FOCUS ON TOMORROW

RESEARCH FUNDED BY WORKSAFEBC

Identifying Possible Work-related Lung Cancer in the Clinical Setting – Getting Started

June 2008

Principal Investigator/Applicant
Dr. Linn Holness
Ms. Irena Kudla

RS2006-DG02

WORKSAFE BC

WORKING TO MAKE A DIFFERENCE

IDENTIFYING POSSIBLE WORK-RELATED LUNG CANCER IN THE CLINICAL SETTING –GETTING STARTED

REPORT TO WORKSAFE BC

D Linn Holness
Irena Kudla
Gary Liss
Victor Hoffstein
Yaron Shargall

St Michael's Hospital and University of Toronto

30 June 2008

TABLE OF CONTENTS

RESEARCH POINTS ..... **iii**

EXECUTIVE SUMMARY ..... **iv**

RESEARCH PROBLEM/CONTEXT **1**
- Introduction 1
- Background 1
- Objectives 7

METHODOLOGY **8**
- Objective 1 - Questionnaire 8
  - Questionnaire 8
  - Patient Population 8
  - Occupational Hygienist Completed Survey 9
  - Follow-up 10
  - Debrief with Research Assistant 10
- Objective 2 – Barriers and Facilitators 10
  - Clinician Interviews 10
- Data Analysis 11

RESEARCH FINDINGS **11**
- Objective 1 - Questionnaire 11
  - Patient Questionnaire 11
  - Matched Patient Questionnaire and Occupational Hygiene Interview 12
  - Follow-up 13
  - Debrief with Research Assistant 13
- Objective 2 – Barriers and Facilitators 14
  - Interviews of Clinic Staff 14
- Discussion 18
  - Objective 1 – Questionnaire 18
  - Objective 2 – Barriers and Facilitators 20

IMPLICATIONS FOR FUTURE RESEARCH ON OCCUPATIONAL HEALTH **23**

POLICY AND PREVENTION **24**

DISSEMINATION/KNOWLEDGE TRANSFER **25**
- Knowledge Translation 25

REFERENCES **26**

APPENDICES

A. Poster - Development of a Screening Tool to Identify Patients at Risk for Occupational Lung Cancer.

B. Patient Questionnaire, Ease of Use Survey, Occupational Hygiene Interview Guide

C. Clinician Interview Guide

DATA TABLES

1. All Patients - General Workplace Characteristics

2. All Patients - Job and Industry

3. All Patients - Exposures

4. Patients with Hygiene Interview - General Workplace Characteristics

5. Patients with Hygiene Interview - Job and Industry

6. Patients with Hygiene Interview - Exposures

7. Occupational Hygiene Interviews - Profile of Patients Interviewed

RESEARCH POINTS

While it is estimated that 9% -15% of lung cancer may be work-related, under-reporting of occupational diseases, including occupational cancers is well recognized.

The use of a questionnaire aimed at obtaining information about workplace exposures that may be associated with lung cancer is feasible in the clinic setting.

Clinicians working in a lung cancer clinic setting recognize that some lung cancers may be associated with work.

Barriers to clinicians investigating and reporting work-related lung cancer include lack of knowledge, time constraints, complexity of the workers' compensation system and lack of easy referral to expert occupational medicine resources.

Facilitators to improving the reporting of work-related lung cancer include a patient completed exposure questionnaire, clear and simple criteria for clinicians to refer to occupational medicine expertise and the availability of occupational medicine expertise to investigate the cases.

It is not clear who in the cancer care delivery team is ultimately responsible for the patient's overall care, including submitting a compensation claim.

An intervention study addressing the barriers and facilitators of recognizing and reporting possible work-related lung cancer should be undertaken.

EXECUTIVE SUMMARY

Common estimates suggest that between 9% and 15% of lung cancer may be work-related. However, a minority of possible work-related lung cancer is reported to workers' compensation boards. Factors that have been identified in the literature as leading to under-reporting of occupational disease include lack of knowledge and skills on the part of clinicians, time constraints, administrative bureaucracy of the workers' compensation process and lack of clear referral routes.

This study was designed as a pilot study to develop and test an occupational exposure assessment tool for patients attending a lung cancer clinic and to identify barriers and facilitators to the practical implementation of an exposure assessment tool from the perspective of the health care team and patient.

Twenty nine patients with primary lung cancer attending a lung cancer clinic completed a focused exposure questionnaire and 17 of these patients had a clinical occupational hygiene interview as well. Seven clinicians were interviewed to identify barriers and facilitators to the practical implementation of an exposure assessment tool.

Workers reported a number of possible exposures that could be associated with lung cancer, the most common of which were asbestos and second hand smoke. In general, the clinical occupational hygiene interview was consistent with the worker completed questionnaire but the hygienist, by asking more detailed questions regarding specific exposures, tended to identify fewer relevant exposures. Nonetheless, 41% of those interviewed by the clinical occupational hygienist were thought appropriate for submitting a workers' compensation claim and referral to an occupational health clinic.

Clinicians noted that though they knew of some occupational causes of lung cancer, they did not obtain an occupational history in a consistent way or pursue workers' compensation. Key barriers included lack of knowledge, time constraints, administrative bureaucracy and lack of clear referral sources. Templates for occupational history taking, patient completion of an occupational history template, easily accessed information about what jobs and sectors are associated with which exposure and easy referral routes were identified as possible facilitators.

An occupational exposure assessment tool for patients is feasible and could serve as a screening tool to identify patients requiring further investigation of possible work-relatedness. Some modification of the tool used in the study is recommended. A clear process for identifying those for further investigation and an expert source are important features of a system. In the setting of a lung cancer clinic, the key foci of the specialized physicians are diagnosis and treatment. A fundamental question posed by this work is which clinician is responsible for the overall care of the patient, including possible identification and follow-up of possible work-relatedness to ensure the patient receives appropriate workers' compensation benefits both for themselves and their survivors.

Next steps include the development of a poster and/or information sheet related to work-related lung cancer for use in lung cancer clinics and the development of an intervention study in a large lung cancer clinic utilizing a modified questionnaire, clear referral criteria and an expert occupational medicine resource. This could also be applied to other possible work-related cancers.

RESEARCH PROBLEM/CONTEXT

Introduction

Occupational diseases are under-recognized and under-reported, particularly those with a long latency such as cancers. It is estimated that 9% to 15% of lung cancers may be occupationally related. Generally, only a small number of claims are submitted to workers' compensation authorities. If a worker has a work-related lung cancer, compensation is important for the worker's wage loss replacement and treatment and also for their survivors.

One opportunity for recognition of possible work-relatedness is in the diagnostic and treatment process. However, the literature suggests that physicians do not routinely collect workplace exposure information. One approach would be to target clinical centres that are focused on lung cancer diagnosis and treatment. However, there are no validated questionnaires and we do not know the feasibility issues related to this approach. This development grant is designed to start to address these two issues in order to provide information for a more formal intervention study.

Background

Lung cancer is the second most frequent cancer in BC with an annual incidence of approximately 64 per 100,000 in men and 54 per 100,000 in women in 2003.[1] Mortality varies with cell type and stage of disease with an overall 5 year survival rate of 14%.[2]

While smoking is the most significant risk factor for the development of lung cancer, other risk factors include occupational exposures and various dietary factors.[3] Rahman et al report established workplace agents associated with lung cancer as including: asbestos, crystalline silica, hexavalent chromium, nickel, arsenic, polycyclic aromatic hydrocarbons (PAHs) such as coal tars, coal tar pitch and soot, beryllium, cadmium, and radon gas and its decay products.[4]

The estimate for the percentage of lung cancer possibly attributable to workplace exposures varies widely from 0.5% to 40%. Alberg and Samet suggested that 9% to 15% of lung cancers are related to occupational exposure.[3] Two studies from Sweden and Finland reported rates of approximately 25% for lung cancer related to occupational exposures.[5-6] A review by Henderson et al concluded that 4% to 12% of lung cancer cases may be related to asbestos exposure.[7]

Most research related to occupational cancers has focused on epidemiologic investigations to examine associations between exposures and cancers. Other research has focused on the content and results of screening programs. There is minimal research focused on occupational exposure histories and their use in the clinical setting for the identification of work-related lung cancer. While the need for taking an occupational history as part of the medical examination is identified and the fact that it is often not done is documented, there is little work examining ways to improve this in specific practice settings.

