases where the waiting time interval examined did not match with the five defined intervals, the waiting time referred to in the study was documented.

3) Outcomes of Waiting Time

Finally, the critical framework synthesized the main findings with respect to several outcomes central to the focus of purpose of the project. Brief statements capturing study findings or author comments about the following outcomes were documented:

- **Quality of Life**

Information about assessing patient quality of life including description of elements included in the assessment and any specific tools used.

- Description – improvement (yes or no)
- Tool Used

- **Health Status**

Information about patient health including survival, surgical complications, and mortality and other co-morbidity factors.

- Mortality
- Pre and Post Operative Status

- **Costs**

Information about impact with respect to the financial burden of waiting time to the patient or the health system.

In addition, reviewers documented main study findings and any important comments about the study.

Review Selection

The preliminary results of the literature search in stage one revealed a limited, yet, very variable number of articles on nature and focus on waiting times. While a plethora of opinions on waiting issues have been published, few actual studies measuring waiting times for cancer patients treated surgically were found. In addition, a more thorough review of the articles uncovered a number of studies examining transplant patients, which were felt not to be germane to this project. As a result, a detailed filtering process was established to identify the articles directly related to the aim of the project.

Study Selection

Given the variability found in the literature retrieved, studies were selected for critical evaluation through two stages. The first stage re-assessed article relevance to the goal of the project. The second filtered out articles auxiliary to the aim of stage two but not directly related.

Relevance Rating Re-assessed

Initially, the relevance of each article was assessed in stage one based on the title of the article. The principal investigator (a surgeon with a strong clinical interest in cancer) gave each item a score from 1 to 5 (1 = highly relevant to 5 = definitely not relevant) representing the item's relevance to this project. The rating provided a quick assessment of the material to eliminate items unrelated to the focus of the study. Full articles with a relevance rating of one, two, or three were ordered. Of 172 articles originally identified, 133 articles were retrieved.

In order to thoroughly analyze the relationship between patient characteristics and cancer waiting time, the principal investigator (a surgeon with a strong clinical interest in cancer) re-assessed the relevance of all 172 articles based on the full article or abstract. The second relevance rating ranked articles according the following criteria.

Level 1 –

- Articles including cancer patients treated surgically with findings related to project outcome measures.

Level 2 –

- Articles including cancer patients treated surgically with findings probably related to project outcome measures.

Level 3 –

- Poorly conducted articles including cancer patients treated surgically with findings possibly related to project outcome measures.
- Well conducted studies for non-surgical patients (radiotherapy) with a possible relevance to surgery and waiting time or applicable lesson to be learned.
- Articles about general waiting time possibly related to project outcome measures or reporting applicable lesson to be learned.

Level 4 –

- Articles including cancer patients treated surgically with findings probably not related to project outcome measures.
- Articles dealing with transplants as the issues surrounding waiting times for those waiting for transplants are unique and not applicable to cancer cases in general.

Level 5 –

- Articles not mentioning cancer patients and not reporting outcome measures relevant to the project.

Based on the inclusion criteria, only articles with a rating of one, two, or three were retained for the critical evaluation of the literature. The results of the second relevance rating are reported in Table 2. The re-assessment provided a mechanism to sort through the variability in the literature and effectively identify 74 articles focused on the issues of interest in this project.

Auxiliary Articles

The re-assessment of relevance sifted through the literature and focused on the issues of interest in this project. The relevance rating, however, did not assess the type of literature and only examined the potential content of the article. Many articles rated as relevant that could provide helpful information about waiting times and benchmarks did not directly measure waiting time for cancer patients treated surgically. In order to focus on the information required in stage two articles were sorted into two groups, *auxiliary* or *for review*.

Auxiliary articles included a range of material from editorials to studies beyond the scope of the critical evaluation framework. Whereas articles for review related directly to the relationships of interest in Objective 1: “synthesizing the research evidence regarding the relationship between patient characteristics and health services waiting times according to a number of key outcomes.”

Articles were identified as “Auxiliary” under the following conditions:

Inclusion criteria:

- a) only editorial or commentary information provided
- b) provided a review of a study/studies
- c) studies not directly referring to all three terms: cancer, waiting times, and surgery.

In addition, reports with no direct measure of cancer patients waiting times treated surgically and dissertations were excluded in stage two. Although, auxiliary articles were not evaluated in this stage of the project, it is recognised that the material may provide expert opinion and useful information about lesson learned in managing waiting times. As a result, key findings from the auxiliary literature, reports, and dissertations will be summarized in stage 3 of the project.

The re-assessment of relevance identified 74 articles focused on the issues of interest in this project. Of the 74, 27 articles were categorized as auxiliary. Subsequently, 47 articles remained for review. Of the 47 articles, six were still on order and not available for the start of the critical evaluation. Accordingly, 41 articles were critically evaluated.

Table 2
Articles in Database by Relevance Rating

Number of Articles in Database					
Relevance Level:	1st Relevance Rating (Based on Title)	2nd Relevance Rating (Based on Abstract or Full Article)	Marked as Aux. (A)	Articles to Review	Articles Pending
Level 1	39	29	4	22	3
Level 2	33	17	7	9	1
Level 3	61	28	16	10	2
Total	133	74	27	41	6
		43% of 172		24% of 172	
Level 4	24	75			
Level 5	15	23			
TOTAL	172	172			

Review Protocol

All identified studies that met the inclusion criteria were assessed for methodological quality and pertinent information outlined in the framework. To critically evaluate the literature, a highly qualified evaluation team of three research consultants with a diverse and valuable set of skills to carried out the review.

The reviewers were Masters and PhD. prepared and included one reviewer with a nursing background given the medical complexity of cancer. The evaluation team also included a reviewer with experience in health care evaluation to ensure sufficient merit given to the external validity of studies (Downs, 1998). In addition, reviewers had a background in statistical study design and analysis for a reliable review of methodological quality. Two of the three reviewers had experience with waiting time measurement and the issues surrounding waiting times including urgency scores.

Each article was reviewed independently by two different reviewers. The double review of studies conducted independently reduces bias and increases objective evaluation of the findings. Results were then reviewed and combined.

Consensus Model

Consistent with other systematic reviews (PHRED, 2004), articles were reviewed independently and examined for discrepancies. Differences in the quality ratings, sample size, waiting time measures and definitions were highlighted as discrepancies. Discrepancies were then reviewed with the evaluation team and resolved through a consensus model.

Under the consensus model, the evaluation team resolved discrepancies by discussion and reaching agreement. Under this review system, reviewers studied the rating and information difference and came to a mutual decision. If the reviewers found it difficult to make a decision, the third research consultant on the evaluation team worked through the issue with the reviewers and made a final decision acceptable to both reviewers.

The consensus model provided the opportunity to identify if the discrepancy was an actual discrepancy. In addition, the three member evaluation team allowed one researcher to remain objective and assist with the decision process.

Discrepancies

Discrepancies were due to differences in interpretation of evaluation criteria. The majority of differences in the responses were due to oversight or misunderstanding the information reported in the study. Given the project

timelines, less time was spent analysing each article than would have been ideal and this increased the number of oversights. In a few cases, differences in interpretation of the study arose. Using the consensus model, all discrepancies were resolved. Most differences were documentation issues rather than actual opinion differences.

Overall, 80 discrepancies were found. Of the 80, 22 discrepancies were related to questions about general methodological quality. The majority of differences 44 (55%), however, involved specific design elements impacting the assessment of waiting times.

Of the 44, most were due to differences in evaluating sample bias (15) and application of the results (17). Both of these aspects of quality are difficult to assess as a number factors influence bias and generalizability. Finally, seven of the 80 discrepancies in the level of evidence were noted along with six regarding sample size and waiting time information.

Review Bias and Challenges

As with any research project, methods are developed to minimise the risk of error and bias. In this project, articles were evaluated by two independent reviewers. The double review of studies conducted independently reduces bias and increases objective evaluation of the findings. In addition, reviewers evaluated articles from different relevance levels, countries, and outcomes.

Although many efforts were made to reduce review bias, prejudice can still be introduced. In the review process, the consensus model was used to resolve discrepancies. While the model provided many advantages, the group process could have reduced the objectivity of reviewers. As noted, however, most differences were documentation issues rather than actual opinion differences.

During the review process a number of challenges emerged. Given the timelines of the project, less time was devoted to article assessment than found in other systematic reviews. The time restriction may have increased the number of discrepancies documented as reviewers searched for key information quickly with little time for reflection and second review. Reviewers were also challenged by the level of detail to analyze in assessing quality.

In addition, the variation found in the studies proved problematic. First, unlike most systematic reviews evaluating randomized control trials for a specific condition, the articles on waiting times included multiple cancer conditions and generic groups of cancer patients. Second, waiting time measures and time intervals also varied dramatically. Third, in some cases surgeons were studied and in other case specific patient groups. As a result, uniform documentation and synthesis of the results was difficult to achieve due to the variation in the literature.

Primary and Secondary Search Processes

The primary search of the literature was conducted in stage one with the assistance of the University of Manitoba medical library. In total, 172 articles and 8 reports were identified from relevant databases including Medline, PubMed, CINAHL, and ProQuest.

At the time, the local library did not have access to EMBASE. As a result, the 172 articles obtained were reviewed while negotiations with another medical library were made. Presently, arrangements have been made with a second medical library to search EMBASE. The results of the search will be included in the next report.

In addition to database searching, the bibliographies of the highly relevant articles identified in stage one were reviewed for relevant articles. In total, 185 additional articles have been identified as potentially relevant to the project. These articles will be retrieved, assigned a relevance rating, and sorted into *auxiliary* and *for review* categories.

Some of the 185 articles refer to issues on waiting times and health status and other are general articles on waiting times. Of the 185 additional articles ordered, it is expected that only about 40 will be critically evaluated and the results compared to the current evaluation. The remainder will be added to the auxiliary category and reviewed for key findings and lessons to be learned.

A number of articles highlighted did not refer to surgery as the form of treatment, but rather, radiotherapy. These articles will also be retrieved and examined to identify any lessons to be learned or key insights about waiting times.

Furthermore, relevant informal reports and unpublished documents from related medical organizations and health authorities will be investigated stage three. These secondary sources will also be reviewed and key findings summarized.

Results

In total, 41 highly heterogeneous articles were reviewed in detail. The information collected on the quality of the study, specific study dimensions, and key outcomes has been synthesized and reported below.

Study Quality

Given the importance of evaluating the evidence provided in the studies found in the literature, reviewers assessed quality in a number of areas. Table 3 and 4 report the results for each aspect of quality evaluated.

As shown in Table 3, the majority of studies were found to be of high quality. Generally, the studies reported data source, sample size, and provided sufficient information to support the author's findings.

Overall, 51% of the studies examined showed strong methodological quality. Many more were rated as moderate and only 17% were described as weak. The moderate and weak ratings are not an assessment of solely study design. Assessment could only be made on the information provided in the study. As a result, a well conducted study failing to report key design and analysis information would receive a lower rating.

With respect to question 2, (Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time?), some studies did not explain when or how a patient was placed on a waiting list or adequately describe the waiting time interval examined. While only 41% failed in question two, these definitions of waiting times are crucial for comparing studies but are often very poorly described, raising serious questions about the quality of the literature evaluated and the results reported. Without a clear explanation of waiting lists, studies cannot be accurately compared and summarized.

Given the issues found in assessing question 2, the results of the questions assessing specific design elements were not surprising. Of the 41 studies reviewed, 33 or 80% were not generalizable to the target population examined.

The generalizability of a study refers to the extent that the results could be applied to the source population and other relevant populations. This means that any of the major variables would not associate strongly to nor vary considerably in different societies with other social, economic, cultural, ethical, or geographical differences. In order for a study to be considered generalizable, a study would have good external validity, good response rates, little missing data, and good sample size linked with appropriate study design.

The issues surrounding the application of the results based on the level of quality of the study was also captured in Fletcher & Sackett (Phillips, 1998) grading system. The evaluation of the literature found all the studies were; individual cohort studies, outcome based studies, or based on administrative databases. Fletcher & Sackett (Phillips, 1998) grade these levels of evidence as grade B (50% of the cases) and grade C (50% of the cases).

The grade of the studies reviewed, however, reflect the difficulty in studying cancer patient waiting times. While a randomized control trial would be considered grade A evidence, it is unlikely and that a hospital ethics committee would approve such a design.

Table 3 – Summary of Study Quality

Quality Descriptors:					
General Methodological Quality					
<i>Question</i>	<i>Yes</i>	<i>Percentage Succeeded</i>	<i>No</i>	<i>Percentage Failed</i>	<i>Total</i>
Q1) Did the study report source of patient information, patient selection method, and sample size?	32	78%	9	22%	41
Q2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time?	24	59%	17	41%	41
Q3) Was there enough information provided to follow the process of analysis and assess the author's conclusions?	36	88%	5	12%	41
Quality Rating (Based on Q1, Q2, Q3 listed above)	Strong (Yes to all 3 Questions)	Moderate (Yes to 2 Questions)	Weak (1 Yes or Less)	Total	
<i>Number of Studies</i>	21	13	7	41	
<i>Percent of Total</i>	51%	32%	17%	100%	
Specific Design Elements Impacting Waiting Time Assessment					
<i>Question</i>	<i>Yes</i>	<i>No</i>	<i>Unknown</i>	<i>% Failed</i>	<i>Total</i>
<i>Selection bias of Study</i>	9	23	9	22%	41
<i>Application of Results (Generalizable)</i>	5	33	3	80%	41
<i>Withdrawals/drop-outs (21 cases not applicable)</i>	9	7	4	50%	41
<i>Environmental factors</i>	Only comments provided from reviewers given the factors possible.				
<i>Methodology design:</i>	<i>Retrospective</i>		<i>Prospective</i>		<i>Total</i>
	21		20		41

Table 4
Levels of Evidence for Reviewed Articles

Level of Evidence	Grading Criteria	Number of Reviewed Studies	Grade
1a and 1b	Randomized Controlled Trial (RCT)	0	A
1c	Randomized Controlled Trial (All and None)	0	
2a	Systematic Review of Cohort Studies	0	B
2b	Individual Cohort Studies, or Low Quality RCT	10	
2c	Outcomes Research	11	
3a	Systematic Review of Case-Control Studies	0	
3b	Individual Case-Control Studies	0	
4	Case-series or Non-RCT studies and Administrative Database Research.	20	C
5	Expert Opinion	0	D
	Total:	41	

Note: Levels of evidence as defined by the Canadian Task Force on the Periodic Health Examination (Phillips, 1998).

Half of the studies examined used retrospective designs limiting the type of patient examined. Of the 20 studies using a prospective approach, only nine tracked all participants including withdraws and dropouts. The articles reviewed are listed in Appendix A with the corresponding quality ratings. All of the articles reviewed, despite quality ratings, were examined for relationships in the literature and benchmarks.

The issues highlighted the question as to the context under which the findings reported in the literature can be utilized and the conclusions that can be drawn.

Dimensions and Outcomes in Waiting Time

A review of the literature found studies could be categorized into two groups:

A) Studies reporting information about a specific variable:

For example, many studies reported the mean age of the patients examined but did not investigate the effect of age on waiting time or any outcome variable.

