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ANNUAL REPORT TO THE LEGISLATURE
MINNESOTA TACONITE WORKERS HEALTH STUDY

DATE: February 16, 2009

TO: Sen. John Marty, chairman
Senate Health, Housing and Family Security Committee
328 Capitol

Sen. James P. Metzen, chairman
Senate Business, Industry and Jobs Committee
75 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, MN 55155-1606

Rep. Paul Thissen, chairman
House Health Care and Human Services Policy and Oversight Committee
351 State Office Building

Rep. Jim Davnie, chairman
House Labor and Consumer Protection Division
545 State Office Building

Rep. Tom Rukavina
House Higher Education and Workforce Development Finance and Policy
Division
477 State Office Building
100 Rev. Dr. Martin Luther King Jr. Blvd.
St. Paul, MN 55155-1206

FROM: John R. Finnegan, Jr., assistant vice president for public health, dean and
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Jeffrey Mandel, associate professor, principal investigator (E-mail:
mand0125@umn.edu; Phone: 612 626 9308)

COPIES: *Iron Range Legislative Delegation*

Rep. Tom Anzelc
Sen. Tom Bakk
Rep. David Dill
Sen. Tom Saxhaug
Rep. Tony Sertich
Rep. Loren Solberg
Sen. David Tomassoni

UNIVERSITY OF MINNESOTA

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Dear Legislators,

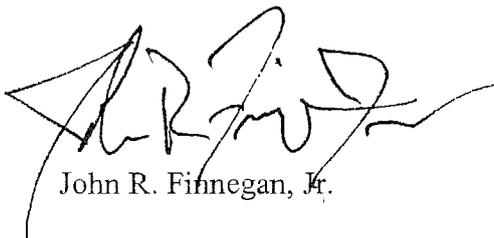
Per House File No. 3569 which states that the University of Minnesota must report annually to the committees of the legislature that are responsible for health and workers' safety, we are pleased to present the attached report on our research into the health status of Minnesota taconite mine workers.

In the report, you will find background information on what led to the aforementioned legislation, the approach we are taking with our research project, and a progress report on the three main study areas.

In addition to our scientific research efforts, we have made open communication and transparency fundamental objectives of our work. We regularly communicate about our work with the broader Iron Range community through the Minnesota Taconite Workers Lung Health Partnership which has met several times, via our Web Site (www.sph.umn.edu/lunghealth), and in our work with the news media in the Twin Cities that have statewide reach, as well as with media in northeastern Minnesota.

As always, we welcome your comments and suggestions, and would be delighted to present this report in person if you wish.

Thank you for the opportunity to advance scientific knowledge on this critical issue facing Minnesota.



John R. Finnegan, Jr.



Jeffrey Mandel

BACKGROUND

Beginning in the mid-1980s, the University of Minnesota School of Public Health researchers were involved in the identification of potential health issues among Iron Range workers. Some 70,000 unique individuals, all working for one year or more in the taconite industry, were identified during the time period 1952 through 1983. An effort to capture general work history information was made during this time for approximately 75% of the cohort. No further health assessments were made by university researchers at that time due to funding constraints.

Since 1997, the Minnesota Department of Health (MDH) has measured an increase in observed mesothelioma cases compared to expected cases for the northeastern part of Minnesota. More recently, 58 cases have been identified, using the Minnesota Cancer Surveillance System (MCSS) from within the cohort originally identified by the University of Minnesota.

The occurrence of these cases has triggered concern about the potential risks from mining dust within the non-working community as well as among the taconite workers. The work needed to link these cases to etiologic factors has not been done. With the increase in case numbers, this situation is now positioned for the conduct of a thorough epidemiologic investigation into the cause(s) of the excess cases and to assess other parameters of health in the Minnesota taconite mining industry. In June 2007, the School of Public Health received a formal request from Iron Range legislators to investigate this matter fully.

OUR RESEARCH APPROACH

In the course of the past several months, since legislation was enacted to fund research into this issue, discussions with various stakeholders and the University of Minnesota researchers have surfaced three questions which have shaped the scientific approach being undertaken:

1. What are the factors associated with the 58 cases of mesothelioma, with particular attention to exposures within the mining industry?
2. Are other diseases, respiratory and non-respiratory, associated with work in the taconite industry?
3. Are spouses at risk for respiratory diseases as a result of their partners working in the taconite industry?

Since no one study design addresses all of these questions, to adequately assess these issues we have developed an approach based on three separate study designs. Each of these approaches offers unique perspectives on miner health. The study designs will include an in-depth occupational exposure assessment, cohort mortality and cancer incidence studies, a case-cohort study of mesothelioma and a respiratory health study. The latter effort generates data not captured in the state's mortality and cancer registries. It will involve studying a sample of current and former workers and their spouses, using standardized approaches to history and physical exams, chest x-rays, spirometry, as well as more detailed testing on those who screen positive. Progress on these areas of investigation is described below.

OCCUPATIONAL EXPOSURE ASSESSMENT

There are three main goals for the exposure assessment component of this research:

1. Assess historical exposures of workers to health-relevant components of dust from taconite operations (asbestos and non-asbestos fibers, respirable dust, and respirable silica) in the taconite industry for the time period 1955 until present to evaluate the relationship between exposures and health effects.
2. Assess current exposures of workers to the health-relevant components of dust from taconite operations in relation to current occupational exposure limits.
3. Evaluate existing practices and methods to reduce worker exposures in this industry and, where appropriate, suggest improvements in these methods.