A number of questionnaires related to general occupational exposures or specific exposures such as asbestos have been developed for epidemiological studies. In some instances, the exposure questionnaires were examined to assess their sensitivity,

specificity, reliability and validity, and to assess different methods of information collection. Bakke et al investigated the consistency of self-reported exposures with interviewer-administered questionnaires.[8] For reporting of dust or gas exposure, asbestos exposure, and quartz exposure the prevalence of occupational exposures was 1.4 to 2.9 times higher with the interview-based method compared to the self-administered method. Samet et al investigated the reliability of both symptom and exposure information collected by questionnaire in asbestos exposed workers and found that the questionnaire provided reliable estimates of specific occupational exposures.[9]

Another setting in which exposure information is collected is in screening programs. Levin et al provided guidance about the content of an appropriate occupational history for asbestos screening.[10] Holmes and Garshick reported on the reproducibility of self-reporting of asbestos and dust exposure based on 114 male veterans who responded to both a mailed survey and then completed a questionnaire in clinic on average 213 days later.[11] Sixty percent (60%) and 71% provided concordant responses for asbestos and dust exposures respectively. A study of a screening questionnaire that included 13 substances was used in a colorectal screening program of 243 men.[12] The responses to whether they were exposed or not to the 13 substances were highly consistent.

There have been a number of articles addressing the issue of occupational history taking in general medical practice. Goldman and Peters published an article in 1981 outlining the components of an occupational history.[13] In an article addressed to family physicians in 1983, Coye and Rosenstock noted that taking an occupational

history may enable the physician to make more accurate diagnoses, prevent the development of work-related disease, stimulate workplace evaluations, establish the medico-legal basis for future compensation and detect new associations between exposures and disease.[14] They observed that most of the instruments were designed to take a full occupational history and what was lacking was a practical instrument that the family physician could use. In a following publication, Rosenstock et al reported on the development and validation of a self-administered occupational health history questionnaire.[15] In spite of these and other efforts, a decade later in response to a question posed in the Journal of Occupational and Environmental Medicine "Is there a standardized questionnaire for obtaining an occupational history?" the answer was "there are currently no validated or standardized questionnaires available for use" and further "too often, massive amounts of data are collected without concrete plans about how this information would be used".[16]

There is continuing documentation of the lack of physician history taking regarding workplace exposures. A recent study by Politi et al confirms that physicians continue to have problems in this area.[17] Suggested methods to improve the situation have focused on educational initiatives and other strategies such as the use of a questionnaire.[18-22]

There are a number of potential barriers to the recognition and management of occupational injury and disease. Barriers identified in several studies include inadequate training and knowledge, lack of time, and legal, economic and administrative complexities.[23-24] We have recently completed a study of barriers to identifying occupational disease amongst respirologists and family physicians in Ontario.[25]

Although focused on occupational asthma, challenges identified in taking an occupational history and investigating work-relatedness included time constraints, lack of expertise, lack of knowledge about workers' compensation and lack of timely access to specialists. A template was identified as a possible facilitator.

In 2004, we undertook a study to describe the physician assessment of occupational risk factors in patients referred for lung cancer (Appendix A). The study consisted of a retrospective chart review of consecutive patients with a diagnosis of lung cancer or mesothelioma at a regional cancer centre. Data was abstracted from the consultation notes in the charts. Occupational histories were graded as follows: 0) no occupational assessment; 1) most recent job title noted; 2) industry noted; 3) past work history noted; 4) specific exposure history included; and 5) referral to workers' compensation or an occupational physician for further assessment. The charts for 150 lung cancer patients were examined. The consultation notes had been done by respirologists, thoracic surgeons, medical oncologists and radiation oncologists. Occupational information of any kind was noted in 20% of the charts, with 60% of these having the most recent job title noted and 40% having specific exposure history, including notation of exposures to asbestos, radiation and metal fumes.

More recent literature from Europe reports some work on recognition of occupational lung cancer in the clinical setting. Most of these studies involve the use of occupational experts in the clinical process. De Lambertine et al reported a study done in the University Hospital of Grenoble.[26] Patients with primary lung cancer completed a standardized questionnaire with an occupational physician. When there was evidence of exposure to occupational carcinogens a claim was made and their compensation

status was followed a least two years post study. Three hundred and five patients with primary lung cancer were included. Twenty percent made a claim (usually only 2% would do so). Of the 20% that made a claim, 77% were accepted.

Porru et al report a study in Brescia Italy.[27] Prior to the study they report that few patients with lung cancer were referred to the Occupational Pathology group and even fewer were compensated. They instituted a program where all patients were given a short occupational history form. All new cases were referred to and evaluated by the Occupational Pathology group. They searched the records of 1503 lung cancer patients with screening and found that 693 had been referred for full evaluation. Occupational etiology was identified in 182 (26%) and 48 cases were compensated and more were being litigated. The common occupational exposures were silica, asbestos, PAHs, truck driving, painting and road paving. Porru et al also wrote an article summarizing the possible role of the occupational physician in the process.[28]

Chiriac et al report a retrospective study from Romania.[29] Of 304 patients with lung cancer, 60 (20%) were referred for consultation with the Occupational Pathology Department and 27 were declared to have an occupational disease.

Legrand Catton et al report a study in a Paris hospital utilizing a specific occupational questionnaire.[30] There were 207 eligible patients and 122 had the occupational questionnaire. The questionnaire was reviewed by two experts in the Occupational Pathology Department. They graded exposures on several categories including certain or probable carcinogen; intensity of exposure; length of exposure; and frequency and probability of exposure. Of the 122, fifty had at least one occupational exposure. Compensation claims were submitted in 32 cases.

Pairon et al noted that there is a difference in the type of questionnaire needed for epidemiological/research purposes and clinical purposes.[31] The French group, La Société Française de Médicine du Travail et la Société de Pneumologie de Langue Française have developed a questionnaire for clinical use for lung cancer focusing on professions and sectors.

In summary, lung cancer is a common cancer with well recognized occupational causes. In spite of this knowledge, the possible work relationship is under-recognized and under-reported. Although it is agreed that physicians should take an occupational history, this is still done in a minority of cases. There has been some work that has identified a gap in medical education as a key factor, but other barriers include time constraints and administrative issues as reasons for the lack of taking an adequate occupational history. While there has been significant work done on occupational exposure screening questionnaires for epidemiological and screening purposes, there continues to be an absence of a concise, practical standardized questionnaire that has received broad acceptance for use in the clinical setting. Some recent studies from Europe suggest that referral to an occupational medicine clinic as a useful step in identifying possible work-related lung cancers.

Objectives

1. To develop and test an occupational exposure assessment tool for patients attending a lung cancer clinic, and
2. To identify barriers and facilitators in the practical implementation of an exposure assessment tool from the perspective of the health care team and worker.

METHODOLOGY

The study was reviewed and approved by the Research Ethics Board of St Michael's Hospital (SMH) (REB #06-244).

Objective 1 - Questionnaire

The study took place in the Respiratory Clinic at SMH. Patients with possible lung cancer are referred to a thoracic surgeon who holds a clinic every second week.