B) Studies examining the relationship between waiting time and/or another variable:

a. Dimension to Waiting Time

For example: One study examined if changes in referral process decreases patient waiting time to consultation.

b. Waiting Time to Outcome

For example: One study examined if increases in patient waiting time impacts health status, and if the condition of the patient deteriorates during the waiting period.

c. Dimension to Waiting Time to Outcome

For example: One study examined if a change in patient referral to a clinic reduced waiting time and in turn, clinic costs.

While the literature included both general information and relationships, examining the relationships between variables was the main aim of stage two.

An overview of the dimensions and outcome investigated in the studies evaluated is provided in Figure 1. In addition to the dimensions and outcomes defined in the critical evaluation framework, five new variables were added to the figure. The new variables were included to represent the important parts of the literature on cancer waiting times.

While the variables were identified as a result of the review process, attempts were made to summate key findings for each variable from all the studies reviews. Not all of the new variables, however, have been examined in the literature. Nonetheless, the variables were included as a pertinent part of the findings. The additional variables included in were patient anxiety (Anxiety), patient co-morbidities (Co-morbidities), socio-economic factors (Socio-Econ), and health system facilities (Facilities) and patient satisfaction (Patient Satisfaction).

In Figure 1, the numbers of studies simply reporting information about a variable are listed in a bracket for each variable. The number of studies examining a relationship or reporting significant findings of the variable to another are listed in bold. The main findings from the articles exploring relationships in the literature are summated in Appendix B.

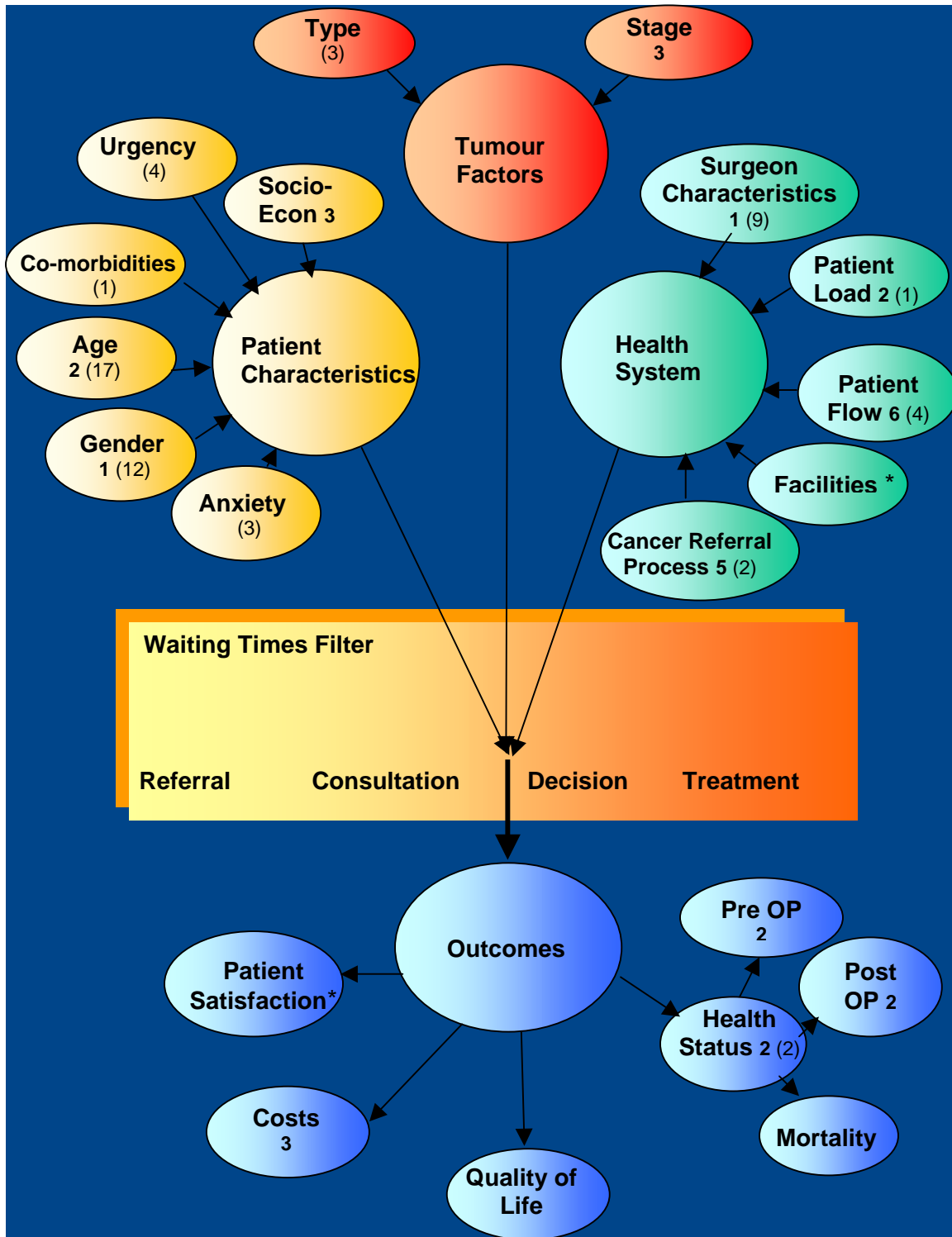
The numbers in Figure 1 depict the scarcity of articles examining key outcome measures in cancer waiting time research. Of the studies reviewed, none measured quality of life and patient satisfaction. Only six studies examined health status. Surprisingly, few studies in the literature examined the effect of waiting on patients with different tumour factors and their resulting health outcomes.

More studies, however, examined the effect of change to the health care system on waiting times and in some cases, on outcomes. One article examined surgeon characteristics and actual waiting time and nine recorded the number and/or type of surgeons involved in the study. Several studies investigated the referral process and patient flow in the health care system and waiting times, some of which were found to reduce costs.

Reviewers also documented the waiting time reported in the studies. The result of the 41 studies reviewed found that while many studies measured the actual waiting times experienced by cancer patients, no consistent trend could be summarized due to considerable variation in definitions, patient groups, and methods. In addition, many studies reported waiting time for patients on a waiting list without describing when and how a patient was placed on the list. Unfortunately, few studies examined waiting time in relation to outcome measures.

These preliminary results suggest that organizations may be predominantly focused on the collection of baseline data and the assessment of patient flow and processing rather than developing waiting time limits.

Figure 1
Distribution of Studies for Waiting Time Dimensions and Outcomes



Note: Numbers in bold e.g. **3** indicates number of studies examining relationships. Numbers in brackets e.g. (2) indicates the number of studies reporting information only. * Marks variables not examined in detail.

Discussion

This project set out to provide an in-depth summary of the issues and evidence for establishing waiting time benchmarks in solid organ malignancies treated by surgery. To achieve this aim, a systematic review with a critical evaluation of the literature was conducted.

A critical review of the literature is important because if waiting time studies are used as evidence to set benchmarks then the quality of those studies needs to be evaluated to ensure benchmarks are based on well planned thorough studies with results that can be generalizable to larger populations. The results of the systematic review found studies to be of poor quality reporting limited findings.

Study Quality

Of the 172 articles identified from the original search strategy, only 24% qualified and were critically evaluated. Articles were assessed and performed poorly on several aspects of quality.

Overall, 49% of the articles reviewed did not report a strong methodology. Also, 80% of the articles were not generalizable to other settings or geographical areas. In addition, the level of evidence for 49% of the articles were graded at a C level. Specifically, when assessed for a clear plan to explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time, 41% of the studies failed.

The descriptions for waiting times are central to the literature and in many cases the studies themselves, raising serious questions about the quality and value of the results reported. Without a clear explanation of waiting lists, studies cannot be accurately compared and summarized. When documenting waiting time, reviewers found that studies were measuring different delays at different times with different patients.

The lack of standardized and reliable data prevents healthcare providers and governments from making informed decisions. As a result, study findings must be examined carefully and not taken as evidence to help inform decision makers with setting benchmarks.

The reality is that there were no studies identified which were designed for the purpose of establishing benchmark waiting times for the surgical treatment of cancer patients. All of the articles, regardless of quality ratings, were examined for evidence relevant to benchmark waiting times.

Waiting Time Findings

The results of the 41 studies reviewed found that studies mostly discussed the use of actual waiting times experienced by cancer patients. In the studies reporting waiting times, many reported that more urgent cases experienced shorter waiting times (Chin., 1999; Mayo et al., 2001; Olson et al., 2002; Reed et al., 2004). While studies may have reported how quickly or how slowly patients were processed, no conclusions could be drawn about the affect of waiting on health status.

With respect to health outcomes, very few studies have attempted to measure the impact of waiting for surgery on clinical outcomes of cancer treatment. Bozcuk et al., (2001) found delays in time to treatment showed no difference in survival for lung cancer. For postoperative patients, Marshak et al., (2004) found delay in follow-up radiotherapy had no effect. Nam et al., (2003), however, found delay to surgery increased postoperative recurrence in prostate cancer patients. Overall, there is limited evidence of deterioration in medical condition while waiting for cancer surgery. A summary of the articles reviewed and the waiting times reported is provided in Appendix C.

While only some studies examined waiting and health outcomes directly, many examined how patients and referrals are managed in the system. Bozcuk et al., (2001) noted that one factor influencing health outcomes for lung cancer patients waiting for surgery was early referral and diagnosis.

Several studies found waiting times decreased with a facilitated referral process or one stop investigation clinic (Olivotto et al., 2001; Khan et al., 1999; Gui et al., 1995). Improvements to the health care system involved changes to the referral process, which reduced waiting time at little or no additional cost to the system (Olivotto et al., 2001; Parente et al., 2002). Consequently, while there is no strong evidence that waiting for cancer surgery impacted negatively on clinical outcome from the cancer, there is good evidence that reduced waiting times can be achieved through system changes.

In short, the literature tells us little about issues surrounding the waiting time of cancer patients and provides little evidence for establishing benchmarks. A review of the level of evidence supporting the benchmarks found in the literature is described in section C.

C) Research Results – Objective 2

- Summary of wait time benchmarks that are currently used nationally or internationally.
- Synthesis of research evidence (if any) that has been used to support these benchmarks.

Summary of Benchmarks

A critical evaluation of the literature also included the search for benchmarks and the evidence used to support them. Overall, a review of relevant articles (relevance ranking of 1, 2 or 3) and reports revealed few cancer waiting time benchmarks.

Describing Benchmarks

To date, no universal definition of a cancer waiting time benchmark exists. The basic dictionary definition of a benchmark is “a standard by which related items may be judged” (Merriam-Webster, 1995). With respect to this study, a benchmark is a time limit set for patient care, against which actual patient care can be measured.

For the purposes of this study, waiting time benchmarks for cancer were reviewed according to a number of dimensions. Firstly, the range of settings was examined, for which the benchmark applies. The range of settings reviewed included: primary site; other specific patient factors; tumour factors; form of treatment; and region.

The primary site was that part of the body to which the cancer benchmark pertains (if designated). Patient factors included age, gender, and any other patient characteristic specific to the benchmark. Tumour factors described metastasized, non-metastasized, or any other condition specific to the benchmark. Region refers to the area for which the benchmark applies from provincial, to national, or single institution versus multi-institution (e.g. all patients with breast cancer in Ontario). The form of treatment was also included as a broad category to filter out studies not pertaining to the surgical treatment of cancer.

Secondly, the specific time intervals defined by the benchmarks were analyzed. Most cancer waiting time benchmarks can be divided into two categories, *waiting for consultation* and *waiting for surgery*.

Each category can be further divided into many different waiting time intervals. For example, waiting for consultation can be broken down to: a) the time from when first symptoms appeared to appointment with a general

practitioner (GP); and b) the time from referral made by the GP to the first appointment with the surgeon. Similarly, waiting for surgery can be measured from the first appointment with the surgeon to date of surgery, or, from date of referral by GP to date of surgery.

Generally, within the literature, however, the most common intervals measured and for which benchmarks are set, can be captured in five specific times. In order to simplify the results, these five time intervals are used to define the cancer waiting time benchmarks found. In a few cases, where the defined waiting time interval did not match with the five defined intervals, the waiting time referred to is given.

The five waiting time intervals defined in this study are:

- T0 – Time from symptom to GP visit where a decision to refer to a surgeon is made.
- T1 – Date of referral by GP to first appointment with surgeon.
- T2 – Date of first appointment with surgeon to date decision to proceed with surgery is made.
- T3 – Specialist diagnosis and decision to proceed with surgery is made to date of actual surgery.
- T4 – Date of referral by GP to date of actual surgery date.

Table 3 summarizes the benchmarks specific to Canada and any relevant factors examined in the range of settings. Table 4 portrays the waiting time benchmarks for cancer patients set by the National Health Service in the United Kingdom (UK). International benchmarks are listed in Table 5. Finally, countries with 'generic' waiting time benchmarks for all treatment areas (including cancer) are provided for comparison in Table 6.

Searching Results

The results of the search reflect the recent concern with patient waiting times, with most relevant articles occurring more recently. In stage two, 23 of the 42 articles reviewed referred to an existing benchmark. Of the waiting time benchmarks identified, both national and international targets were found. The benchmarks identified were documented along with comments from the authors of the studies and are listed in Appendix D.

In total, 22 of the 41 articles cited an established benchmark, seven of the studies noted that patients did not meet the proposed target. In one case, meeting the benchmark set for referral waiting times simply increased treatment waiting times as department resources were shifted (Robinson et al., 2003).

In addition, 14 of the benchmarks were set on a national level. Of the 22 benchmarks, 12 were set by a government organization and 8 by health practitioners and 2 under the Patient Charter in the UK.

The results of stage 1 and 2 were combined in Tables 5, 6, 7 and 8. In total, five Canadian benchmarks for cancer waiting times were identified as show in Table 5. Tables 6 and 7 show the 17 international benchmarks (7 by the National Health Service in the United Kingdom). In addition, 6 other benchmarks for all treatment areas including cancer were found are listed in Table 8.

Comparison of Waiting Times

Many of the waiting time intervals used in the benchmarks could be categorized into one of the five study defined waiting time definitions. While the time frame used for a benchmark varied, in most cases benchmarks were set for T1 (time from GP referral to first appointment with the specialist or hospital) or T3, the time from consult with surgeon to treatment (e.g. surgery), ranged from 2 weeks to 1 month.

In constructing the critical evaluation framework, these five time intervals were included for comparison with the benchmarks. A review of the studies found that while many studies measured the actual waiting times experienced by cancer patients, no consistent trend could be summarized due to considerable variation in definitions, patient groups, and methods.

The absence of standard waiting time intervals or definitions was due to a number of factors. First, a retrospective design was used for half of the studies reviewed. A retrospective design limits the data collection to the dates available in administrative databases or other records, which are often different from prospective designs.

For example, a prospective study could follow patients by recording date of first appointment with surgeon and date the decision to proceed with surgery was made. Retrospectively, surgeon schedule books are difficult to locate and use, rather, first date of billing for consult and date of surgery slated could be used. While the difference may be subtle, the studies are hard to compare. In addition, the difference in dates may make compliance with a benchmark time interval hard to capture.