Questionnaire

A questionnaire was developed to obtain information regarding workplace exposures to possible cancer related agents or environments (Appendix B). The industries, jobs and exposures selected for inclusion were chosen based on the their appearance in the article "Occupational risk factors for lung cancer among young men".[32]

The questionnaire was initially tested for readability, time for and ease of completion by five workers seen in the Occupational Health Clinic at SMH. The patients were provided with information about participating in the pilot and agreement to participate was obtained. Following completion of the questionnaire, a short survey (Appendix B) was administered relating to ease of questionnaire completion. The five patients had no concerns related to readability or ease of completion and the average completion time was 5 minutes (range "very short" to 10 minutes).

Patient Population

Patients were eligible for the study if they were referred for further investigation or treatment of primary lung cancer and could speak English. The clinic component of the study was conducted by two research assistants (RA), both respirology fellows.

One RA worked on the study until June 2007 and the other RA took over the role in August 2007. The RA reviewed the clinic schedule and consulted with the physician and clinic receptionist to identify possible patients meeting eligibility requirements. Potential participants were approached by the RA and provided with an information sheet outlining details of the study. The RA answered any questions the patients had about the study. If the patient agreed to participate in the study, their signed consent to participate was obtained. The RA administered the questionnaire, however, when asking about industry sector and type of exposure, the questionnaire was placed in front of the patient so the RA and the patient could read through the lists together.

The study was carried out between March 2007 and March 2008. The plan was to survey 50 patients. However, due to scheduling challenges (biweekly clinics, clinics cancelled, research assistant changeover, RA not available (injury)) and the clarification of eligible patients (approximately 50% of the patients were being seen for metastatic disease and hence were not eligible) it took longer to accrue patients than originally anticipated. In the end, surveys were completed for 29 patients.

Occupational Hygienist Completed Survey

It was planned that the first 25 patients who completed the questionnaire would be interviewed by Irena Kudla, a clinical occupational hygienist (COH) who works in the Occupational Health Clinic at SMH. The interview guide used is attached in Appendix B.[33] The interview was conducted by telephone and required from 10 minutes to 45 minutes to complete depending on the work history. Twenty-four patients agreed to be interviewed by the COH, however, five patients could not be reached, one had since died and one was unwilling to participate further. Seventeen patient interviews were

completed by the COH. The COH did not see the responses to the patient completed clinic survey prior to the telephone interview.

Follow-up

Following the COH interview, if it was determined that the worker's exposure might include agents associated with lung cancer, the worker was provided with information related to filing a worker's compensation claim and referral to an occupational health clinic for further investigation.

Debrief with Research Assistant

The second RA made observations as he carried out the study so following the completion of recruitment of the study participants, the second RA was interviewed by the principal investigators to obtain feedback regarding process issues, questionnaire content, sensitivity (ie., given the diagnosis of lung cancer did this present obstacles in trying to obtain the occupational history), logistics, and thoughts for future studies.

Objective 2 – Barriers and Facilitators

Clinician Interviews

Barriers to taking an occupational history (e.g. time constraints, lack of knowledge and administrative components of the workers' compensation system) and possible facilitators were probed with the physician and health care staff in the respiratory clinic at SMH and the lung cancer clinic at the Juravinski Cancer Centre in Hamilton. A total of 7 interviews were conducted. A structured interview guide was developed (Appendix C).

Data Analysis

The information from the questionnaire and hygiene assessment was entered into a dataset and the frequency of responses tabulated. Although we had originally proposed to calculate kappa statistics, because of the very small number of individuals reporting various jobs and exposures, and the resulting lack of precision, these were not calculated.

RESEARCH FINDINGS

Objective 1 - Questionnaire

Patient Questionnaire

In total, 29 patients completed the questionnaire. Their mean age was 68.5 and 55% were male. At the time of assessment, 62% were retired, 21% off work on sick leave or disability and 17% employed either full-time or part-time. Nineteen percent (19%) of the patients were current smokers and of the 81% currently not smoking, 82% reported smoking previously.

Information regarding general workplace conditions and specific prevention practices were probed. The responses are recorded in Table 1. In general, approximately half of the patients reported working in unhealthy conditions and being exposed to dusts, chemicals and fumes. Thirty-two percent (32%) thought their current problem was related to their work. One-third reported having workplace health and safety training and only 14% noted being advised to wear respiratory protection.

Reporting of particular industries and jobs is presented in Table 2. Numbers reporting any particular job or industry were low. The most common job/industry was

food services reported by 17% of patients (N=5), followed by 10% reporting metals/iron/steel foundry, wood industry/carpenter, printing and transportation (3 patients each).

Reporting of specific exposures is presented in Table 3. The most common exposure reported was asbestos (8 patients) followed by with solvents and wood dust (7 patients each). Because of the structure of the questionnaire, questions related to exposure to smokers or second-hand smoke were asked in three different questions. The results were similar with those reporting exposure ranging from 19 in response to exposure to second-hand smoke, 20 reporting exposure to many smokers at work and 21 reporting exposure to heavy second-hand smoke at work (prior to non-smoking bylaws).

Matched Patient Questionnaire and Occupational Hygiene Interview

Seventeen (17) of the patients also had COH interviews. In this group, the mean age was 69.5 and 59% were male. At the time of assessment, 70% were retired, 12% off work on sick leave or disability and 18% employed either full-time or part-time. Nineteen percent (19%) of the patients were current smokers and of those currently not smoking, 82% reported smoking previously.

Information regarding general workplace conditions and specific prevention practices were probed. The responses are recorded in Table 4. Over half of the patients reported that their workplace had been unhealthy and they had exposure to dusts, chemicals or fumes. Twenty percent thought their current problem was related to work. One-third reported having workplace health and safety training and only 14% noted being advised to use respiratory protection.

Reporting of particular industries and jobs is presented in Table 5. The distribution of jobs/industries was similar to the larger group. Reporting of particular exposures is presented in Table 6. The distribution of exposures is similar to the large group.

The results comparing the response from the patient survey and occupational hygiene interviews are presented in Tables 4, 5 and 6. In general, the occupational hygiene interview tended to report exposures or industries or jobs less commonly than the patient. Items with greater divergence in response included exposure to dust, fumes or chemicals at work, exposure to second hand smoke, exposure to solvents, exposure to sulphuric acid and the food industry.

Follow-up

Following the occupational hygiene interview, if the COH determined that the worker was exposed to potential work-related carcinogens, the worker was provided with information related to filing a worker's compensation claim and referral to an occupational health clinic for further investigation. This occurred in 41% of the cases interviewed by the clinical occupational hygienist (7/17). Table 7 outlines the job, exposure of those interviewed by the clinical occupational hygienist and those referred for further investigation.

Debrief with Research Assistant

The RA was interviewed by the two principal investigators at the end of the study to obtain further information that might inform both the survey and also the barriers and facilitators to exposure history taking.

The RA commented that if the patient was not interviewed prior to the appointment with the physician, capturing the patient after the appointment was problematic since most patients wanted to leave the clinic immediately, particularly if being informed of a diagnosis of lung cancer.

The RA noted that obtaining a simple history was usually 10 minutes in duration whereas a more complex history required about 15 minutes.

The RA found posing the questions “scary” commenting that one can not anticipate how the patient will respond and there was the fear that once one begins probing the issue, the patient will go on and on, upsetting the schedule of a very busy clinic.

The RA found the following questions particularly useful:

- Do you think you have worked in an unhealthy job in the past?
- Do you think your current health problems might be related to your past or present work?
- Have you been exposed to heavy second-hand smoke at work?

When asked what the key exposures were the RA suggested asbestos and heavy second-hand smoke.