Second, the studies reported time intervals from referral to various diagnostic procedures and then from the investigated procedures to final diagnosis. Since the diagnostic procedures required for diagnosis vary with different types of cancer, comparisons were hard to make. This variation in diagnosis pathway raises questions about the application of a universal benchmark for all types of cancer.

Third, a review of the studies showed many different types of referrals in diagnosing and treating a patient. For example, patients were referred from the GP to a specialist, who may have in turn referred the patient to another specialist before the patient received treatment. Again, the referral pathway can make comparing or applying standard waiting times difficult.

Synthesis of Research Evidence

Each benchmark was also reviewed according to the levels of evidence. Within the field of research, evidence can be based on very different things.

To address this issue, Fletcher and Sackett as part of the Canadian Task Force on the Periodic Health Examination devised a ranking system to reflect the validity of the evidence or “level of evidence” provided by a study (Phillips, 1998). Based on the levels of evidence, each study could then be given a grade to represent the value of the findings. Since 1998, the ranking system has evolved and is now used in many different aspects of health research.

In order to systematically evaluate the evidence supporting each benchmark, the Canadian Task Force on the Periodic Health Examination ranking system was used. Under this system, the level of evidence used to establish each benchmark was assessed and a corresponding grade was given.

A brief summary of this system is provided:

- Grade A – Benchmark based on Level 1 studies using randomized controlled trials (RCTs).
- Grade B – Benchmark based on Level 2 and 3 studies using non-randomized controlled trials (e.g. Cohort Study or Case Control Study).
- Grade C – Benchmark based on Level 4 studies using case series or extrapolations from level 2 or 3 studies.
- Grade D – Benchmark based on Level 5 studies using expert opinion or consensus.

According to the levels of evidence defined in this system, RCTs are superior in methodology, because the potential for bias is limited. By randomly assigning patients to intervention or control groups RCTs minimize the chance of confounding variables influencing the results. While RCTs provide a higher quality methodology in the hierarchy of evidence, it is sometimes not practical or ethical to perform RCTs to answer clinical questions.

Within the field of health care, conducting true randomized studies in order to determine valid patient waiting times for the treatment of malignant diseases is impractical, and probably unethical. Consequently, no benchmarks based on studies designed as RCTs exist in the literature.

Benchmark Report Cards

To evaluate the level of evidence provided for each benchmark, a corresponding grade was listed in Tables 5, 6, and 7 along with the other dimensions. As suspected, no benchmarks were based on RCTs. In addition, none of the benchmarks identified were based on non-RCTs.

In most cases, the benchmark was a grade D, solely based on expert opinion with little to no rationale given as to how the specific waiting time was derived.

The Canadian Society of Surgical Oncology (CSSO) has stated that for the average patient with cancer, the time from completion of diagnostic tests to definitive surgery should not exceed 2 weeks. This benchmark was established solely on the basis of expert opinion, with no other supporting evidence. Two studies assessing compliance with the CSSO standard, found only 32.5% of cancer patients in Ontario and 44% of breast cancer patients in Alberta met the 2 week rule.

In Saskatchewan, the benchmarks set were defined based on input from physicians and health care professionals. In other cases, such as New Zealand, the benchmark was based on the maximum acceptable waiting time set by the local hospital.

Furthermore, none of the benchmarks clearly indicated the involvement of patients in the process of defining acceptable waiting times. Yet, given the recent public outcry over waiting times, the inclusion of public perception of acceptable waiting time would be critical.

Benchmark Report Card

Table 5: Canadian Waiting Time Benchmarks for Cancer Patients Potentially Treated Surgically

Levels of Evidence from the Canadian Task Force on the Periodic Health Examination: Grade A – Excellent (Randomized Control Trials), Grade B – Very Good (Cohort or Case Control Studies), Grade C – Good (Case Series) and Grade D – Fair (Expert Opinion).

Region	Organization Setting Benchmark	Range of Settings	Recommended Benchmark Waiting Time	Waiting Time Interval Used for Benchmark	GRADE
National	Canadian Society of Surgical Oncology	All cancer patients	2 weeks	T3 – From diagnostic testing to surgery	D
National	Canadian Strategy for Cancer Control	All cancer patients	4 weeks	The maximum time to diagnose the most common cancers following patient presentation to a general practitioner (GP)	D
Saskatchewan	Saskatchewan Health	Confirmed or suspected malignancy	95% of patients seen within 3 weeks	T3 – From diagnostic testing to surgery for urgency level II patients	D
Ontario	Based on Gynaecological Survey	Adult females with pre + invasive malignancies	7 to 14 days	T1 – Date of referral by GP to first appointment with gynaecologist	D
British Columbia	The Canadian Breast Cancer Screening Initiative (CBCSI)	Adult female patients over 40 with abnormal mammograms	90% of patients diagnosed in 2 to 4 weeks	First assessment to diagnosis.	D

Benchmark Report Card

Table 6: Waiting Time Benchmarks for Cancer Patients Potentially Treated Surgically Set by the United Kingdom National Health Service (NHS)

Levels of Evidence from the Canadian Task Force on the Periodic Health Examination:
Grade A – Excellent (Randomized Control Trials), Grade B – Very Good (Cohort or Case Control Studies), Grade C – Good (Case Series) and Grade D – Fair (Expert Opinion).

Region	Organization Setting Benchmark	Range of Settings	Recommended Benchmark Waiting Time	Waiting Time Interval Used for Benchmark	GRADE
United Kingdom	NHS	All patients with suspected cancer	2 weeks	T1 – From general practitioner (GP) urgent referral to first appointment with surgeon	D
United Kingdom	NHS	All patients with suspected cancer	1 month	T3 – From specialist diagnosis to treatment	D
United Kingdom	NHS	All patients with suspected cancer	2 months by 2005 1 month by 2008	T4 – From general practitioner (GP) urgent referral to treatment	D
United Kingdom	NHS	Women with suspected breast cancer	2 weeks	T1 – From urgent referral to first hospital appointment	D
United Kingdom	NHS	Women with suspected breast cancer from 1996 to 2001	90% seen in less than 21 days	T3 – From specialist diagnosis to treatment	D
United Kingdom	NHS	All female patients with positive PAP test and referred for colposcopy	Over 90% seen in less than 8 weeks	T1 – From general practitioner (GP) urgent referral to first appointment with specialist	D
United Kingdom	NHS	Patients waiting for plastic surgery	18 months	T3 - Waiting for surgery	D

Benchmark Report Card

Table 6 continued: Waiting Time Benchmarks for Cancer Patients Potentially Treated Surgically Set by the United Kingdom National Health Service (NHS)

Levels of Evidence from the Canadian Task Force on the Periodic Health Examination: Grade A – Excellent (Randomized Control Trials), Grade B – Very Good (Cohort or Case Control Studies), Grade C – Good (Case Series) and Grade D – Fair (Expert Opinion).

Region	Organization Setting Benchmark	Range of Settings	Recommended Benchmark Waiting Time	Waiting Time Interval Used for Benchmark	GRADE
United Kingdom	British Thoracic Society	All patients with suspected lung cancer with resectable tumours	4 weeks	T3 – From specialist diagnosis to surgery	D
United Kingdom	British Thoracic Society	All patients	8 weeks	T4 – From general practitioner (GP) urgent referral to surgery	D
United Kingdom	Dermatology Clinic	All patients for elective basal cell surgery	10 weeks	T3 – From specialist diagnosis to treatment	D
United Kingdom	Lothian Health Region	Patients waiting for plastic surgery	10 months	T3 - Waiting for surgery	Unknown
United Kingdom	Patient's Charter	All new out-patients	90% seen with 13 weeks 100% seen within 26 weeks	T1 – From general practitioner (GP) urgent referral to first appointment with specialist	Unknown Set Nationally
United Kingdom	Patient's Charter	All patients attending a clinic	30 minutes	All seen within 30 minutes of scheduled time	Unknown Set Nationally

Benchmark Report Card

Table 7: Other International Waiting Time Benchmarks for Cancer Patients Potentially Treated Surgically

Levels of Evidence from the Canadian Task Force on the Periodic Health Examination: Grade A – Excellent (Randomized Control Trials), Grade B – Very Good (Cohort or Case Control Studies), Grade C – Good (Case Series) and Grade D – Fair (Expert Opinion).

Region	Organization Setting Benchmark	Range of Settings	Recommended Benchmark Waiting Time	Waiting Time Interval Used for Benchmark	GRADE
Italy	Lombardy Health Authorities	All patients suspect to have a severe disease	3 days	Have a diagnostic procedure within 3 days of referral by GP	D
Italy	Italian Group for Planning and Evaluating Mammographic Screening Programs (CPO – Piemonte, GISMA, EBCSN)	Female patients with breast screen detected lesions	90% seen in less than 21 days	T4 – From general practitioner (GP) urgent referral to surgery	D
New Zealand	New Zealand Health System	All surgery patients	Maximum waiting time for patients from: 24 hours, 4 week, to 6 months (based on an urgency score)	T3 – From specialist diagnosis to surgery Waiting time is for urgency scores is set by local hospitals	D
Australia	Victoria Health Department	Prostrate patients	90 days	T3 – From specialist diagnosis to surgery	D

Table 8: Countries with Waiting Time Benchmarks for All Treatment Areas (including cancer)

Country	Range of Settings	Recommended Benchmark Waiting Time	Waiting Time Interval Used for Benchmark ^{tt}
Australia	All patients	30 days for urgent cases 90 for second urgent level cases 12 months for all other cases	Waiting times for admission
Demark	All patients with critical illness	2 week for investigation 2 weeks for treatment 2 weeks for follow-up treatment	
Netherlands	All patients	80% receive outpatient care within 5 weeks 80% inpatient or day treatment within 7 weeks	
Spain	All patients	6 months	Maximum waiting time for all treatments
Sweden	All patients	Specialist consultation must occur within 90 days From diagnosis treatment must occur within 90 days	
*United Kingdom	All patients	6 months inpatient treatment 3 months for outpatient services	Maximum waiting time for treatment/services

Note: ^{tt} Level of evidence used to set benchmark is unknown.

* In UK, cancer therapy has specific target waiting time as noted in Table 4.

Overview of the Findings:

A review of the benchmarks identified in the studies revealed the following:

- 11) No consistent benchmark for a specific cancer site or patient characteristic was observed.
- 12) Most benchmarks were simple targets set for a specific waiting time interval. A few, however, included complex stratifying systems based on patient urgency, such as in Saskatchewan.
- 13) Some benchmarks were quite broad and others specific to individual diagnostic conditions or patient treatments.
- 14) The waiting time interval used in benchmarks varied and did not match the waiting time measures examined in the literature.
- 15) The deviations in referral pathways noted in some studies made comparing standard waiting times to benchmarks difficult.
- 16) The variation in diagnosis pathways raised questions about the application of a universal benchmark for all types of cancer.
- 17) Some studies found waiting time varied by type of cancer, suggesting not all cancers should be given the same benchmark.
- 18) Most studies comparing patient waiting time data to an existing benchmark did not meet the time frame mandated.
- 19) None of the benchmarks cited in the literature were found to be based on a level of evidence higher than a grade of D (Expert Opinion).
- 20) None of the benchmarks clearly indicated the involvement of patients in the process of defining acceptable waiting times.

In addition, none of the studies described best practice or future suggestions for developing benchmarks based on higher levels of evidence. Clinically based guidelines, at the moment, are the normative practice with little scrutiny to the value and usefulness of the guidelines, and to whom.

Value of Benchmarks

Given that the quality of the literature was not strong and level of evidence currently used for the establishment of the benchmarks was graded at a D level,

the value of benchmarking is questionable. In the absence of good quality studies providing solid evidence, any benchmarks set will be arbitrary.

From a clinical perspective, it is unlikely that waiting a few weeks impacts clinical outcome. A review of the literature found no strong evidence that waiting for cancer surgery impacted negatively on clinical outcome from the cancer.

In addition, setting one benchmark for time to treatment for all types of cancer is not reasonable. Not all cancers are equal in diagnosis and treatment. For example, it is important to treat patients with potentially obstructing colon cancer immediately. A patient with a papillary thyroid carcinoma can wait longer than a non-cancer condition such as acute cholecystitis. Consequently, the establishment of benchmarks based on consensus does little to help general practitioners and surgeons provide better care.

From a health management perspective, implementation of the benchmarks will force compliance and indirectly lead to system change. Yet, there is good evidence that reduced waiting times can be achieved through system changes without intermediate policy targets such as benchmarking.

From a patient perspective, waiting can undoubtedly lead to considerable stress and anxiety which may in turn affect health outcome. Benchmarks give patients the opportunity to understand the parameters under which treatment should be provided.

Olivotto et al., (2001) noted, “the interval after an abnormal breast screen is associated with significant anxiety and social dysfunction for women and families.” With respect to prostate patients, Schou et al., (1993) found “a number of the referred patients were more anxious about prostatic cancer than prostatism.” Similarly, Mayo et al., (2001) studying breast cancer reported anxiety faced by women and families waiting for results of tests and for surgery.

Patient anxiety and patient satisfaction are key issues in the force to make changes to health care in Canada. Do patients need benchmarks? Or, do patients need better service and real system change? Gui et al., (1995) reported the positive impact of a “one stop breast clinic.” At the “one stop breast clinic,” patients with a GP referral were assessed by a surgeon and if needed offered; mammography, ultrasonography, cytology and counselling at the same outpatient visit. Gui et al., (1995) notes, “the aim is to provide a diagnosis, management plan, and a date for definitive treatment at the same visit...in the minimum time to reduce this anxiety.” In this study, 72% of the patients were seen in less than 2 hours and health professions could consult immediately with each other working as a team.

The resources required to set benchmarks and manage changes to the health care system to comply with such benchmarks, may be more effective in

setting standards of patient care through initiatives like the “one stop breast clinic”.

Improving Patient Flow - “No Patient is Left Behind”

Instead of setting numerous benchmarks for specific conditions, Canadian health care providers could alternatively adopt a mandate to change the system from referral to treatment for all patients.

In lessons learned from the United Kingdom, which has been dealing with the same waiting time problems and related political pressure, real change has come from improving the health system. In some areas such as colorectal cancer, benchmarks have done little to change waiting times of patients (Trickett et al., 2004). In other cases, meeting benchmark targets to reduce referral delay have come at the expense of increasing treatment delay. The establishment of benchmarks, however, could provide the impetus for improving patient flow.

The literature from the United Kingdom has shown improvements to patient flow and changes to the referral process, to be the most effective in reducing waiting times (Appleby et al., 2001). Similarly, a study based in British Columbia examining breast cancer patients found targets set by a Canadian Breast Cancer Initiative could be met by making changes to the health care system, such as facilitated referral.

Identifying and improving efficiency in the system will do more to improve waiting times and patient satisfaction than benchmarking. Through initiatives such as the “one stop breast clinic,” there is good evidence that reduced waiting times can be achieved through system changes.

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Chin, S. & Harrigill, K. M. (1999). Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans. *Obstet.Gynecol.*, 93, 922-927.

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Gui, G. P., Allum, W. H., Perry, N. M., Wells, C. A., Curling, O. M., McLean, A. et al. (1995). Clinical audit of a specialist symptomatic breast clinic. *J.R.Soc.Med.*, 88, 330-333.

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Kirkup, M. E. & De Berker, D. A. (1999). Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery. *Br.J.Dermatol.*, 141, 876-879.

Lee, J., Marchbank, A., & Goldstraw, P. (2002). Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective. *Ann.R.Coll.Surg.Engl.*, 84, 304-308.

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Marshak, G., Rakowsky, E., Schachter, J., Shivero, J., Feinmesser, R., Sulkes, A. et al. (2004). Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer? *Otolaryngology Head and Neck Surgery*, 131, 489-493.

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Nam, R. K., Jewett, M. A., Krahn, M. D., Robinette, M. A., Tsihlias, J., Toi, A. et al. (2003). Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy. *Can.J.Urol.*, 10, 1891-1898.

Nuttall, M. C., van der, M. J., McIntosh, G., Gillatt, D., & Emberton, M. (2005). Changes in patient characteristics and outcomes for radical cystectomy in England. *BJU.Int.*, 95, 513-516.

Olivotto, I. A., Borugian, M. J., Kan, L., Harris, S. R., Rousseau, E. J., Thorne, S. E. et al. (2001). Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract). *Canadian Journal of Public Health*, 92, 366-371.

Olson, D. W. & de Gara, C. J. (2002). How long do patients wait for elective general surgery? *Can.J.Surg.*, 45, 31-33.

Parente, F., Bargiggia, S., & Bianchi, P. G. (2002). Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy. *Aliment.Pharmacol.Ther.*, 16, 1011-1014.

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Reed, A. D., Williams, R. J., Wall, P. A., & Hasselback, P. (2004). Waiting time for breast cancer treatment in Alberta. *Can.J.Public Health*, 95, 341-345.

Robinson, D., Bell, C. M., Moller, H., & Basnett, I. (2003). Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England. *Br.J.Cancer*, 89, 492-496.

Sauven, P., Bishop, H., Patnick, J., Walton, J., Wheeler, E., & Lawrence, G. (2003). The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001. *Br.J.Surg.*, 90, 82-87.

Schou, J., Poulsen, A. L., & Nordling, J. (1994). The anatomy of a prostate waiting list: a prospective study of 132 consecutive patients. *Br.J.Urol.*, 74, 57-60.

Shen, N., Mayo, N. E., Scott, S. C., Hanley, J. A., Goldberg, M. S., Abrahamowicz, M. et al. (2003). Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997. *Med.Care*, 41, 1353-1366.

Shortt, S. E. & Shaw, R. A. (2003). Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery? *CMAJ.*, 168, 413-416.

Shortt, S. E., Shaw, R. A., Elliott, D., & Mackillop, W. J. (2004). Monitoring trends in waiting periods in Canada for elective surgery: validation of a method using administrative data. *Can.J.Surg.*, 47, 173-178.

Simunovic, M., Gagliardi, A., McCreedy, D., Coates, A., Levine, M., & DePetrillo, D. (2001). A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario. *CMAJ.*, 165, 421-425.

Subramonian, K. R., Puranik, S., & Mufti, G. R. (2003). How will the two-weeks-wait rule affect delays in management of urological cancers? *J.R.Soc.Med.*, 96, 398-399.

Trickett, J. P., Donaldson, D. R., Bearn, P. E., Scott, H. J., & Hassall, A. C. (2004). A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage. *Colorectal Dis.*, 6, 428-431.

Appendix A: Reviewed Articles and Quality Rating

Appendix B: Main Findings by Variable

Dimensions

Primary Cancer Site

Simunovic, M., Gagliardi, A., McCreedy, D., Coates, A., Levine, M., & DePetrillo, D. (2001). A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario. *CMAJ*, 165, 421-425.

The waiting times varied by cancer type; for example, the median time from referral to surgery varied from 29.0 days for colorectal cancers to 64.0 days for urologic cancers.

Patient Characteristics

Age

Reed, A. D., Williams, R. J., Wall, P. A., & Hasselback, P. (2004). Waiting time for breast cancer treatment in Alberta. *Can.J.Public Health*, 95, 341-345.

Longer waiting time was significantly associated with patients younger than 70 years and Stage 1 cancer.

Shen, N., Mayo, N. E., Scott, S. C., Hanley, J. A., Goldberg, M. S., Abrahamowicz, M. et al. (2003). Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997. *Med.Care*, 41, 1353-1366.

Variation in waiting time was substantially explained by the number of procedures received before surgery. The variable most impacted by the inclusion of number of procedures was woman's age. Younger women tended to receive more procedures and older women fewer.

Gender

Arnesen, K. E., Erikssen, J., & Stavem, K. (2002). Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management. *Health Policy*, 62, 329-341.

Gender was examined to explain variations in waiting time and no significant difference was found.

Co-morbidities – None found.

Tumor Factors

Type– None found.

Tumor Factors Continued

Stage

Bozcuk, H. & Martin, C. (2001). Does treatment delay affect survival in non-small cell lung cancer (NSCLC)? A retrospective analysis from a single UK centre. *Lung Cancer*, 34, 243-252.

Found that for patients with NSCLC, time to treatment (hospital delay) does not affect survival. But, survival affected by route of referral in early stages.

Nam, R. K., Jewett, M. A., Krahn, M. D., Robinette, M. A., Tsihlias, J., Toi, A. et al. (2003). Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy. *Can.J.Urol.*, 10, 1891-1898.

Found no significant differences in the distribution of grad or stage among patients who had delayed or early treatment.

Reed, A. D., Williams, R. J., Wall, P. A., & Hasselback, P. (2004). Waiting time for breast cancer treatment in Alberta. *Can.J.Public Health*, 95, 341-345.

Longer waiting time was significantly associated with patients younger than 70 years and Stage 1 cancer.

Surgeon Characteristics

Cromwell, D. & Griffiths, D. (2002). Waiting time information services: what are the implications of waiting list behaviour for their design? *Australian Health Review*, 25, 40-49.

Noted considerable variation in behaviour between surgeons in the same specialty and over time.

Patient Flow

Appleby, A. & Lawrence, C. (2001). From blacklist to beacon, a case study in reducing dermatology out-patient waiting times. *Clin.Exp.Dermatol.*, 26, 548-555.

Authors discussed processes used to increase patient flow which decreased waiting time.

Ashwood, N., Witt, J. D., Hallam, P. J., & Cobb, J. P. (2003). Analysis of the referral pattern to a supraregional bone and soft tissue tumour service. *Ann.R.Coll.Surg.Engl.*, 85, 272-276.

Acquisition of scans was often time consuming and contributed to the delay in the patients's onward referral.

Patient Flow Continued

Gui, G. P., Allum, W. H., Perry, N. M., Wells, C. A., Curling, O. M., McLean, A. et al. (1995). Clinical audit of a specialist symptomatic breast clinic. *J.R.Soc.Med.*, 88, 330-333.

The mean wait from designated appointment to seeing the surgeon was 37.6 minutes. One-stop investigations had a total wait of less than 2 hours. For patients not investigated at the same clinic, the mean time until investigations was 6.1 days. Our aim is to extend the one-stop facility to all patients with symptomatic breast disease where clinically indicated. Immediate reporting of cytology has been shown to be a reliable procedure and is cost effective.

Mayo, N. E., Scott, S. C., Shen, N., Hanley, J., Goldberg, M. S., & MacDonald, N. (2001). Waiting time for breast cancer surgery in Quebec. *CMAJ.*, 164, 1133-1138.

Waiting time for breast cancer surgery increased from median 29 days in 1992 to 42 days in 1998. The number of diagnosis procedures before surgery was the strongest factor contributing to waiting time. The authors question the need for additional diagnostic procedures.

Robinson, D., Bell, C. M., Moller, H., & Basnett, I. (2003). Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England. *Br.J.Cancer*, 89, 492-496.

Treatment wait (T3) was significantly influenced by only two factors- it was shorter in high throughput hospitals, and highly dependent on type of treatment.

Shen, N., Mayo, N. E., Scott, S. C., Hanley, J. A., Goldberg, M. S., Abrahamowicz, M. et al. (2003). Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997. *Med.Care*, 41, 1353-1366.

Variation in waiting time was substantially explained by the number of procedures received before surgery. The variable most impacted by the inclusion of number of procedures was woman's age. Younger women tended to receive more procedures and older women fewer.

Cancer Referral Process

Bozcuk, H. & Martin, C. (2001). Does treatment delay affect survival in non-small cell lung cancer (NSCLC)? A retrospective analysis from a single UK centre. *Lung Cancer*, 34, 243-252.

Found that for patients with NSCLC, time to treatment (hospital delay) does not affect survival. Survival affected by route of referral in early stages.

Khan, F. & McGregor, J. C. (1999). Polaroid photographic referral for skin cancer--a potentially useful method of reducing time to surgery. *Scott.Med.J.*, 44, 77-78.

Cancer Referral Process Continued

In this study, a saving of time as well as money has been possible in referrals from the dermatologists because the intermediate plastic surgery out-patient clinic has been avoided.

Olivotto, I. A., Borugian, M. J., Kan, L., Harris, S. R., Rousseau, E. J., Thorne, S. E. et al. (2001). Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract). *Canadian Journal of Public Health*, 92, 366-371.

A facilitated referral process had the greatest impact on waiting times. The ideal model would include facilitated referral to a service integrating on-site imaging with access to core-biopsy, surgical assessment and procedure-room biopsies. The largest impacts were noted in the pilot where an existing system was re-organized and not from adding new resources or personnel into the existing system.

Parente, F., Bargiggia, S., & Bianchi, P. G. (2002). Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy. *Aliment.Pharmacol.Ther.*, 16, 1011-1014.

A significantly higher proportion of upper gastrointestinal cancers were diagnosed in patients referred under the three-day rule compared to those referred on an open access basis. The three day rule requirement was not met at the expense of a substantial increase in the waiting time for routine referrals, which were kept to an average of 22 days during the study.

Trickett, J. P., Donaldson, D. R., Bearn, P. E., Scott, H. J., & Hassall, A. C. (2004). A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage. *Colorectal Dis.*, 6, 428-431.

Just over half of patients with colorectal cancer were referred directly to surgical outpatients and 20% of the patients in the study met the two week rule. Direct referrals were slower to treatment but the tumours were still of a less advanced pathological stage.

Socio-economic Factors

Arnesen, K. E., Erikssen, J., & Stavem, K. (2002). Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management. *Health Policy*, 62, 329-341.

Gender and socioeconomic status could not explain variations in waiting times after adjusting for other clinical and non-clinical variables.

Emberton, M., Neal, D. E., Black, N., Harrison, M., Fordham, M., McBrien, M. P. et al. (1995). The National Prostatectomy Audit: the clinical management of patients during hospital admission. *Br.J.Urol.*, 75, 301-316.

Socio-economic Factors Continued

Differences were also noted in waiting times for public and private sectors and age of men, social class and education level. More than 50% of all cases had surgery within at least 3 months of being on the waiting list.

Shortt, S. E. & Shaw, R. A. (2003). Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery? *CMAJ*, 168, 413-416.

Socioeconomic Status was measured to determine association to waiting times and the variables included were postal code, enumeration area, proportion of rental accommodations, proportion of single parent families, household incomes, unemployment rates and levels of postsecondary education. Little support that socioeconomic status is associated with waiting times. Only significant difference found for prostatectomy where the high socioeconomic status waited fewer days than those in a low socioeconomic status group, however, these differences are not likely to be clinically significant.

Patient Load – *None found*

Urgency – *None found*

Patient Co-morbidities – *None found*

Patient Anxiety – *None found*

Health System Facilities – *None found*

Outcomes

Health Status

General

Bozcuk, H. & Martin, C. (2001). Does treatment delay affect survival in non-small cell lung cancer (NSCLC)? A retrospective analysis from a single UK centre. *Lung Cancer*, 34, 243-252.

Found that for patients with NSCLC, time to treatment (hospital delay) does not affect survival. Survival affected by route of referral in early stages.

Kirkup, M. E. & De Berker, D. A. (1999). Clinical measurement of dimensions of basal cell carcinoma (BCC): effect of waiting for elective surgery. *Br.J.Dermatol.*, 141, 876-879.

A mean delay of 10 weeks between review and surgery does not appear to compromise the outcome of treatment of BCC in patients with well-defined BCCs of the face outside the central T.

Health Status Continued

Pre-Operative

Ashwood, N., Witt, J. D., Hallam, P. J., & Cobb, J. P. (2003). Analysis of the referral pattern to a supraregional bone and soft tissue tumour service. *Ann.R.Coll.Surg.Engl.*, 85, 272-276.

In an examination of causes for delay and whether prior investigations or procedures had complicated further management. 16 of 34 biopsies were poorly or inadequately executed complicating management. Early referral to high quality specialist center recommended.

Emberton, M., Neal, D. E., Black, N., Harrison, M., Fordham, M., McBrien, M. P. et al. (1995). The National Prostatectomy Audit: the clinical management of patients during hospital admission. *Br.J.Urol.*, 75, 301-316.

Men who waited longer for surgery had worse symptoms by the time of their operation, men with suspected malignancies prior to surgery had approx. 3 times likely to have shorter waiting times.

Post-Operative

Marshak, G., Rakowsky, E., Schachter, J., Shivero, J., Feinmesser, R., Sulkes, A. et al. (2004). Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer? *Otolaryngology Head and Neck Surgery*, 131, 489-493.

Post-Operative patients were followed monthly for first year, bi-monthly for second year and semi-annually thereafter. Found that delay in postoperative radiotherapy in advanced laryngeal cancer is not a significant predictor of locoregional control or survival.

Post-Operative

Nam, R. K., Jewett, M. A., Krahn, M. D., Robinette, M. A., Tsihlias, J., Toi, A. et al. (2003). Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy. *Can.J.Urol.*, 10, 1891-1898.

Authors claim this is the first report to demonstrate a possible trend towards lower cancer cure rates because of delays in treatment for prostate cancer. Patients who wait more than 3 months from the time of diagnosis have a possible 1.5-fold increase in risk for developing cancer recurrence compared to patients who undergo early surgery, after adjusting for grade, stage and PSA.

Costs

Chin, S. & Harrigill, K. M. (1999). Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans. *Obstet.Gynecol.*, 93, 922-927.

Managed care organizations provide medical care at a 20-40% lower cost than traditional fee-for-service plans because they control the provision

Costs Continued

of care. Concern exists that the quantity and quality of patient care may be compromised by such cost containment. This study found that membership in a managed care organization is associated with a delay in receiving definitive surgical care for benign gynaecologic, but not gynaecologic oncologic, diseases.

Olivotto, I. A., Borugian, M. J., Kan, L., Harris, S. R., Rousseau, E. J., Thorne, S. E. et al. (2001). Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract). *Canadian Journal of Public Health, 92*, 366-371.

Process changes can improve the time to diagnosis after an abnormal breast screen, with similar or lower physician costs per subject. Facilitating the referral process had the greatest impact.

Parente, F., Bargiggia, S., & Bianchi, P. G. (2002). Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy. *Aliment.Pharmacol.Ther., 16*, 1011-1014.

A significantly higher proportion of upper gastrointestinal cancers were diagnosed in patients referred under the three-day rule compared to those referred on an open access basis. The three day rule requirement was not met at the expense of a substantial increase in the waiting time for routine referrals, which were kept to an average of 22 days during the study. The estimated cost of the three day rule scheme (in extra examinations alone) was 10 780 euros, with about 1198 euros per diagnosis of cancer, but only 229.5 euros per 'useful' diagnosis.