Objective 2 – Barriers and Facilitators

Interviews of Clinic Staff

Interviews were conducted with seven clinical staff: three from the St Michael’s Hospital Lung Cancer Clinic and four from the Lung Cancer Clinic at the Juravinski Cancer Centre in Hamilton. One nurse was interviewed from each site and the five physicians included the specialties of respirology, thoracic surgery, medical oncology

and radiation oncology. The physicians had all worked in this area for at least 5 years while the nurses had been in their current positions for less than 10 years. The responses are grouped by the probes used for the interviews.

How aware are you of occupational factors as a cause of lung cancer?

All the respondents noted they are aware of the possible association between workplace exposures and lung cancer. If the issue is raised in the clinical encounter, the physicians reported that it is usually brought up by patient. The differential diagnosis with respect to etiology was viewed as someone else's responsibility.

> *In some ways it's not a big focus for me as a specialist – I'm more therapeutic. I don't come up with a differential diagnosis. The issues of occupational exposure would be more important to the respirologist – I'm aware of some of the links between occupational exposure and cancers, but I don't focus as much as someone else might.*

Other issues raised in response to this probe are the fact that it may relate to a job or exposure long ago. There is awareness of the more obvious associations, however, an admitted lack of knowledge exists regarding the many exposures that might be related to lung cancer and there is a lack of awareness of which exposures are associated with various jobs.

> *I am aware of occupational factors, but it's so hard to catch. Exposure could have been years ago – the effects come out quite late.*

> *Yes, it comes up in my mind. I know some of the potential hazards – what I have difficulty with is which ones go with which kinds of work settings. If someone told me their occupation, I wouldn't be able to identify potential hazards at their place of employment.*

Some have claimed occupational exposure, and I've seen quite a few who have brought up a history of asbestos exposure, but I never pursued it with Workman's Compensation.

Taking a workplace history

Clinicians varied in the reporting of taking a workplace history. In one instance, the occupational history was noted as part of the clinician's history taking but there was no specific question for occupational exposure on the form that was in use.

It will come up if it's a very obvious exposure, like mining, but otherwise it's not considered to be part of my history-taking.

Occupational history is part of my history-taking. We have a pretty thorough form for history, but we don't have a specific question for occupational exposure on the form.

Barriers to taking an occupational history

Many barriers were identified regarding completing an occupational history. They included: lack of training about occupational exposures associated with lung cancer, the number of questions to ask, time constraints, focus on treatment and management, the overwhelming effect of smoking, WSIB complexity (including the time required for submission of documentation),

I don't feel that I have adequate enough knowledge – I know I should worry about asbestos, silica, radon, but I don't know the occupations they're associated with.

There are so many other questions to ask! I must say that I usually do ask the patient what they did for a living, but I don't usually say anything unless it's really striking – I ask just for my own personal interest.

I see 20 -35 patients a day. I only have time for this kind of investigation at the end of the day.

Clinics are busy, and there's pressure to get through. The focus tends to be on the current symptomatology, recent history, getting to a decision of what is appropriate care.

When I see a patient, I'm more interested in diagnosis and treatment – not the cause of the problem. In most occasions (80%) it's obvious that it's past smoking.

Decision making for the here and now. With lung cancer, there's the overpowering role of smoking itself – you get a smoking history and you don't tend to go further. Also, in one's training, there's relatively little that one gets and retains about various occupational exposures that might be associated with lung cancer.

WSIB complexity: medicine has become dominated by filling out forms etc. We become overwhelmed – you spend more and more time filling out forms.

Issues that were not mentioned included the patients' lack of knowledge about exposures and the lack of adequate re-imbursement.

<u>Facilitators for taking a workplace history</u>

Most clinicians agreed that having a template would be useful for identifying possible work-related lung cancer. However, issues related to who would complete the questionnaire were consistently raised. Even if the information was collected, there was still a question about what to do with the information and not knowing what to do with the patient.

At our centre, we do all the initial health history; they don't initiate that process in the waiting room. We are looking at moving part of it into the waiting room, and that would be a helpful way to get it in place – when I think of it, I think it should list occupations, and then list all the potential hazards linked to that occupation beside it: like a cheat sheet.

Some doctors would fill it out with the patients, but definitely not all of them. The best way would be to give it to the front desk to hand to the patients. Put it in every chart and have them fill it out themselves. When you implement it, I would start clinic by clinic, rather than just having everyone start all at once.

It would need to be a simple, short, patient-administered tool – as opposed to investigator-administered – with instructions so the patients can complete it themselves.

The patient would likely have to complete it – I just don't have the time with them.

If you're asking about my interest in doing it – that depends on what you'd use the information for. If the info goes nowhere, it's not of value to me. If you're clear that it increases the likelihood of successful compensation, you'll get better buy-in.

A smoking history sometimes just makes them feel worse, and doesn't have an impact on their care – so this kind of history… I would need to know that it would be providing value. I don't want to make them feel guilty without any real benefit.

The process needs to be as short as possible. WSIB has specifically designated doctors, so that makes it difficult and slow to get time with them. It would help if there were a choice of doctors to go to.

I need something fairly automatic that would tell me, if a patient worked in a specific sector, I could refer them to a centre that is clear on the specific risks for that sector. The average doc isn't likely to have the necessary expertise to sort all those things out.

One item that was not mentioned was better remuneration.

Discussion

Objective 1 – Questionnaire

Those patients approached agreed to participate in the pilot study. The patient questonnaire was easy to administer. Patients were willing to complete the

questionnaire and this was not emotionally challenging, however, it should be noted that these patients, by and large, had a positive outcome (post-surgery) or slow, progressive disease. The RA noted that it was important to have the patient complete the questionnaire while they were waiting to see the physician. Patients were not as likely to want to stay to complete the questionnaire after the visit. Further, the RA noted that if the visit confirmed the diagnosis of cancer, completing the questionnaire immediately following this news might be more problematic and uncomfortable.

Contacting patients via telephone was often challenging and 29% could not be reached after several attempts over several weeks to months. One individual who had agreed to be interviewed initially, refused at the time of the telephone call. Another individual was contacted several times without success and when contact was made with a family member, the COH was informed that the individual had since died.

The questionnaire, as presented, is likely too complex, particularly with regards to the information on exposure. The RA reported that many of the patients were unfamiliar with some of these substances which suggests that relevant exposures may not have been identified thus leading to under-reporting. The RA noted that patients were most comfortable with identifying a specific job title and this seemed easier than identifying the industry sector or specific exposures. Focusing on well-known exposures that are accepted as lung carcinogens such as asbestos, silica, radiation, might be a place to start.

On the other hand, specific exposures identified by patients tended to be higher in number relative to those exposures identified by the COH. As an example, more patients identified asbestos as an exposure of interest than the COH. The reason for

this was that although asbestos was identified by patients as being present in the workplace, the in-depth occupational hygiene interview revealed that although present there was no “active” exposure to the worker (for example, it was often mentioned that “asbestos was in the building I worked in” but the worker was not directly exposed based upon the information obtained in the interview). This speaks to the need for an expert assessment as utilized in the more recent studies in Europe where an occupational medicine group was involved as part of the assessment.

Common exposures reported by the patients included asbestos, solvents, wood dust and man-made mineral fibres. This distribution is somewhat different from the European studies where asbestos, silica and radiation were the commonly reported exposures.

Forty one percent of those interviewed by the COH were referred for further investigation. This is similar though higher than the numbers reported in the European studies. We do not know how many actually followed up on these referrals or the outcomes if they did.

Objective 2 – Barriers and Facilitators

A number of barriers and facilitators to taking a workplace history, pursuing workers’ compensation and the practical implementation of a questionnaire were raised. In general, these are similar to those identified in other studies of occupational disease examining similar questions.