Quality of Life – None found

Patient Satisfaction (Patient Satisfaction) – None found

Appendix C: Reviewed Articles and Waiting Times Reported

Appendix D: Reviewed Articles and Benchmarks

D) ADDITIONAL COMMENTS (e.g. challenges you have faced and how you have/are addressed/ing them, deviation(s) from your original research proposal...)

D) COMMENTAIRES ADDITIONNELS (p. ex. des obstacles que vous avez rencontrés et la façon dont vous les avez / que vous les surmontés, tout écart par rapport à votre proposition de recherche initiale...)

SIGNATURE OF PRINCIPAL INVESTIGATOR:
SIGNATURE DU CHERCHEUR PRINCIPAL DÉSIGNÉ :

DATE:
DATE :

CIHR Cancer Waiting Time Benchmarks - Report 2 Dr. M. Taylor										
Appendix A - Reviewed Articles and Quality Rating										
Article Information					Quality General					
ID#	Article Title	Authors	Year	Relevance 2nd Rating	1) Did the study report source of patient information, patient selection method, and sample size? <i>If no, explain.</i>	2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time? <i>If no, explain.</i>	3) Was there enough information provided to follow the process of analysis and assess the author's conclusions? <i>If no, explain.</i>	Quality Rating		
7	Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract)	Olivotto IA;Borugian MJ;Kan L;Harris SR;Rousseau EJ;Thorne SE;Vestrup JA;Wright CJ;Coldman AJ;Hislop TG;	2001	2	Yes	Yes	Yes	3		
8	Waiting time information services: what are the implications of waiting list behaviour for their design?	Cromwell D;Griffiths D;	2002	1	No	Do not know how the patients got on the list or how the list was generated.	Unable to compared as source of patients not clear.	No	Groups are not defined	0
10	Waiting times for surgery -- inheritance for primary care organisations in Trent	Hippisley CJ;Pringle M;Coupland C;Cater R;	2002	1	Yes	Yes	Yes	3		

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Article Information					Quality General						
ID#	Article Title	Authors	Year	Relevance 2nd Rating	1) Did the study report source of patient information, patient selection method, and sample size?	If no, explain.	2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time?	If no, explain.	3) Was there enough information provided to follow the process of analysis and assess the author's conclusions?	If no, explain.	Quality Rating
13	Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer?	Marshak G;Rakowsky E;Schachter J;Shivero J;Feinmesser R;Sulkes A;Brenner B;	2004	3	No	What is data source?	Yes		Yes		2
18	Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy	Parente F;Bargiggia S;Bianchi PG;	2002	2	Yes		No	No - because failed to outline what is considered an alarm/signs of severe disease.	Yes		2
19	Analysis of the referral pattern to a supraregional bone and soft tissue tumour service	Ashwood N;Witt JD;Hallam PJ;Cobb JP;	2003	3	Yes		No	Unclear how waiting time intervals were measured	Yes	Weak discussion of analysis.	2

CIHR Cancer Waiting Time Benchmarks - Report 2 Dr. M. Taylor											
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Article Information					Quality General						
ID#	Article Title	Authors	Year	Relevance 2nd Rating	1) Did the study report source of patient information, patient selection method, and sample size?	If no, explain.	2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time?	If no, explain.	3) Was there enough information provided to follow the process of analysis and assess the author's conclusions?	If no, explain.	Quality Rating
20	Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective	Lee J;Marchbank A;Goldstraw P;	2002	1	No	Inclusion criteria unclear.	No	Inclusion criteria unclear.	Yes		1
28	Waiting time thresholds: are they appropriate?	MacCormick AD;Parry BR;	2003	1	Yes		No	Lack of how the waiting list is defined thus not able to compare	Yes		2
35	Changes in patient characteristics and outcomes for radical cystectomy in England	Nuttall MC;van der MJ;McIntosh G;Gillatt D;Emberton M;	2005	2	Yes		Yes		Yes		3

CIHR Cancer Waiting Time Benchmarks - Report 2 Dr. M. Taylor											
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Article Information					Quality General						
ID#	Article Title	Authors	Year	Relevance 2nd Rating	1) Did the study report source of patient information, patient selection method, and sample size? <i>If no, explain.</i>	2) Was a clear plan reported which explicitly set out the methods of the study well enough to be repeated including a clearly defined waiting time? <i>If no, explain.</i>	3) Was there enough information provided to follow the process of analysis and assess the author's conclusions? <i>If no, explain.</i>	Quality Rating			
37	Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England	Robinson D;Bell CM;Moller H;Basnett I;	2003	1	Yes	Yes	Yes	3			
38	Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery	Kirkup ME;De Berker DA;	1999	2	Yes	No	Study dates? Source of information not clear if pt records or form etc. Yes	2			
43	The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001	Sauven P;Bishop H;Patrick J;Walton J;Wheeler E;Lawrence G;	2003	2	No	Hard to find some information in this study such as patient selection method for waiting times. Yes	Yes	2			

CIHR Cancer Waiting Time Benchmarks - Report 2 Dr. M. Taylor											
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Article Information					Quality General						
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44	The National Prostatectomy Audit: the clinical management of patients during hospital admission	Emberton M;Neal DE;Black N;Harrison M;Fordham M;McBrien MP;Williams RE;McPherson K;Devlin HB;	1995	3	Yes		Yes	Authors referred to another source for study design, methods, questionnaires and response rates.	Yes		3
45	The anatomy of a prostate waiting list: a prospective study of 132 consecutive patients	Schou J;Poulsen AL;Nordling J;	1994	3	Yes		No	No - because failed to list how and when patient is placed on waiting list so how comparable are the results? Also pt pop poorly described.	Yes		2
49	Waiting time for breast cancer treatment in Alberta	Reed AD;Williams RJ;Wall PA;Hasselback P;	2004	1	Yes		Yes		Yes		3

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51	Monitoring trends in waiting periods in Canada for elective surgery: validation of a method using administrative data	Shortt SE;Shaw RA;Elliott D;Mackillop WJ;	2004	1	Yes	No	Patient description lack enough information to replicated.	Yes			2
53	How long do patients wait for elective general surgery?	Olson DW;de Gara CJ;	2002	1	Yes	Yes		Yes			3
54	Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy	Nam RK;Jewett MA;Krahn MD;Robinette MA;Tsihlias J;Toi A;Ho M;Evans A;Sweet J;Trachtenberg J;	2003	1	Yes	Yes		Yes			3

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56	From blacklist to beacon, a case study in reducing dermatology out-patient waiting times	Appleby A;Lawrence C;	2001	3	No	Unclear as to actual source of patient information - could guess from clinic records - but not stated, unclear patient selection method however, sample sizes were reported.	No	The methods used to provide the evidence/findings discussed in this study are not adequately presented.	No	All that is really captured here is the counts between time periods, which is not sufficient evidence to support the findings in this study.	0
64	Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery?	Shortt SE;Shaw RA;	2003	2	Yes		No	Unclear how patients were placed on the waiting list	Yes		2
67	A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario	Simunovic M;Gagliardi A;McCready D;Coates A;Levine M;DePetrillo D;	2001	1	Yes		Yes		Yes		3

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68	Waiting time for breast cancer surgery in Quebec	Mayo NE;Scott SC;Shen N;Hanley J;Goldberg MS;MacDonald N;	2001	1	Yes	Yes	Yes				3
69	A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage	Trickett JP;Donaldson DR;Bearn PE;Scott HJ;Hassall AC;	2004	1	Yes	Yes	Yes				3
71	The two week referral for colorectal cancer: a retrospective analysis	Barwick TW;Scott SB;Ambrose NS;	2004	2	Yes	Yes	Yes				3

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72	Monitoring surgical treatment of screen-detected breast lesions in Italy	Distante V;Mano MP;Ponti A;Cataliotti L;Filippini L;Giorgi D;Lazzaretti MG;Marchesi C;Perfetti E;Segnan N;	2004	1	Yes		Yes		Yes		3
82	Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management	Arnesen KE;Erikssen J;Stavem K;	2002	1	Yes		Yes		Yes		3
92	Factors influencing physicians' assessment of urgency for inpatient surgery	Arnesen KE;Erikssen J;Stavem K;	2001	1	Yes		No	No actual waiting times measured or defined	Yes		2

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94	Waiting-list prioritization in the National Health Service	Prasad S;Kapoor PK;Kumar A;Reddy KT;Kumar BN;	2004	2	No	There was no details as to how participants were selected within the groups.	No	Lacking description as to how the questionnaire was administered and the validity and reliability of the questionnaire was not presented.	No	No indication as to how te data was analyzed.	0
95	Waiting times during the management of head and neck tumours	Jones TM;Hargrove O;Lancaster J;Fenton J;Shenoy A;Roland NJ;	2002	1	Yes		Yes		Yes		3
98	Referral patterns for gynaecologic cancers and precancerous conditions	Gagliardi A;DePetrillo D;Elit L;	2002	3	Yes		Yes		Yes		3

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100	Waiting times for treatment of rectal cancer in North West England	Duff SE;Wood C;McCredie V;Levine E;Saunders MP;O'Dwyer ST;	2004	1	Yes	yes	Yes	3		
101	How will the two-weeks-wait rule affect delays in management of urological cancers?	Subramonian KR;Puranik S;Mufti GR;	2003	1	No	Source of patient and selection method were not described.	Did not identify how a patient gets on the list, not enough information to be reproducible.	Not enough data presented to draw conclusions.	0	
103	Clinical audit of a specialist symptomatic breast clinic	Gui GP;Allum WH;Perry NM;Wells CA;Curling OM;McLean A;Oommen R;Sullivan M;Denton S;Carpenter R;	1995	3	Yes	No	Waiting lists were not clearly defined in order to compare to other studies, not clear on how routine and urgent referrals were categorized..	Yes	2	

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105	Who should have a prostatectomy? A survey of the management of patients presenting with bladder outflow obstruction	Lloyd SN;Kirk D;	1991	3	No	Not clear on patient selection method	No	Waiting list not defined	Yes		1
126	Does treatment delay affect survival in non-small cell lung cancer? A retrospective analysis from a single UK centre	Bozcuk H;Martin C;	2001	1	Yes		Yes		Yes		3
127	Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997	Shen N;Mayo NE;Scott SC;Hanley JA;Goldberg MS;Abrahamowicz M;Tamblyn R;	2003	1	Yes		Yes		Yes		3

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128	Waiting times for surgical procedures	DeCoster C;Carriere KC;Peterson S;Walld R;MacWilliam L;	1999	1	Yes		Yes		Yes		3
134	Generic surgical priority criteria scoring system: the clinical reality	Dennett ER;Parry BR;	1998	2	Yes		Yes		Yes		3
140	Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans	Chin S;Harrigill KM;	1999	1	Yes		No	Initiation of care not defined except as time of diagnosis for surgery but no source listed and trigger point not clear.	Yes		2

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150	Polaroid photographic referral for skin cancer--a potentially useful method of reducing time to surgery	Khan F;McGregor JC;	1999	3	Yes		Yes		No	Lack of evidence to support all of the authors conclusions.	2
152	Plastic surgery waiting list--the numbers game fact or fiction?	McGregor JC;	1998	3	No	Article failed to provide sample size (can't get accurate number from Fig. 1)	No	Waiting time was not defined	Yes	Author presents only comparisons of numbers on waiting lists over time yet focuses on many environmental factors in addition to other influences on waiting list numbers.	1

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7	Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract)	Olivotto IA;Borugian MJ;Kan L;Harris SR;Rousseau EJ;Thorne SE;Vestrup JA;Wright CJ;Coldman AJ;Hislop TG;	2001	2	No	No	Larger sample sizes would be required to confirm this finding or replicated over several consecutive years.	The community dynamics may have affected the results and there were differences found in the demographics of women between the groups.	R	n/a	4
8	Waiting time information services: what are the implications of waiting list behaviour for their design?	Cromwell D;Griffiths D;	2002	1	Unknown	Unknown		State wide reduction program included	R	n/a	4
10	Waiting times for surgery -- inheritance for primary care organisations in Trent	Hippisley CJ;Pringle M;Coupland C;Cater R;	2002	1	No	No	Affected by different policies on data entry and did not include private referrals		R	n/a	4

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13	Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer?	Marshak G;Rakowsky E;Schachter J;Shivero J;Feinmesser R;Sulkes A;Brenner B;	2004	3	No	No	Sample size and because of favorable prognostic factors in their patient population.	Type of patients.	R	n/a	4
18	Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy	Parente F;Bargiggia S;Bianchi PG;	2002	2	No	Yes			P	Yes	2c
19	Analysis of the referral pattern to a supraregional bone and soft tissue tumour service	Ashwood N;Witt JD;Hallam PJ;Cobb JP;	2003	3	No	Unknown	Not enough patient characteristics to understand if there are unique characteristics between the patients in the study and all patients with bone and soft tissue tumors.	National policies	P	Yes	2b

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20	Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective	Lee J;Marchbank A;Goldstraw P;	2002	1	No	No	Data from only one site, small sample, unclear sample selection.	Policy of benchmark waiting times introduced during this period	R	n/a	2c
28	Waiting time thresholds: are they appropriate?	MacCormick AD;Parry BR;	2003	1	Unknown	No	May not include patients who have different access points, co-morbidities, etc. does not yield comparable results.	Hospital in transition period to reduce waiting time thresholds, number of surgeons.	P	Yes - appropriate hazard model	2c
35	Changes in patient characteristics and outcomes for radical cystectomy in England	Nuttall MC;van der MJ;McIntosh G;Gillatt D;Emberton M;	2005	2	No	No	The data does not include independent hospital admissions, nor does it consider increased surgical activity..	differences due to discharge policies may exist	R	n/a	4

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37	Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England	Robinson D;Bell CM;Moller H;Basnett I;	2003	1	No	No	Database used compiled data from 28 hospital but data from 9 hospitals was not used as well the waitlist definiton and patient description was not provided	Number of surgeons/consultants/resources involved not specified	R	n/a	2c
38	Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery	Kirkup ME;De Berker DA;	1999	2	No	No	Small sample size and only one dermatologist.		P	No	4
43	The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001	Sauven P;Bishop H;Patrick J;Walton J;Wheeler E;Lawrence G;	2003	2	No	No		Best practices introduced throughout regions during this time.	P	No	2b

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44	The National Prostatectomy Audit: the clinical management of patients during hospital admission	Emberton M;Neal DE;Black N;Harrison M;Fordham M;McBrien MP;Williams RE;McPherson K;Devlin HB;	1995	3	Unknown	Yes		SES differences between health regions	P	Not indicated in this paper I suspect they did by comments referring to supplemental reports.	2b
45	The anatomy of a prostate waiting list: a prospective study of 132 consecutive patients	Schou J;Poulsen AL;Nordling J;	1994	3	No	Yes		timeframe short, GP referrals consistent?	P	Yes, 15 did not get eval b/c had surgery elsewhere, had improved, pt had no time to participate	2c
49	Waiting time for breast cancer treatment in Alberta	Reed AD;Williams RJ;Wall PA;Hasselback P;	2004	1	No	Yes		Authors identified other potentially important variables include ethnicity, family history, surgeon protocol, the waiting time interval chosen for this study.	R	n/a	4