<u>Lack of knowledge</u>

The interviews highlighted the healthcare providers’ lack of awareness of occupational factors as a cause of lung cancer. The physicians stated that it is often the

patient who initiates this discussion. All of the healthcare providers did admit to a general lack of awareness of occupational factors as a cause of lung cancer. Both the physicians and nurses reported knowing only a few common causes of work-related lung cancer and most of them reported asbestos.

Given the time constraints and patient case load these physician specialists are confronted with, an easy to use reference that links job titles or industries with common exposures might facilitate the healthcare provider's decision that a referral to an occupational medicine specialist is required.

Time constraints

Time constraint was clearly a factor for all healthcare providers. If this information is to be collected several healthcare providers stated that the desire is that this be a simple, self-administered tool (i.e. by the patient) as opposed to investigator-administered. One physician suggested key highlighted questions and should the patient answer "yes", a scorecard system would be applied that would initiate a referral to an occupational health clinic.

Workers' compensation process

In general, the workers' compensation process was viewed as complex, time consuming overwhelming and unappealing. Comments included not being able to recall any case which was sent to workers' compensation and the need to be educated as to how to go about doing this. On a positive note, a physician mentioned that if a short, simple patient (or nurse) administered questionnaire was available, he would be interested in pursuing this information if it was clear that it increases the likelihood of successful compensation. This was viewed as a "buy-in".

Referral mechanism

Most wanted to know a clear referral route – "all you need is a name and a clinic number". This, in turn, raises the other piece of required information – a referral list outlining contact information for occupational health clinics equipped with the required expertise to handle these cases. To reinforce the message of potential work-relatedness, this information should also be provided to the patient since the physicians noted that it was often the patient who raised the issue of occupational factors.

The COH identified 7 cases (41% of those interviewed) that seemed appropriate for follow-up to further investigate work-relatedness. Given the comments made by many of the physicians such as lack of time, lack of knowledge about workplace exposures, too much bureaucracy with respect to submitting workers' compensation documentation and the focus on treatment, these cases identified for further follow-up investigation illustrate: 1) the importance of having enough time to obtain the detailed occupational exposure history; and 2) the importance of having the appropriate "expert" to identify cases for further investigation and proper referral. What has not been addressed is the specific role of the expert clinician or clinic.

Who is responsible for the patient?

A concept that clearly emerged from the interviews relates to the question of which clinician is primarily responsible for the patient's overall care. The specialist physicians interviewed noted that their primary foci were diagnosis and treatment. In the time constrained reality of the current practice setting, their attention was often urgent issues related to diagnosis and treatment. What is not clear is who is primarily responsible. A key step in implementing a system for identification of possible work-

related lung cancers will be to have a clear process in place with responsibility assigned for referral to an expert centre.

IMPLICATIONS FOR FUTURE RESEARCH ON OCCUPATIONAL HEALTH

The results of this pilot study provide necessary information to guide the development of an intervention study designed to improve the reporting of workers with possible work-related lung cancer. Key conclusions from this study include:

1. A questionnaire is feasible. At least initially, it may be preferable to reduce the list of possible agents and concentrate on those clearly associated with lung cancer. A patient completed questionnaire is preferred by clinicians.
2. Clinicians require further training or information to allow them to easily take the questionnaire responses and ascertain if referral is necessary.
3. In the current practice context, with time and knowledge constraints, it does not seem appropriate for the detailed exposure investigation to be undertaken by the lung cancer clinic staff. Rather, a clear and accessible referral system to occupational medicine expertise is needed.

POLICY AND PREVENTION

The results of this pilot study have implications for the health care and occupational health and safety systems. Building on findings of the pilot, a strategy to increase the reporting of possible work-related cancers can be developed, implemented and evaluated. A next step could be to conduct an intervention study. This could include the use of a modified patient-completed questionnaire, a method for easy clinic interpretation of the questionnaire and a clear referral source for further investigation. The preferred site would be a large lung cancer clinic associated within the provincial cancer delivery system.

Key user groups include the health care system (particularly the cancer components) and the workers' compensation system. The results have application both at the system level and also at the level of the individual health care provider. No policy-related interactions have been yet undertaken by the applicants.

DISSEMINATION/KNOWLEDGE TRANSFER

Knowledge Translation

The results of this pilot study will be shared with clinical, academic and administrative audiences within the cancer care and occupational health and safety systems. The results will be presented at Occupational Medicine rounds at SMH on October 22, 2008. These rounds are distributed by the Ontario Telemedicine Network and will be archived. Abstracts are being submitted to the 2009 American Industrial Hygiene Association and American Thoracic Society meetings. In addition, we will develop a poster and or an information sheet for use in a lung cancer clinic. This could include general information about work-related lung cancer and common work-related causes and then information about workers' compensation and referral sources.

REFERENCES

1. BC Cancer Agency (2006) Lung cancer. Available at: http://www.bccancer.bc.ca. Accessed March 28, 2006.
2. Xie L, Ugnata A, Morriss J, et al. Histology-related variation in the treatment and survival of patients with lung carcinoma in Canada. Lung Cancer 2003;42:127-139.
3. Alberg AJ, Samet JM. Epidemiology of lung cancer. Chest 2003;123:21-49.
4. Rahman Q, Nettesheim P, Smith KR, Seth PK, Selkirk J. International Conference on Environmental & Occupational Lung Diseases – Meeting Reports. Environ Health Perspectives 2001;109:425-431.
5. Axelson O. Alternative for estimating the burden of lung cancer from occupational exposures: some calculations based on data from Swedish men. Scand J Work Environ Health 2002;28:58-63.
6. Nurminen M, Karjalainen A. Epidemiologic estimate of the proportion of fatalities related to occupational factors in Finland. Scand J Work Environ Health 2001;27:161-213.
7. Henderson DW, Rodelsperger K, Woitowitz HJ, Leigh J. After Helsinki: a multidisciplinary review of the relationship between asbestos exposure and lung cancer, with emphasis on studies published 1997-2004. Pathology 2004;36:517-550.
8. Bakke PS, Hanoa R, Gulsvik A. Relation of occupational exposure to respiratory symptoms and asthma in a general population sample: self-reported versus interview-based exposure data. Am J Epidemiol 2001;154:477-483.

9. Samet JM, Speizer FE, Gaensler EA. Questionnaire reliability and validity in asbestos exposed workers. Bull Europ Physiopath Resp 1978;14:177-188.

10. Levin SM, Kann PE, Lax MB. Medical examination for asbestos-related disease. Am J Ind Med 2000;37:6-22.

11. Holmes E, Garshich E. The reproducibility of the self-report of occupational exposure to asbestos and dust. J Occup Med 1991;33:134-138.

12. Neale AV, Demers RY, Severson RK. Consistency of occupational exposure history from pattern and model makers. J Occup Environ Med 2000;42:76.

13. Goldman RH, Peters JM. The occupational and environmental health history. JAMA 1981;246:2831-2836.

14. Coye MJ, Rosenstock L. The occupational health history in a family practice setting. Am Family Physician 1983;28:229-234.

15. Rosenstock L, Logerfo J, Heyer NJ, Carter WB. Development and validation of a self-administered occupational health history questionnaire. J Occup Med 1984;26:50-54.

16. Lerner PJ. Occupational Medicine Forum J Occup Environ Med 1997;39:401.

17. Politi BJ, Arena VC, Schwerha J, Sussman N. Occupational medical history taking: how are today's physicians doing? A cross sectional investigation of the frequency of occupational history taking by physicians in a major US teaching center. J Occup Environ Med 2004;46:550-555.

18. Frazier LM, Berberich NJ, Moser R, Cromer JW, Hitchcock MA, Monteiro FM, Greenberg GN. Developing occupational and environmental medicine curricula for primary care residents: project EPOCH-Envi. Educating physicians in

occupational health and the environment. J Occup Environ Med 1999;41:706-711.

19. Gladman RH, Rosenwasser S, Armstrong E. Incorporating an environmental/occupational medicine theme into the medical school curriculum. J Occup Environ Med 1999;41:47-52.

20. Schuman SH, Mohr LJ, Simpson WM. The occupational and environmental medicine gap in family medicine curriculum: needs assessment in South Carolina. J Occup Environ Med 1997;39:1183-1194.

21. Storey E, Thal S, Johnson C et al. Reinforcement of occupational history taking: a success story. Teach Learn Med 2001;13:176-182.

22. Thompson JN, Brodkin CA, Kyes K, Neighbor W, Evanoff B. Use of a questionnaire to improve occupational and environmental health history taking in primary care physicians. J Occup Environ Med 2000;42:1188-1194.

23. Harber P, Merz B. Time and knowledge barriers to recognizing occupational disease. J Occup Environ Med 2001;43:285-288.

24. Merrill RN, Pransky G, Hathaway J, Scott D. Illness and the workplace: a study of physicians and employers. J Fam Pract 1990;31:55-59.

25. Holness DL, Tabassum S, Tarlo SM, Liss G, Silverman F, Manno M. Pulmonologist and family physician practice patterns for occupational lung disease. Chest 2007:132:1526-1531.

26. De Lambertine G, Maitre A, Goux S, Brambilia C, Perdrix A. How do we reduce the under-reporting of occupational primary lung cancer. Rev Mal Respir 2002;19:190-195.

27. Porru S, Scotto Di Carlo A, Placidi D, Arici C, Tassi G, Alessio L. I tumori occupazionali “ritrovati”. Considerazioni sul ruole del Medico del Lavoro neela recerca sistematica e neela diagnosi eziologica dei tumori polmonari, alla luce di una casistica. Med Lav 2006;97:565-580.

28. Porru , Placidi D, Scotto Di Carlo M, et al. Malignant mesotheliona and the working environment: the viewpoint of the occuaptional physician. Med Lav 2005;96:312-329.

29. Chiriac CF, Gavrilita L. When confronted with a new lung cancer cases, are we often thinking of and searching for an occupational etiology? Pneumologia 2002;51:272-276.

30. Legrand Cattan K, Chouaid C, Monnet I, et al. Evaluation des expositions professionnelles et cancer bronchipulmonaire. Rev Mal Respir 2000;17:957-962.

31. Pairon J-C, Ameille J, Dalphin J-C. Cancers bronchiques professionnels : comment les reperer. Rev Mal Respir 2006;23:4S83-4S84.

32. Kreuzer M, Pohlabein H, Ahrens W, Kreienbrock L, Brüske-Hohlfeld I, Jöckel K-H, Wichmann HE. Occupational risk factors for lung cancer among young men. Scand J Work Environ Health 1999;25:422-429.

33. Kudla I. Case studies: Exposure to benzene-contaminated toluene and bone marrow disorders – a retrospective exposure assessment. Appl Occup Environ Hyg 1997;12:11-14.

TABLE 1

ALL PATIENTS – GENERAL WORKPLACE CHARACTERISTICS

N=29

	% reporting
Worked in an unhealthy job in past	52%
Current health problem related to work*	32%
Exposed to dusts, chemicals, fumes or metals at work	56%
Had workplace health and safety training	33%
Material safety data sheets available at your workplace	19%
Material safety data sheets accessible when required	22%
Ever advised to wear respiratory protection	14%
Wore a respirator at work	14%

* only 25 patients responded to this question (8/25)

TABLE 2

ALL PATIENTS – JOB and INDUSTRY

N=29

JOB/INDUSTRY	number reporting
Agriculture or vineyard	1
Mining or iron-ore mining	1
Asbestos production	1
Metals or iron and steel foundry	3
Metals – nonferrous eg smelting, alloying	1
Brazing	1
Shipbuilding, Railroad manufacturing	0
Coke plant worker	0
Gas worker	1
Insulators or pipe coverer	1
Roofer	0
Asphalt worker	1
Painter	2
Butcher/meat industry	1
Leather industry/tanner/processor	0
Wood industry or carpenter	3
Printing, printing press or binding	3
Rubber manufacture	2
Ceramics industry, ceramics, pottery	0
Glass industry	0
Motor vehicle manufacturing	1
Mechanic	2
Welder	2
Electrician	2
Transport or railroad worker, bus or truck driver	3
Operator of excavating machines	1
Laundry and dry cleaners	1
Food service industry (restaurants, bars, clubs)	5

TABLE 3

ALL PATIENTS – EXPOSURES

N=29

EXPOSURES	number reporting
Asbestos	8
Man made mineral fibres	6
Silica	1
Asphalt fumes	0
Coal tars, coal tar pitch, soot	1
Ionizing radiation	1
Metal working fluids	4
Diesel exhaust	3
Coke oven emissions	0
Solvents	7
Sulphuric acid	2
Acrylonitrile	0
Metal fumes	4
Arsenic	0
Beryllium	0
Cadmium	2
Nickel	2
Hexavalent chromium	0
Molybdenum	0
Wood dust	7
Second Hand Smoking Questions	
Second hand tobacco smoke	19
Exposed to heavy second hand smoke at work	21
Exposed to many smokers in your workplace	20

TABLE 4

PATIENTS WITH HYGIENE INTERVIEW – GENERAL WORKPLACE CHARACTERISTICS

N=17

	% reporting	
	Patient	Hygiene
Worked in an unhealthy job in past	53%	Not asked
Current health problem related to work	20%	Not asked
Exposed to dusts/chemicals/fumes/metals at work	63%	59%
Had workplace health and safety training	31%	25%
Material safety data sheets available at your workplace	13%	Not asked
Material safety data sheets accessible when required	19%	Not asked
Ever advised to wear respiratory protection	12%	6%
Wore a respirator at work	6%	6%

TABLE 5

PATIENTS WITH HYGIENE INTERVIEW - JOB and INDUSTRY

N=17

JOB/INDUSTRY	number reporting	
	Patient	Hygiene
Agriculture or vineyard	1	0
Mining or iron-ore mining	1	0
Asbestos production	1	1
Metals or iron and steel foundry	3	0
Metals – nonferrous eg smelting, alloying	1	0
Brazing	1	0
Shipbuilding, Railroad manufacturing	0	0
Coke plant worker	0	0
Gas worker	1	0
Insulators or pipe coverer	1	0
Roofer	0	0
Asphalt worker	0	0
Painter	0	0
Butcher/meat industry	0	0
Leather industry/tanner/processor	0	0
Wood industry or carpenter	2	1
Printing, printing press or binding	3	1
Rubber manufacture	1	0
Ceramics industry, ceramics, pottery	0	0
Glass industry	0	0
Motor vehicle manufacturing	1	1
Mechanic	1	1
Welder	1	1
Electrician	1	1
Transport or railroad worker, bus or truck driver	1	1
Operator of excavating machines	0	0
Laundry and dry cleaners	1	0
Food service industry (restaurants, bars, clubs)	2	2

TABLE 6

PATIENTS WITH HYGIENE INTERVIEW – EXPOSURES

N=17

EXPOSURES	number reporting	
	Patient	Hygiene
Asbestos	7	3
Man made mineral fibres	4	2
Silica	0	0
Asphalt fumes	0	0
Coal tars, coal tar pitch, soot	0	0
Ionizing radiation	0	0
Metal working fluids	3	0
Diesel exhaust	2	1
Coke oven emissions	0	0
Solvents	6	4
Sulphuric acid	2	1
Acrylonitrile	0	0
Metal fumes	2	2
Arsenic	0	0
Beryllium	0	0
Cadmium	1	0
Nickel	2	2
Hexavalent chromium	0	1
Molybdenum	0	0
Wood dust	4	2
Second Hand Smoking Questions		
Second hand tobacco smoke	15	13
Exposed to heavy second hand smoke at work	15	11
Were exposed to many smokers in your workplace	14	13