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51	Monitoring trends in waiting periods in Canada for elective surgery: validation of a method using administrative data	Shortt SE;Shaw RA;Elliott D;Mackillop WJ;	2004	1	No	Unknown			R	n/a	4
53	How long do patients wait for elective general surgery?	Olson DW;de Gara CJ;	2002	1	Yes	No	Authors recognize this is preliminary work and results are based on small sample sizes.	Authors refer to possible surgeon, hospital and seasonal variances.	P	Yes	4
54	Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy	Nam RK;Jewett MA;Krahn MD;Robinette MA;Tsihlias J;Toi A;Ho M;Evans A;Sweet J;Trachtenberg J;	2003	1	No	No		Number of Surgeons involved not specified	R	n/a	2b

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56	From blacklist to beacon, a case study in reducing dermatology out-patient waiting times	Appleby A;Lawrence C;	2001	3	Yes	No		differences due to other process impacts not measured	P	Yes	4
64	Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery?	Shortt SE;Shaw RA;	2003	2	No	No	Study only focussed on those who received services excluding those patients who did not follow through on the waiting list or who continued to wait beyond the study period.	No adjustment for severity of illness, many other time intervals of the waiting experience may be different and no account for patients outside of catchment area that could be on the waiting list.	R	n/a	4
67	A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario	Simunovic M;Gagliardi A;McCready D;Coates A;Levine M;DePetrillo D;	2001	1	Yes	No		surgeons not affiliated with the cancer centres are not included	P	No	2b

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68	Waiting time for breast cancer surgery in Quebec	Mayo NE;Scott SC;Shen N;Hanley J;Goldberg MS;MacDonald N;	2001	1	Yes - 5 month interval may cause an underestimation of the true waiting time and exclude people with larger waiting times.	No		Controlled for urban/rural mix, number of available hospital beds and population demographics (aging population increases)	R	n/a	4
69	A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage	Trickett JP;Donaldson DR;Bearn PE;Scott HJ;Hassall AC;	2004	1	Uknown	Yes		external waiting time policy imposed by federal government for a 'two week rule'	R	n/a	2b
71	The two week referral for colorectal cancer: a retrospective analysis	Barwick TW;Scott SB;Ambrose NS;	2004	2	No	No	Catchment area not identified and selection criteria looked at only those with a proforma and only at 1/2 a year of data.	Time of year.	R	n/a	4

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72	Monitoring surgical treatment of screen-detected breast lesions in Italy	Distante V;Mano MP;Ponti A;Cataliotti L;Filippini L;Giorgi D;Lazzaretti MG;Marchesi C;Perfetti E;Segnan N;	2004	1	No	No			R	n/a	2c
82	Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management	Arnesen KE;Erikssen J;Stavem K;	2002	1	No	No	Comparisons to similar studies will demonstrate this - however, authors identify many limitations such as hospital capacity, physician behaviour and attitude.	One facility, hospital capacity, capacity utilization, change in demand during the period and physician opinion.	P	Yes - very well documented	2b
92	Factors influencing physicians' assessment of urgency for inpatient surgery	Arnesen KE;Erikssen J;Stavem K;	2001	1	Unknown	No	Authors present five reasons that generalizability may be limited.	physicians were salaried by hospitals and there is a global budget for the hospital	P	No	4

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94	Waiting-list prioritization in the National Health Service	Prasad S;Kapoor PK;Kumar A;Reddy KT;Kumar BN;	2004	2	Yes - response rate and sample size may influence the assessment of priorities.	No	Low response rates form general practitioners and ENT consultants may affect outcomes.	Local policies, geographic differences in Trusts where data was obtained	P	No	2c
95	Waiting times during the management of head and neck tumours	Jones TM;Hargrove O;Lancaster J;Fenton J;Shenoy A;Roland NJ;	2002	1	Yes	No	Small cell sizes may influence generalizability	Public awareness and GP education may impact waiting times	R	n/a	4
98	Referral patterns for gynaecologic cancers and precancerous conditions	Gagliardi A;DePetrillo D;Elit L;	2002	3	Yes	No	Authors indicate that reponse rate was less than 50% and not representative of locations that did not have local gynaecological oncology services.		P	Unknown	2c

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100	Waiting times for treatment of rectal cancer in North West England	Duff SE;Wood C;McCredie V;Levine E;Saunders MP;O'Dwyer ST;	2004	1	Yes	No	Small sample size, not all included seasonal etc	Linear accelerators not running to capacity as lack of staff. Year, location of facilities (urban or rural).	P	No	4
101	How will the two-weeks-wait rule affect delays in management of urological cancers?	Subramonian KR;Puranik S;Mufti GR;	2003	1	Unknown	No	Small sample size and too many unknown characteristics of the population.	policy/regulations determined by local government may affect practitioner and facility level decisions, patient delay, physician delay and hospital delay were identified by authors.	R	n/a	4
103	Clinical audit of a specialist symptomatic breast clinic	Gui GP;Allum WH;Perry NM;Wells CA;Curling OM;McLean A;Oommen R;Sullivan M;Denton S;Carpenter R;	1995	3	No	No	This represents a unique sub population which should be compared to the women who attend the National Breast Screening Program to determine generalizability to all new breast cancer patients.	specialized unit in a teaching hospital	P	Yes	2b

Article Information	Quality Specific
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ID#	Article Title	Authors	Year	Relevance 2nd Rating	Are there differences between the eligible population and the participant populations that affects the inferences in this study (Internal bias)?	Are the results generalizable to the target population?	If no, explain.	What factors may have impacted the results of the study?	Was the study Retrospective or Prospective?	Did the study track withdrawals and drop-outs or report what happened to them?	Study Evidence Level (1,2,3,4) See attached sheet.
105	Who should have a prostatectomy? A survey of the management of patients presenting with bladder outflow obstruction	Lloyd SN;Kirk D;	1991	3	Yes	No	Not enough participant characteristics	national policies	P	Yes	4
126	Does treatment delay affect survival in non-small cell lung cancer? A retrospective analysis from a single UK centre	Bozcuk H;Martin C;	2001	1	No	No	Small sample size.	Resources found in facilities were not specified.	R	n/a	2c
127	Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997	Shen N;Mayo NE;Scott SC;Hanley JA;Goldberg MS;Abrahamowicz M;Tamblyn R;	2003	1	No	No	Because of exclusion criteria.		R	n/a	2c

Article Information	Quality Specific
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ID#	Article Title	Authors	Year	Relevance 2nd Rating	Are there differences between the eligible population and the participant populations that affects the inferences in this study (Internal bias)?	Are the results generalizable to the target population?	If no, explain.	What factors may have impacted the results of the study?	Was the study Retrospective or Prospective?	Did the study track withdrawals and drop-outs or report what happened to them?	Study Evidence Level (1,2,3,4) See attached sheet.
128	Waiting times for surgical procedures	DeCoster C;Carriere KC;Peterson S;Walld R;MacWilliam L;	1999	1	Unknown	No	Specific exclusion criteria and database issues.	Changed treatment procedure midway for some diagnosis eg. Chole to lap.	R	n/a	4
134	Generic surgical priority criteria scoring system: the clinical reality	Dennett ER;Parry BR;	1998	2	Unknown	No			P	Unknown	2b
140	Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans	Chin S;Harrigill KM;	1999	1	No	No	No idea how representative for area. No idea of # of surgeons, hospitals, clinics. Did control for years, seasons, and urgent or chronic confounding factors - nice to see. Low sample size for cancer pts.	There are many companies providing managed care and may be different. Research suggests that up to 1/3 of hysterectomies may not be required. Pt population of catchment area may be different than others etc.	R	n/a	4

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Appendix A - Reviewed Articles and Quality Rating											
Article Information					Quality Specific						
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Are there differences between the eligible population and the participant populations that affects the inferences in this study (Internal bias)?	Are the results generalizable to the target population?	If no, explain.	What factors may have impacted the results of the study?	Was the study Retrospective or Prospective?	Did the study track withdrawals and drop- outs or report what happened to them?	Study Evidence Level (1,2,3,4) See attached sheet.
150	Polaroid photographic referral for skin cancer--a potentially useful method of reducing time to surgery	Khan F;McGregor JC;	1999	3	No	No	Very unique site testing a new protocol.	new protocol being assessed	P	Unknown	2b
152	Plastic surgery waiting list--the numbers game fact or fiction?	McGregor JC;	1998	3	Unknown	No	No comparisons made to other surgeons lists with similar practices	Recent move to a computerized system, decreased number of available beds in system, increase in the number of consultants, consultation with specialists did not occur but was occurring for other specialties	P	Unknown	4

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Appendix C - Reviewed Articles and Waiting Times Reported									
Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
7	Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract)	Olivotto IA;Borugian MJ;Kan L;Harris SR;Rousseau EJ;Thorne SE;Vestrup JA;Wright CJ;Coldman AJ;Hislop TG;	2001	2	Breast	Women 40 years + who had an abnormal mammogram screening in 1998 and were in one of five intervention or control groups.	No tumor factor information		
8	Waiting time information services: what are the implications of waiting list behaviour for their design?	Cromwell D;Griffiths D;	2002	1				46 surgeons with 10 surgical specialties with at least 2 surgeons in each specialty, surgeons were active for full study time frame	27827
10	Waiting times for surgery -- inheritance for primary care organisations in Trent	Hippisley CJ;Pringle M;Coupland C;Cater R;	2002	1	Breast and Colon	Median age of female breast cancer surgery is 58, and median age of colon cancer surgery patients is 72 years.			7337 for breast, 3100 for colon, + 5 other procedures
13	Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer?	Marshak G;Rakowsky E;Schachter J;Shivero J;Feinmesser R;Sulkes A;Brenner B;	2004	3	Larynx		T stage, N status, Grade, and Site		44

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Appendix C - Reviewed Articles and Waiting Times Reported									
Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
18	Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy	Parente F;Bargiggia S;Bianchi PG;	2002	2	Upper gastrointestinal	Three day rule group ave age 56.4 and routine referral group 52.	6 gastric cancer in three day rule group were locally staged as T3 and the other 2 were T2N0 and T2N1.	four endoscopists	3 day rule = 142 and open access were 767
19	Analysis of the referral pattern to a supraregional bone and soft tissue tumour service	Ashwood N;Witt JD;Hallam PJ;Cobb JP;	2003	3	Bone and soft tissue tumors	average age was 36.3 years, slightly more men than women	benign, malignant or metastatic		100
20	Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective	Lee J;Marchbank A;Goldstraw P;	2002	1	Lung	Median patient age was 65 years, a little over half were men.	tumor stage group		90
28	Waiting time thresholds: are they appropriate?	MacCormick AD;Parry BR;	2003	1		Elective general surgery patients including malignancies		Not described - only one facility	921

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Appendix C - Reviewed Articles and Waiting Times Reported									
Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
35	Changes in patient characteristics and outcomes for radical cystectomy in England	Nuttall MC;van der MJ;McIntosh G;Gillatt D;Emberton M;	2005	2	Bladder	Two-thirds of the patients were >65 years old and 76% were men.			8228
37	Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England	Robinson D;Bell CM;Moller H;Basnett I;	2003	1	Breast	Most meeting referral target were b/w 50 and 64 yrs. Most meeting treatment target were 65+			5750
38	Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery	Kirkup ME;De Berker DA;	1999	2	Face not central T area	31 men, 19 female aged 48 to 89 years old with a mean of 71.9 years.	27 of 50 were solid, 14 cystic, 3 adenoid, 3 multifocal two infiltrating and 1 mixed type with solid and multifocal features.	one dermatologist	50
43	The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001	Sauven P;Bishop H;Patnick J;Walton J;Wheeler E;Lawrence G;	2003	2	Breast			maybe 419	2979

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Appendix C - Reviewed Articles and Waiting Times Reported									
Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
44	The National Prostatectomy Audit: the clinical management of patients during hospital admission	Emberton M;Neal DE;Black N;Harrison M;Fordham M;McBrien MP;Williams RE;McPherson K;Devlin HB;	1995	3	Prostate malignancies	81% men had elective admissions, 88% recorded as first operation, majority did not have maximum peak urine flow measured		103 surgeons representing 97% of all urologists and general surgeons undertaking prostatic surgery	5281 men participated, 616 had malignant disease
45	The anatomy of a prostate waiting list: a prospective study of 132 consecutive patients	Schou J;Poulsen AL;Nordling J;	1994	3	Bladder cancer				117
49	Waiting time for breast cancer treatment in Alberta	Reed AD;Williams RJ;Wall PA;Hasselback P;	2004	1	Breast	Mean age of patients was 60.5 years, 37% had Stage 1, 34% had Stage 2, 6% had Stage 3, 3% had Stage 4 and 20% of the cases the stage was unknown.	Stage 1, 2, 3 or 4 or unknown		6238
51	Monitoring trends in waiting periods in Canada for elective surgery: validation of a method using administrative data	Shortt SE;Shaw RA;Elliott D;Mackillop WJ;	2004	1					22703

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
53	How long do patients wait for elective general surgery?	Olson DW;de Gara CJ;	2002	1	Breast and Colon	No patient characteristics provided other than the procedure received.		11	74
54	Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy	Nam RK;Jewett MA;Krahn MD;Robinette MA;Tsihlias J;Toi A;Ho M;Evans A;Sweet J;Trachtenberg J;	2003	1	Prostate	Mean age was 62.6 years, also summarized for patients were histological grade, pathological stage, and PSA levels.	Gleason score 2-10, pathological stage: organ confined, extracapsular extension, and seminal vesicle involvement		645
56	From blacklist to beacon, a case study in reducing dermatology out-patient waiting times	Appleby A;Lawrence C;	2001	3	skin	unknown			
64	Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery?	Shortt SE;Shaw RA;	2003	2		33% were in the high SES group, and 28% were in the low SES group			39090

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Appendix C - Reviewed Articles and Waiting Times Reported									
Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
67	A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario	Simunovic M;Gagliardi A;McCready D;Coates A;Levine M;DePetrillo D;	2001	1	Breast, gynecologic, colorectal, head and neck, thoracic and urologic cancers	unknown		62	1456
68	Waiting time for breast cancer surgery in Quebec	Mayo NE;Scott SC;Shen N;Hanley J;Goldberg MS;MacDonald N;	2001	1	Breast	Patients >= 20 years		did not measure	29606 episodes and 28100 women
69	A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage	Trickett JP;Donaldson DR;Bearn PE;Scott HJ;Hassall AC;	2004	1	Colorectal	urgency were provided as a patient characteristic, in Group 1 20% were referred under the two week rule, 21% as urgent and 12% as nonurgent; in Group 2, 29% were referred initially to accident and emergency and 18% referred to general medical outpatients. There was a difference in the	Dukes' pathological state (A, B, C, or D) and the anatomical location of the tumor		147
71	The two week referral for colorectal cancer: a retrospective analysis	Barwick TW;Scott SB;Ambrose NS;	2004	2	Colorectal	avg. age 68, 43% male and 57% female			N = 144 but only 14 with CRC