TABLE 7

OCCUPATIONAL HYGIENE INTERVIEWS – PROFILE OF PATIENTS INTERVIEWED

Current Job Title [Past work in ( )]	Further Investigation	Potential Exposures
Welder	Yes	-nickel fume -hexavalent chromium
Secretary/Cashier	No	
Legal Assistant	No	
Supervisor, Translations	No	
Waitress/Housekeeper	No	
Writer	No	
Medical Secretary	No	
Daycare Worker	No	
Electrician	Yes	-asbestos
Stockbroker	No	
Financial Officer (asbestos mill; lime mill)	Yes	-asbestos -corrosives
Accountant (automobile manufacturing)	Yes	-metalworking fluids
Driver	Yes	-diesel exhaust
Window Display Designer	Yes	-asbestos -wood dust
Only worked when teenager over 2 summers	No	
Cleaner	No	
Design Engineer	Yes	-need to investigate exposures -worked in several industrial sectors

APPENDIX A

Poster – Development of a Screening Tool to Identify Patients at Risk for Occupational Lung Cancer

Development of a screening tool to identify patients at risk for occupational lung cancer.

M. Patel*, I. Kudla+, L. Holness+

Department of Respirology* and Occupational Medicine+, St. Michael's Hospital/Gage Institute, University of Toronto

Introduction

Previous studies have estimated that approximately 10% of lung cancers may be related to occupational exposures to known carcinogens. From a clinical perspective, it appears that most patients do not undergo adequate assessment for occupational risk factors. This observation is supported by the relative paucity of referrals to Occupational Health specialists and WSIB claims for occupation-related lung cancer.

In a related study, we retrospectively reviewed 150 consecutive lung cancer cases seen at the University Health Network (Toronto, Ontario). Less than 10% of patients had an adequate occupational history documented in their chart, and no referrals to an Occupational specialist were made.

Failure to identify work-related risk factors for lung cancer may have a significant impact on patients and their families with respect to financial compensation. From a scientific perspective, documenting occupations associated with lung cancer may provide the premise for identifying previously unknown carcinogens. Finally, from a public health perspective, identifying high risk occupations will help focus preventative and screening efforts.

Given that the majority of patients diagnosed with lung cancer have a relatively short survival, it is imperative to identify patients with occupation-associated lung cancer in a timely fashion. Barriers to identifying occupational risk factors for lung cancer include lack of physician awareness, the complexity of interpreting an occupational history, co-existence of smoking, and the long latency between exposure and diagnosis.

Purpose

- To develop and validate a simple screening questionnaire, for use by patients and non-occupational health specialists, to identify patients at risk for occupational-lung cancer.

Hypothesis

- The use of a simple self-administered screening questionnaire may improve identification of occupational-lung cancers.

Methods

Patient Population

- Consecutive patients attending outpatient clinics a tertiary teaching hospital or regional cancer centre with a proven or suspected diagnosis of lung cancer
- Sample size = 50

Questionnaire

•2 components:
I-Physician-administered
-Brief (5 questions)
-Intended to be very sensitive
II-Self-administered
-In-depth occupation and exposure assessment
-Known respiratory carcinogens
•Random sample of 10 participants interviewed to determine the readability and acceptability of the questionnaires
•Reference standard:
-detailed exposure assessment by an Occupational Hygienist

Performance Indicators

- •Physician/patient acceptance
- •Time to completion
- •Indicators of user response
- •Indicators of understanding
- •Internal consistency
- •Reliability of self-assessed exposures
- •Ability to discriminate among workers with different degrees of exposure

Questionnaire *(Truncated)*

Part I. (Physician-administered)

1. Do you think you have worked in an unhealthy job in the past?
2. Do you think your current health problems might be related to your past or present work?
3. Were you exposed to dusts, chemicals, fumes, or metals at work?
4. Were you ever advised to wear respiratory (breathing) protection (egg. face-mask or hood)?
5. Have you been exposed to heavy second-hand smoke at work?

Part II. (Self-administered)

A. Please indicate if you've worked in any of the following industry sectors:

Work/Industry	Duration		
	6mos-2yrs	2-5yrs	>5yrs
• Agricultural work (using arsenical insecticides)			
• Mining or iron-ore mining			
• Asbestos production			
• Metals or iron and steel founding			
• Metals (nonferrous basic industries: smelting, alloying, etc.)			
• Brazing			
• Shipbuilding, railroad manufacturing			
• Coke plant worker			
• Gas worker			
• Insulators and pipe coverer			
• Roofer			
• Asphalt worker			
• Painter			
• Butcher or meat industry worker			
• Leather industry or tanner and processor			
• Wood industry or carpenter			
• Printing, printing press or binder			
• Rubber manufacturing industry			
• Ceramics industry or ceramics and pottery workers			
• Glass industry			
• Motor vehicle manufacturing			
• Mechanic, welder			
• Transport or railroad worker, bus or truck driver			
• Operator of excavating machines			
• Laundry and dry cleaners			

Part II. (Self-administered)

A. Please indicate if you've had any of the following exposures in any of your jobs:

Exposure

❑ Asbestos	❑ Second-hand smoke
❑ Man-made fibers (e.g. fiberglass, mineral wool, ceramic fiber)	❑ Acrylonitrite
❑ Silica	❑ Metal fumes
❑ Asphalt fumes	❑ Arsenic
❑ Coal tars, soot	❑ Beryllium
❑ Ionizing radiation (e.g. Radon)	❑ Cadmium
❑ Metalworking fluids	❑ Nickel
❑ Diesel exhaust	❑ Hexavalent chromium
❑ Coke oven emissions	❑ Wood dust
❑ Solvents	❑ Sulphuric acid

- Do you wear a respirator (breathing mask) at work?
- Have you always worn a respirator at work?
- Were you trained on how to use and maintain your respirator?

Discussion

- Data collection is ongoing.
- In the data analysis, we will be looking for a "scoring" system to identify patients that should be referred for further assessment by an Occupational Hygienist or Occupational physician specialist.
- This is the first questionnaire targeted to patients at risk for occupational lung cancer
  - Modifications of this questionnaire may be useful in identifying patients with occupational lung disease in general

Acknowledgments - Dr. M. Patel's clinical and research activity is supported by the Meredith Fellowship, funded through the Workers' Safety and Insurance Board of Ontario.

APPENDIX B

Patient Questionnaire, Ease of Use Survey, Occupational Hygiene Interview Guide

ST. MICHAEL'S HOSPITAL
OCCUPATIONAL DISEASE SPECIALTY PROGRAM
Occupational Lung Cancer - Pilot Project

NAME: _____

AGE: _____ Years

SEX: ❒ Male ❒ Female

CURRENT EMPLOYMENT STATUS:

- ❒ Employed Full or Part-time
- ❒ Sick-leave or Disability
- ❒ Retired
- ❒ Unemployed

Section 1

Please answer the following 5 questions by placing a mark in one on the columns below.