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
72	Monitoring surgical treatment of screen-detected breast lesions in Italy	Distante V;Mano MP;Ponti A;Cataliotti L;Filippini L;Giorgi D;Lazzaretti MG;Marchesi C;Perfetti E;Segnan N;	2004	1	Breast	patients with screen detected lesions	pT1a or pT1b; node-positive; grade 1 2 and 3;		515
82	Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management	Arnesen KE;Erikssen J;Stavem K;	2002	1	Thyroid, gastroenterology, gynecology, breast, orthopedics and urology	Study consisted of 227 men and 225 women, with a mean age of 50 years. Urological diseases constituted 36% of the cases, gynecological 30% and orthopedic 14%. Approx 28% of the patients had suspected or verified malignant disease.		46	396
92	Factors influencing physicians' assessment of urgency for inpatient surgery	Arnesen KE;Erikssen J;Stavem K;	2001	1		mean age 50 years			452 patients
94	Waiting-list prioritization in the National Health Service	Prasad S;Kapoor PK;Kumar A;Reddy KT;Kumar BN;	2004	2		n/a			344

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
95	Waiting times during the management of head and neck tumours	Jones TM;Hargrove O;Lancaster J;Fenton J;Shenoy A;Roland NJ;	2002	1	Head and neck malignancies	unknown			75
98	Referral patterns for gynaecologic cancers and precancerous conditions	Gagliardi A;DePetrillo D;Elit L;	2002	3	Gynaecologic				267
100	Waiting times for treatment of rectal cancer in North West England	Duff SE;Wood C;McCredie V;Levine E;Saunders MP;O'Dwyer ST;	2004	1	Rectal	Mean age was 64.5 years, range 35 to 84. Gender - 42 males, 23 females.			65
101	How will the two-weeks-wait rule affect delays in management of urological cancers?	Subramonian KR;Puranik S;Mufti GR;	2003	1	Urological	unknown			160 (40 in each group)

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
103	Clinical audit of a specialist symptomatic breast clinic	Gui GP;Allum WH;Perry NM;Wells CA;Curling OM;McLean A;Oommen R;Sullivan M;Denton S;Carpenter R;	1995	3	Breast	Mean age of patients was 42 year, 81% of referrals came from catchment and 46% prioritized as urgent.		2	134
105	Who should have a prostatectomy? A survey of the management of patients presenting with bladder outflow obstruction	Lloyd SN;Kirk D;	1991	3					46
126	Does treatment delay affect survival in non-small cell lung cancer? A retrospective analysis from a single UK centre	Bozcuk H;Martin C;	2001	1	Lung	Median age of 70 and 71. 4 % males 28.6 % females. Pts mostly Lobectomy or pneumonectomy.	Stage 1, 2,3,4 and metastasis bone and/or liver and adenocarcinoma and squamous cell.		189, surgery cases n=42
127	Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997	Shen N;Mayo NE;Scott SC;Hanley JA;Goldberg MS;Abrahamowicz M;Tamblyn R;	2003	1	Breast		Stages of breast cancer tumors were broken down to include carcinoma in situ, localized, regional, and dessimated.	800 surgeons working in 107 hospitals - teaching and nonteaching hospitals	23,370

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
128	Waiting times for surgical procedures	DeCoster C;Carriere KC;Peterson S;Walld R;MacWilliam L;	1999	1	Breast				40,814
134	Generic surgical priority criteria scoring system: the clinical reality	Dennett ER;Parry BR;	1998	2	Malignancies - primarily refer to breast and colorectal				209
140	Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans	Chin S;Harrigill KM;	1999	1	Gynecologic	Mean age for managed care cancer pts = 48 years and for fee for service cancer pts = 61 yrs			400 (193 were cancer cases specifically)
150	Polaroid photographic referral for skin cancer--a potentially useful method of reducing time to surgery	Khan F;McGregor JC;	1999	3	Skin	Average age was 70 years and 15 out of 25 patients were men.			25

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Article Information					Dimensions				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Cancer Site	Patient Characteristics	Stages or type of tumor cell.	Surgeon Characteristics	Sample Size
152	Plastic surgery waiting list--the numbers game fact or fiction?	McGregor JC;	1998	3		non provided	unknown	1	unknown

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Defintion (T0, T1, T3, T4)			
7	Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract)	Olivotto IA;Borugian MJ;Kan L;Harris SR;Rousseau EJ;Thorne SE;Vestrup JA;Wright CJ;Coldman AJ;Hislop TG;	2001	2	Median wait time with a biopsy: for wait time d) for Pilot A was 22 days, Pilots B, C and E ranged from 38-43 days, and Pilot D was 56 days compared to controls at 57 days. A median of over three weeks without a biopsy and over eight weeks if a biopsy was performed.	Median wait times between a) screen to first assessment; b) first assessment to surgical consultation; c) surgical consultation to diagnosis; d) screen to diagnosis; and e) screen to diagnosis in an earlier time period.			
8	Waiting time information services: what are the implications of waiting list behaviour for their design?	Cromwell D;Griffiths D;	2002	1	measured variation in wait times				
10	Waiting times for surgery -- inheritance for primary care organisations in Trent	Hippisley CJ;Pringle M;Coupland C;Cater R;	2002	1	Median waiting time among the geographies investigate was between 8 days to 21 days for breast cancer and 8 days to 22 days for colon cancer.	The measure of wait from decision to operate to the operation itself has face validity and used by the NHS for monitoring its performance			
13	Is the delay in starting postoperative radiotherapy a key factor in the outcome of advanced (T3 and T4) laryngeal cancer?	Marshak G;Rakowsky E;Schachter J;Shivero J;Feinmesser R;Sulkes A;Brenner B;	2004	3	27 pts started radiation within 42 days of surgery. Median delay was 50 days for radiation after surgery (range 19 to 150 days)	Waiting time: day of surgery to day raditation therapy was started.			

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Defintion (T0, T1, T3, T4)			
18	Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy	Parente F;Bargiggia S;Bianchi PG;	2002	2	All gastroscopies under three day rule were scheduled within three working day with a median of 2 days. Routine referrals were scheduled within 7-39 working days with a median wait of 22 days.	GP urgent referral to gastroscopy			
19	Analysis of the referral pattern to a supraregional bone and soft tissue tumour service	Ashwood N;Witt JD;Hallam PJ;Cobb JP;	2003	3	Time from when patients noted symptoms to when they saw a doctor was 14.8 months (range 0-26 months), while referral to the supraregional centre from the GP or local hospital took an average of 13.5 months (range 0-32 months).	time from patients noting symptoms just prior to seeing a doctor and the time between referral from GP or hospital to the supraregional centre.			
20	Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective	Lee J;Marchbank A;Goldstraw P;	2002	1	Median interval between onset of symptoms and first chest radiograph was 39 days; between onset of symptoms and referral to a surgeon by a chest physician was 112 days; bewteen referral by a respiratory physician and surgical out-patient attendance was 14 days; between referral by a respiratory physician and the surgical procedure was 32.5 days; median length of time from surgical out-patient attendance to the surgical procedure was 32.5 days. Overall median delay from onset of symptoms to surgery was 161 days.	Median interval between onset of symptoms and first chest radiograph; between onsent of symptoms and referral to a surgeon by a chest physician; bewteen referral by a respiratory physician and surgical out-patient attendance; between referral by a respiratory physician and the surgical procedure; median length of time from surgical out-patient attendance to the surgical procedure and overall median delay from onset of symptoms to surgery.			
28	Waiting time thresholds: are they appropriate?	MacCormick AD;Parry BR;	2003	1	Mean wait times reported (42 days for malignant), patients with malignant disease had their operation within 180 days, survival curves for malignant diseases waiting at 180, 360 and 540 days.	Time from prioritization for surgery until procedure at the facility.			

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Defintion (T0, T1, T3, T4)			
35	Changes in patient characteristics and outcomes for radical cystectomy in England	Nuttall MC;van der MJ;McIntosh G;Gillatt D;Emberton M;	2005	2	Mean waiting time in days ranged from 25.5 days (24.2 SD) to 28.4 days (34.8 SD) for the fiscal years studied.	Time in days from the date on which it was decided to admit the patient for surgery to the date of admission to the hospital when the surgery took place.			
37	Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England	Robinson D;Bell CM;Moller H;Basnett I;	2003	1	consultant (referral) before target of 2 weeks (July 1997 - March 1999) mean - 13.6 and - median - 11 proportion meeting target 66.0 %. After target (April 1999 - December 2000) mean - 12.3 and median 10 and proportion meeting target 75.2 %. Treatment wait before target of (July 1997 - March 1999) mean - 21.4 and - median - 16, proportion meeting target 83.8 %. After target (April 1999 - December 2000) mean - 24.1 and median 20, and proportion meeting target 80.3 %. Total wait: before target of 2 weeks (July 1997 - March 1999) mean - 35.0 and - median - 29,	T1 - GP referral to hospital consultant and time to treatment (tamoxifen or endocrine, radiotherapy, surgery, chemotherapy) ans T3			
38	Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery	Kirkup ME;De Berker DA;	1999	2	T0 was median of 17.5 months (range 4-84) T2 was median of 66.7 days.Mean wait time between the clinic visit and treatment was 70 days	T0 and from presentation of tumour to dermatologist to surgery.			
43	The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001	Sauven P;Bishop H;Patnick J;Walton J;Wheeler E;Lawrence G;	2003	2	proportions met recommendations for less than 50% of patients and less than 75% respectively	proportion admitted for diagnostic surgery within 14 days of the decision to operate, proportion of women admitted for therapeutic surgery within 21 days of the decision to operate			

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Definition (T0, T1, T3, T4)			
44	The National Prostatectomy Audit: the clinical management of patients during hospital admission	Emberton M;Neal DE;Black N;Harrison M;Fordham M;McBrien MP;Williams RE;McPherson K;Devlin HB;	1995	3	61% of men waited 3 months or less for their elective operation and 91% of patients waited less than 1 year	measured time on waiting list from consultation/referral to surgery			
45	The anatomy of a prostate waiting list: a prospective study of 132 consecutive patients	Schou J;Poulsen AL;Nordling J;	1994	3					
49	Waiting time for breast cancer treatment in Alberta	Reed AD;Williams RJ;Wall PA;Hasselback P;	2004	1	Mean waiting time was 20.2 days (SD=21.6), median waiting time was 17 days and modal waiting time was 0 days. Median waiting time increased 2 days each year from 1997 to 2000.	number of continuous days between cancer diagnosis and treatment, if the patient had more than one diagnostic test, the last diagnostic test date was used.			
51	Monitoring trends in waiting periods in Canada for elective surgery: validation of a method using administrative data	Shortt SE;Shaw RA;Elliott D;Mackillop WJ;	2004	1	geometric mean difficult to interpret	last service date,decision to undergo surgery date and the date of the patient's last appointment prior to surgery(consultant notes)			

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Definition (T0, T1, T3, T4)			
53	How long do patients wait for elective general surgery?	Olson DW;de Gara CJ;	2002	1	Mean +- SD: T1, T2A, and T2= Breast Cancer Resection: 10.9 (1.0), 13.1 (1.6) and 54.9 (19.5) days respectively; Colorectal cancer resection: 16.7 (3.4), 15.0 (2.6) and 34.0(12.4) days. Note also reported was Cholecystectomy.	T1= time in days from date of referral to initial surgical consultation; T2A = time from initial surgical consultation to operation without additional work-up; and T2B = time from initial surgical consultation to operation with additional work-up			
54	Delay in surgical therapy for clinically localized prostate cancer and biochemical recurrence after radical prostatectomy	Nam RK;Jewett MA;Krahn MD;Robinette MA;Tsihlias J;Toi A;Ho M;Evans A;Sweet J;Trachtenberg J;	2003	1	Median time from date of diagnosis to surgery was 68 days (range 15 to 951 days).	date of diagnosis to surgery			
56	From blacklist to beacon, a case study in reducing dermatology out-patient waiting times	Appleby A;Lawrence C;	2001	3		Referral letter from general practitioner to consultant and appointment made			
64	Equity in Canadian health care: does socioeconomic status affect waiting times for elective surgery?	Shortt SE;Shaw RA;	2003	2	mean waiting time was 30.6 days, 31.1 days for high SES group and 29.3 days for low SES group.	time from surgical consultation to procedure			

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Article Information									
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Definition (T0, T1, T3, T4)			
67	A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario	Simunovic M;Gagliardi A;McCready D;Coates A;Levine M;DePetrillo D;	2001	1	Median wait time from referral to first visit was 11 days, from first visit to treatment decision 0 days, from treatment decision to surgery 20 days, from surgery to receipt of the pathology report 8.0 days. The median wait times for the 2 summary intervals were 37.0 and 48.0 days.	Median wait time from referral to first visit, from first visit to treatment decision, from treatment decision to surgery, and from surgery to receipt of the pathology report. The median wait times for the 2 summary intervals were from referral to surgery and referral to receipt of the pathology report respectively.			
68	Waiting time for breast cancer surgery in Quebec	Mayo NE;Scott SC;Shen N;Hanley J;Goldberg MS;MacDonald N;	2001	1	Median 34 days; increase 37% in 6 years to 42 days	First diagnostic procedure and surgical treatment			
69	A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage	Trickett JP;Donaldson DR;Beare PE;Scott HJ;Hassall AC;	2004	1	Median time in days for Group 1 was 70.5 days and Group 2 was 14 days.	The interval in days from the GP referral to treatment as defined by surgery or the initiation of pre-operative radiotherapy with or without chemotherapy			
71	The two week referral for colorectal cancer: a retrospective analysis	Barwick TW;Scott SB;Ambrose NS;	2004	2	off 144 referred pts with suspected colorectal cancer from GP, 91% were seen by a surgeon or gastroenterologist within 14 days with a median of 10 days.	T1 - GP urgent referral to consultation with surgeon or gastroenterologist			

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Appendix C - Reviewed Articles and Waiting Times Reported										
Article Information										
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Waiting Time Overall (main measurement used e.g. mean or median and the units used)	Waiting Time Definition (T0, T1, T3, T4)				
72	Monitoring surgical treatment of screen-detected breast lesions in Italy	Distante V;Mano MP;Ponti A;Cataliotti L;Filippini L;Giorgi D;Lazzaretti MG;Marchesi C;Perfetti E;Segnan N;	2004	1	Median wait in days: 21 days from referral to operation; 47 days from screening to operation; 7 days from biopsy to histology report; 28 days from biopsy to definitive operation; 8 days from definitive operation to histology report; and 12 days from operation to oestrogen receptors' report.	Median wait in days: from referral to operation; from screening to operation; from biopsy to histology report; from biopsy to definitive operation; from definitive operation to histology report; and from operation to oestrogen receptors' report.				
82	Gender and socioeconomic status as determinants of waiting time for inpatient surgery in a system with implicit queue management	Arnesen KE;Erikssen J;Stavem K;	2002	1	Waiting time for scheduled admission ranged from 6 to 846 days, median 61 days.	time from the initial outpatient assessment until the first day of the hospital stay for the requested procedure				
92	Factors influencing physicians' assessment of urgency for inpatient surgery	Arnesen KE;Erikssen J;Stavem K;	2001	1	assessed maximal waiting time of 4 weeks (median)	from outpatient clinic physician assessment to surgery				
94	Waiting-list prioritization in the National Health Service	Prasad S;Kapoor PK;Kumar A;Reddy KT;Kumar BN;	2004	2						

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95	Waiting times during the management of head and neck tumours	Jones TM;Hargrove O;Lancaster J;Fenton J;Shenoy A;Roland NJ;	2002	1	Mean time from GP referral to ENT was 5.1 weeks, from ENT to endoscopy was 3.1 weeks, to histology was 3.5 weeks, to CT scan 5.6 weeks, to MR 4.1 weeks, to Primary radiotherapy 10.3 weeks and to surgery 5.5 weeks. The mean symptom duration prior to referral was 4.9 months.				
98	Referral patterns for gynaecologic cancers and precancerous conditions	Gagliardi A;DePetrillo D;Elit L;	2002	3		No waiting times measured but gynaecologists were asked for their opinion on acceptable waiting times.			
100	Waiting times for treatment of rectal cancer in North West England	Duff SE;Wood C;McCredie V;Levine E;Saunders MP;O'Dwyer ST;	2004	1	Median waiting times days from initial surgical referral to start of radiotherapy was 40 days (range 11-85) made up as follows:time from referral by the surgeon to oncology department apt. 11 days, time from oncology appointment to start of radiotherapy 29 days. After radiotherapy median delay to surgery was 6 days.	From initial surgical referral to start of radiotherapy. And from completing radiotherapy to surgery.			
101	How will the two-weeks-wait rule affect delays in management of urological cancers?	Subramonian KR;Puranik S;Mufti GR;	2003	1	Overall median wait time in days (IQR) for all cases from GP consultation to referral was 0 days (0-11); for GP referral to first hospital appointment was 33 days (9-60); first hospital appointment to confirmation of diagnosis was 20 days (0-73); from diagnosis to radical surgery was 39 days (11-76); and overall waiting time was 137 days (49-226). Also provided for each of the four cancers investigated.	Overall median wait time in days (IQR) for all cases from GP consultation to referral was measured for GP referral to first hospital appointment; first hospital appointment to confirmation of diagnosis; from diagnosis to radical surgery; and overall waiting time.			