	YES	NO	Don't Know
1. Do you think you have worked in an unhealthy job in the past?	❒	❒	❒
2. Do you think your current health problems might be related to your past or present work?	❒	❒	❒
3. Were you exposed to dusts, chemicals, fumes, or metals at work?	❒	❒	❒
4. Were you ever advised to wear respiratory (breathing) protection (eg. face-mask or hood)?	❒	❒	❒
5. Have you been exposed to heavy second-hand smoke at work?	❒	❒	❒

ST. MICHAEL'S HOSPITAL
OCCUPATIONAL DISEASE SPECIALTY PROGRAM
Occupational Lung Cancer - Pilot Project

Section 2

Please indicate if you've worked in any of the following industry sectors (check all that apply):

	6 months to 2 years	2-5 years	More than 5 years
Agriculture or vineyard workers using arsenical insecticides	❒	❒	❒
Mining or iron-ore mining	❒	❒	❒
Asbestos production	❒	❒	❒
Metals or iron and steel founding	❒	❒	❒
Metals (nonferrous basic industries: smelting, alloying, etc.)	❒	❒	❒
Brazing	❒	❒	❒
Shipbuilding, railroad manufacturing	❒	❒	❒
Coke plant worker	❒	❒	❒
Gas worker	❒	❒	❒
Insulators and pipe coverer	❒	❒	❒
Roofer	❒	❒	❒
Asphalt worker	❒	❒	❒
Painter	❒	❒	❒
Butcher or meat industry worker	❒	❒	❒
Leather industry or tanner and processor	❒	❒	❒
Wood industry or carpenter	❒	❒	❒

	6 months to 2 years	2-5 years	More than 5 years
Printing, printing press or binder	❒	❒	❒
Rubber manufacturing industry	❒	❒	❒
Ceramics industry or ceramics and pottery workers	❒	❒	❒
Glass industry	❒	❒	❒
Motor vehicle manufacturing	❒	❒	❒
Mechanic	❒	❒	❒
Welder	❒	❒	❒
Electrician	❒	❒	❒
Transport or railroad worker, bus or truck driver	❒	❒	❒
Operator of excavating machines	❒	❒	❒
Laundry and dry cleaners	❒	❒	❒
Food service industry (restaurants, bars, clubs, etc.)	❒	❒	❒

Please indicate if you've had the following exposures in any of your jobs (check all that apply):

EXPOSURE	YES	NO
Asbestos	❒	❒
Man-Made Mineral Fibres (e.g., fibreglass, mineral wool, refractory ceramic fibres)	❒	❒
Silica	❒	❒
Asphalt fumes	❒	❒
Coal tars, coal tar pitch, soot	❒	❒
Ionizing radiation (e.g. radon)	❒	❒
Metalworking fluids	❒	❒
Diesel exhaust	❒	❒
Coke oven emissions	❒	❒
Solvents	❒	❒
Sulphuric acid	❒	❒
Acrylonitrile	❒	❒
Metal fumes	❒	❒
Arsenic	❒	❒
Beryllium	❒	❒

EXPOSURE	YES	NO
Cadmium	❒	❒
Nickel	❒	❒
Hexavalent chromium	❒	❒
Molybdenum	❒	❒
Wood dust	❒	❒
Second-hand tobacco smoke	❒	❒

Cigarette smoke exposure

	YES	NO
1. Were you exposed to smokers at home? • If "YES", from what age? _____ until what age? _____	❒	❒
2. Were you exposed to many smokers in your workplace? • If "YES", please specify the type of work: _____	❒	❒
3. Are you currently a smoker? • How many cigarettes per day do you smoke? _____	❒	❒
4. If you are not a current smoker, have you ever smoked? • How many cigarettes per day did you smoke? _____ • At what age did you quit smoking? _____	❒	❒

Section 3

	YES	NO	N/A
1. Do (did) you wear a respirator at work?	❒	❒	❒
2. Have you always worn a respirator at work?	❒	❒	❒
3. Were you trained on how to use and maintain your respirator?	❒	❒	❒

4. Check below which type of respirator you most commonly used.

Disposable respirator (e.g. N95) ❒

Powered air-purifying respirator (PAPR) ❒

Negative pressure air-purifying respirator (e.g. with cartridges, canister) ❒

Self-contained breathing apparatus (SCBA) ❒

Air-line respirator ❒

Check below which type of respirator you most commonly used (cont'd):

Combination air-line/air-purifying.....❒

If you do not know which type of respirator you used, please check here .....❒

Comments

Training (if applicable)

		YES	NO
5.	Did you have workplace health and safety training?	❒	❒
6.	Were material safety data sheets available in your workplace?	❒	❒
7.	Were material safety data sheets accessible to you when required?	❒	❒

Comments

EASE OF USE OR SURVEY

Length of time to complete?

How easy was the survey to complete?

Any questions that were hard to understand?

Any questions that you did not want to answer?

Occupational Exposure History Profile
Standard Format

Occupational Exposure Profile Reports prepared by the Clinical Occupational Hygienist would in the majority of cases follow the template outlined below. These reports are prepared in response to requests by the physician specialist. There could be some variation with regards to the detail presented in the report which will depend on the particular issue being investigated.

The checklist adopted as a tool for developing occupational exposure profiles (OEP) consists of the following topic areas:

(i) Introduction (what is the issue, why OEP requested, etc.)
(ii) Work History
(iii) Job & Process Description
    Duties
    - regular and clean-up
    - breakdown
    Substances Used
    - trade name
    - ingredients
    - description (appearance, odour, state)
    - consumption (amounts used, methods)
(iv) Exposure Evaluation
    Anecdotal
    - symptoms, perceived prevalence of symptoms or diseases among fellow co-workers
    - workplace descriptions
    - housekeeping conditions
    - storage practices
    - hygiene facilities and practices
    - location and strength of emission sources
    - the integrity and extent of control measures in the workplace
    - the use and type of personal protective equipment
    - concerns (suspected high cancer rate)
    Reports
    - safety, hygiene and environmental, material safety data sheets
    - Joint Health & Safety Committee minutes
    - Ministry of Labour (orders, visits, or other reports)
    - Drawings
    - Engineering and process control reports
    - Product info from company sales literature can also be valuable info
    Professional Opinion
    - experience
    Literature Review
    - information from studies of similar processes
(v) Summary/Comments/Conclusions/Plan

In developing the EP, the clinical occupational hygienist will address each of the above points. If, in a particular case, the situation arises where there is no information available with respect to any of the above points this should be recorded in the EP.

APPENDIX C

Clinician Interview Guide

INTERVIEW GUIDE FOR HEALTH CARE PROVIDERS

LUNG CANCER WORKPLACE EXPOSURE SCREENING STUDY

GENERAL INFORMATION ABOUT PRACTICE

Introduction, review purpose of study

Name and position in clinic

Length of time they've worked in this setting

How many lung cancer patients do they see per week/month

How aware are they of occupational factors as a cause of lung cancer

Has this issue (work-related lung cancer) come up, ie have they thought it might be a possibility or has a patient raised the question

TAKING A WORKPLACE EXPOSURE HISTORY - BARRIERS

Studies to date demonstrate that often occupational histories are not taken - we want to explore reasons why this may not happen

Do you usually take a workplace exposure history (try to determine always, most of the time, some time, rarely, never)

If their answer is a yes (any degree) how detailed is the history they take

What are the barriers for taking a workplace exposure history - open ended question first

Then probe – what about

Time constraint

Their lack of knowledge about workplace exposures

Patient's lack of knowledge about workplace exposures

Administrative complexity of WC, e.g. forms

Don't know what to do with information if it is collected.

Lack of adequate re-imbursement

TAKING A WORKPLACE EXPOSURE HISTORY – FACILITATORS

What would make this easier? - Open ended question first

Then probe

Having a template/survey to guide taking the exposure

If yes, who should complete the survey – patient, clinic staff, physician

Clear referral route if patient indicates a concern

Somewhere to send patients so they (staff) don't have to deal with WC

Better remuneration

Additional copies of this publication may be obtained by contacting:

Research Secretariat
6951 Westminster Highway
Richmond, B.C. V7C 1C6
Phone (604) 244-6300 / Fax (604) 244-6295
Email: resquery@worksafebc.com