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103	Clinical audit of a specialist symptomatic breast clinic	Gui GP;Allum WH;Perry NM;Wells CA;Curling OM;McLean A;Oommen R;Sullivan M;Denton S;Carpenter R;	1995	3	37.6 minutes	mean time between designated appointment to surgical consultation for all new patients			
105	Who should have a prostatectomy? A survey of the management of patients presenting with bladder outflow obstruction	Lloyd SN;Kirk D;	1991	3					
126	Does treatment delay affect survival in non-small cell lung cancer? A retrospective analysis from a single UK centre	Bozcuk H;Martin C;	2001	1	Median time to treatment or T4 was 48 days and 11 days for T1.	T1 and T4			
127	Factors associated with pattern of care before surgery for breast cancer in Quebec between 1992 and 1997	Shen N;Mayo NE;Scott SC;Hanley JA;Goldberg MS;Abrahamowicz M;Tamblyn R;	2003	1	Waiting time from the initial diagnostic procedure to the first definitive surgery - localized disease median waiting time was 32 days with 1/4th waiting less than 18 days and 1/4 waiting more than 59 days. -regional disease median was 27 days.	Waiting time from the initial diagnostic procedure to the first definitive surgery			

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128	Waiting times for surgical procedures	DeCoster C;Carriere KC;Peterson S;Walld R;MacWilliam L;	1999	1	Median days in Winnipeg: Cholecystectomy = 34 days, Breast = 17, TUPR = 27	T3			
134	Generic surgical priority criteria scoring system: the clinical reality	Dennett ER;Parry BR;	1998	2					
140	Delay in gynecologic surgical treatment: a comparison of patients in managed care and fee-for-service plans	Chin S;Harrigill KM;	1999	1	Managed care patients benign gynecological surgery had longer delays (133.7 days) compared with 84.9 days with fee for service plans. Managed care patients oncologic gynecological surgery had 35.7 days compared with 20.5 days with fee for service plans.	Time from initial presentation to date of definitive surgical procedure			
150	Polaroid photographic referral for skin cancer--a potentially useful method of reducing time to surgery	Khan F;McGregor JC;	1999	3	Mean of 30 days	time between referral from the dermatologist to the plastic surgical procedure			

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152	Plastic surgery waiting list--the numbers game fact or fiction?	McGregor JC;	1998	3		unknown			

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Appendix D - Reviewed Articles and Benchmarks												
Article Information								Benchmarks			GRADE	
								(A,B,C,D) See list in Report Two.				
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Benchmark (Days or Weeks)	Comments about Benchmark	Who Set?					
7	Improving the time to diagnosis after an abnormal screening mammogram (Structured abstract)	Olivotto IA;Borugian MJ;Kan L;Harris SR;Rousseau EJ;Thorne SE;Vestrup JA;Wright CJ;Coldman AJ;Hislop TG;	2001	2	90th percentile targets set for investigations: abnormal screen to notification of the client = 2 weeks; notification of the client to first assessment = 2 weeks; cumulative duration, abnormal screen to first assessment = 3 weeks; first assessment to diagnosis (without an open biopsy) = 2 weeks; first assessment to diagnosis (with open biopsy) = 4 weeks; diagnosis to notification of client = 1 week; abnormal screen to diagnosis (without open biopsy) = 5 weeks; and abnormal screen to diagnosis (with open biopsy) = 7 weeks.	Authors state, "it is possible to achieve the timeliness targets by establishing dedicated breast assessment centres which include direct referral from the screening to the diagnosis component of the system.	Canadian Breast Cancer Screening Initiative	D				
18	Prospective audit of gastroscopy under the 'three-day rule': a regional initiative in Italy to reduce waiting time for suspected malignancy	Parente F;Bargiggia S;Bianchi PG;	2002	2	3 day rule is for patients with suspected severe disease to have a a diagnostic procedure within 3 working days of referral by a G.P.	Study examined the effectiveness and compliance with the 3 day rule for upper digestive malignancies and found that more upper GI cancers and serious benign disease can be found within a short period with 3 day rule. Improvement was still required as GP were over interpreting the alarm signs and a review of urgent referral criteria is recommended.. Because the median delay for diagnosis is 20 days, any impact by the 3 day rule has yet to be determined	Lombardy Health Authorities in Italy.	D				
20	Implementation of the British Thoracic Society recommendations for organising the care of patients with lung cancer: the surgeon's perspective	Lee J;Marchbank A;Goldstraw P;	2002	1	1. Max 8 weeks between the first respiratory physician consultation and thoracotomy in an uncomplicated operable case. 2. Max. 4 weeks between acceptance on a surgical waiting list and thoracotomy. 3. All patients should have a staging CT scan. 4 5 and 6 are recommendations of process or infrastructure to support patient care.		British Thoracic Society Standards of Care Committee	D				
28	Waiting time thresholds: are they appropriate?	MacCormick AD;Parry BR;	2003	1	6 months for surgery for those eligible to be on list depending on hospital fiscal threshold	Study examined usefulness of 6 month general benchmark for different diagnosis groups and suggest 6 month only suitable for malignancies and 1 year for other types of elective general surgery.	National Advisory Committee, NewZealand Health	D				

Article Information				Benchmarks				GRADE
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Benchmark (Days or Weeks)	Comments about Benchmark	Who Set?	(A,B,C,D) See list in Report Two.
37	Effect of the UK government's 2-week target on waiting times in women with breast cancer in southeast England	Robinson D;Bell CM;Moller H;Basnett I;	2003	1	Breast cancer patient targets: 2 week maximum wait for assessment by hospital consultant for women referred urgently by their GP and all patients should be treated within 1 month of diagnosis by 2001 and within 2 months of urgent GP referral by 2002 and these targets to be extended to all cancer patients by 2005	95% to 99% of target is practical if number of GP referrals does not increase as waits decrease. There was a significant distributional shift towards shorter waiting times for the referral wait and longer times for the treatment wait following the introduction of the target, with the result that total waiting times remain relatively unchanged. The pressure to shorten wait without additional resources being available in hospitals to deliver an improved service, has led to delays in treatment.	National Health Department (NHS) U.K.	D
38	Clinical measurement of dimensions of basal cell carcinoma: effect of waiting for elective surgery	Kirkup ME;De Berker DA;	1999	2	10 week wait for elective surgery for basal cell carcinoma specific to exclusion criteria	Study examined impact on basal cell carcinoma while waiting for surgery suggested that it seems likely that it is safe to use clinical judgement in the discrimination between different types and locations and to allowing a period of delay (10 weeks) in planning of elective surgery.	Dermatologist consultant in U.K.	D
43	The National Health Service Breast Screening Programme and British Association of Surgical Oncology audit of quality assurance in breast screening 1996-2001	Sauven P;Bishop H;Patnick J;Walton J;Wheeler E;Lawrence G;	2003	2	>= 90% of women should be admitted for an operation within 14 days of surgical decision to operate for diagnostic purposes and >= 90% of women should be admitted for an operation within 21 days of the surgical decision to operate for therapeutic purposes.	It is unlikely that units will achieve the new national waiting times target of 1 month from diagnosis to first treatment, as defined in the NHS Cancer Plan, without further resources.	National Health Department (NHS) U.K.	D
49	Waiting time for breast cancer treatment in Alberta	Reed AD;Williams RJ;Wall PA;Hasselback P;	2004	1	No more than two weeks transpire between diagnosis and treatment.	Only 44% of Alberta women receive treatment in the 14 day time period recommended.	Canadian Society for Surgical Oncology	D

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56	From blacklist to beacon, a case study in reducing dermatology out-patient waiting times	Appleby A;Lawrence C;	2001	3	90% of outpatients being seen within 13 weeks of referral and all being seen within 26 weeks	Able to reach with limiting demand and using an agreed referral exclusion criteria.	Patient's Charter, UK	Unknown
67	A snapshot of waiting times for cancer surgery provided by surgeons affiliated with regional cancer centres in Ontario	Simunovic M;Gagliardi A;McCready D;Coates A;Levine M;DePetrillo D;	2001	1	1. The time from completion of diagnostic tests to the definitive surgery should not exceed 2 weeks. 2. The maximum time needed to diagnosis the most common cancers following patient presentation to a family physician is 4 weeks.	Study results are well above the guidelines set.	1. Canadian Society of Surgical Oncology. 2. Canadian Strategy for Cancer Control.	D
68	Waiting time for breast cancer surgery in Quebec	Mayo NE;Scott SC;Shen N;Hanley J;Goldberg MS;MacDonald N;	2001	1	UK 14 days referral for suspected breast cancer patient to be seen by specialist.		National Health Department (NHS) U.K.	
69	A study on the routes of referral for patients with colorectal cancer and its affect on the time to surgery and pathological stage	Trickett JP;Donaldson DR;Beam PE;Scott HJ;Hassall AC;	2004	1	Two Week Rule	The authors propose that the two week rule for colorectal cancer is only met by a minority of patients and should not be used as a general indication of reduction of the interval to treatment and is a poor guide for assessment of a colorectal unit's performance of treatment.	National Health Department (NHS) U.K.	D

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71	The two week referral for colorectal cancer: a retrospective analysis	Barwick TW;Scott SB;Ambrose NS;	2004	2	Patients with suspected cancer seen by consultant within 2 weeks of GP urgent referral.	Authors state, "improvements to time to diagnosis and treatment will only occur if radiology and endoscopy departments are suitably funded to increase, and work within, their capacity.	National Health Department (NHS) U.K.	D
72	Monitoring surgical treatment of screen-detected breast lesions in Italy	Distante V;Mano MP;Ponti A;Cataliotti L;Filippini L;Giorgi D;Lazzaretti MG;Marchesi C;Perfetti E;Segnan N;	2004	1	90% seen in less than 21 days	These are indicators and reference standards important for quality measurement.	Italian Group for Planning and Evaluating Mammographic Screening Programs CPO – Piemonte, GISMA, EBCSN	D
94	Waiting-list prioritization in the National Health Service	Prasad S;Kapoor PK;Kumar A;Reddy KT;Kumar BN;	2004	2	3 months for both outpatient times and admission for surgery from time of listing		National Health Department (NHS) U.K.	D
95	Waiting times during the management of head and neck tumours	Jones TM;Hargrove O;Lancaster J;Fenton J;Shenoy A;Roland NJ;	2002	1	First Symptoms to GP = 1 month; GP to first out-patient visit = 14 days; FNAC = no wait; First out-patient visit to panendoscopy = 7 days; Biopsy to report tissue = 7 days; Out-patient to primary radiotherapy = 14 days to planning; out-patients to surgery = 14 days	Many targets are unable to be achieved such as the proposed two week rule was exceeded by three weeks on average.	British Association of Head, Neck Oncologists, Consensus Document, 2000, UK	D

Article Information				Benchmarks				GRADE
ID#	Article Title	Authors	Year	Relevance 2nd Rating	Benchmark (Days or Weeks)	Comments about Benchmark	Who Set?	(A,B,C,D) See list in Report Two.
98	Referral patterns for gynaecologic cancers and precancerous conditions	Gagliardi A;DePettrillo D;Elit L;	2002	3	The median acceptable number of working days for a women to wait for consultation be 7 days for a pelvic mass and ascites; 14 days for newly diagnosed cervical cancer; and 30 days for postoperatvie management of endometrial cancer.		Survey response from gynaecologists in Ontario	D
100	Waiting times for treatment of rectal cancer in North West England	Duff SE;Wood C;McCredie V;Levine E;Saunders MP;O'Dwyer ST;	2004	1	No patient should wait longer than one month from an urgent referral by GP with suspected cancer to start of treatment in 2008. Patients should be treated within one month of diagnosis and two months from urgent referral in 2005.	Only 6% of patients started radiotherapy within the interim target of 28 days. Delays due to shortages of radiography staff and equipment. Lack of such infrastructure will prove a major stumbling block to achieving targets of the NHS Cancer Plan.	National Health Department (NHS) U.K.	D
101	How will the two-weeks-wait rule affect delays in management of urological cancers?	Subramonian KR;Puranik S;Mufti GR;	2003	1	2 weeks from GP referral to specialist asesment, and 2 months from urgent referral to treatment for all cancers	Authors state that two week rule will not have improved other steps on the urological cancer pathway.	National Health Department (NHS) U.K.	D
103	Clinical audit of a specialist symptomatic breast clinic	Gui GP;Allum WH;Perry NM;Wells CA;Curling OM;McLean A;Oommen R;Sullivan M;Denton S;Carpenter R;	1995	3	Patients attending the clinic are seen within 30 minutes	Just under halve of the patients attending the clinic met the requirement	Patient's Charter, Department of Health, UK	Unknown

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126	Does treatment delay affect survival in non-small cell lung cancer? A retrospective analysis from a single UK centre	Bozcuk H;Martin C;	2001	1	Patient with suspected lung cancer be seen by specialist within 2 weeks of referral from GP	Suggests that waiting time does not affect survival rate.	National Health Department (NHS) U.K.	D
152	Plastic surgery waiting list--the numbers game fact or fiction?	McGregor JC;	1998	3	Waiting for plastic surgery UK set national recommended average of 18 months. Also mentioned local standard of 10 months set as the Lothian guarantee.	Study found patients waiting between 11 and 12 months.	National Health Department (NHS) U.K.	D