The following tasks have been accomplished to date:

1. We have obtained primary exposure monitoring measurements made in the taconite industry for the time period 1955 until present that were abstracted by Dr. John Sheehy in 1986, and data from the Mine Safety and Health Administration.
2. We are in the process of obtaining data on historical exposure monitoring measurements from Cliffs Natural Resources. We are negotiating with US Steel and Arcelor Mittal to gain access to their data.
3. We have started the process of preliminary surveys through one of the mines (UTac) owned by Cliffs Natural Resources to prepare for the assessment of current exposures later in spring and summer of 2009. In these surveys, we conduct a detailed study of the efficacy of existing exposure control measures including engineering controls, work practice and administrative controls, and personal protective equipment. We plan to do the same for all mines owned by all companies that are currently operational. We are negotiating with US Steel and Arcelor Mittal to gain access to their workplaces for assessing exposures.
4. We have purchased all the instruments required for the exposure assessment portion of this study. These include two velocimeters, a portable surface area monitor, a portable particle size distribution monitor, and 13-stage cascade impactor for collecting particle and fiber samples for microscopy. In addition, we are using equipment available at the University (ultrafine particle counter) and borrowing equipment from companies such as TSI Inc. (portable mass concentration monitor) and MSP Corp. (fiber monitor).
5. We have identified the professionally certified analytical laboratories that will analyze the collected samples for asbestos and non-asbestos fibers, respirable dust and silica.

CASE-COHORT STUDY, COHORT MORTALITY AND CANCER INCIDENCE

The overall objective of this part of the study is to determine whether employment in the taconite industry, and more specifically exposure to dust from taconite mining and processing, is related to developing certain cancers or dying from specific diseases. In consultation with the Scientific Advisory Board, specific hypotheses for this study have been developed. This study will determine whether employment in the taconite industry and the attendant dust and fiber exposure exposures are associated with; mesothelioma, lung cancer, colon cancer, pharyngeal cancer, esophageal cancer, laryngeal cancer stomach cancer, and non-malignant respiratory disease. These selected conditions are believed to be most relevant to exposure to asbestos, asbestos-like fibers, and silica that would be encountered in taconite mining and processing.

To address these hypotheses, the existing cohort of taconite industry workers will be linked to mortality records and the Minnesota Cancer Surveillance System to identify the cases of cancer and deaths arising from these conditions. The analysis will use a case-cohort design in which detailed work history and exposure information is abstracted from all individuals identified as having died or developed the diseases of interest and from a sample of the entire study population. This approach will yield scientifically valid results but will be less labor intensive and more cost effective.

To date, the following has been accomplished.

1. In consultation with the Scientific Advisory Board, the final protocol and scope of work has been established.
2. Electronic, microfilm and hard-copy data have been obtained from the Minnesota Department of Health to enumerate the cohort.
3. Hard-copy data have been reviewed and catalogued as a resource for the study.
4. Microfilm and hard-copy records of employment histories are being scanned into an electronically readable format to aid abstraction.
5. Electronic records have been reviewed to identify duplicate records and instances of incomplete or inaccurate data.
6. Searches of several data resources have been conducted to complete missing information on individuals identified for the study.
7. Initial review of historical employment records has been done to determine the scope of data to be abstracted.
8. Historical information is being compiled to separate workers employed in taconite mining and processing and mining of hematite.
9. Procedures have been developed to identify death certificates and obtain mortality data from the Minnesota Department of Health.
10. Protocols for tracing population for vital status, causes of death and cancer incidence are being established and approved.
11. Data analysis to identify and select a valid referent population is being completed.
12. Dialogue with the mining companies to identify current and additional historical employment records has been initiated.

RESPIRATORY HEALTH STUDY

The respiratory health study of taconite miners and their spouses has progressed in the following manner during the period since July 1, 2008.

1. Development of study protocol

A detailed study protocol has been completed and the testing components for each taconite worker and spouse have been defined: a health questionnaire; a physical examination and blood test; a chest x-ray; and two types of lung function tests. This protocol has been approved by the study's Scientific Advisory Board. The protocol has been submitted to the University's Human Subjects' Committee and is nearing approval.

2. Hiring of staff

Leslie Studenski (study coordinator) was hired in October 2009 and directs the day-to-day management of the project in consultation with Drs. Mandel and Greaves. Job advertisements have been placed and remain open for a field manager, on-site study coordinator and two lung function technicians to be employed locally on the Iron Range. Additional staff time will be provided by employees at Virginia Regional Medical Center (see below).

3. Testing equipment

Lung function equipment has been purchased and tested to ensure it is running correctly.

4. Virginia Regional Medical Center (VRMC)

Working space has been identified at VRMC. Arrangements are progressing with respect to the use of X-ray and blood laboratory resources and identification of relevant technical staff at VRMC.

5. Employee records from taconite companies

Agreements are presently in place, or will soon be signed between the University of Minnesota and the three taconite companies (Cliffs; US Steel; and Arcelor-Mittal) to provide electronic and hard-copy employee records of the companies' current and former workers to the University. These records are needed to select scientifically the participants for the respiratory health study. Once employee records have been obtained, we will commence selecting subjects and approaching them to participate in the respiratory health survey.

6. Plans through 2009

We have yet to recruit the field testing staff that will work at VRMC, but expect to have those people in place in early spring 2009. When the staff is hired, we will train them in the various techniques of the study and set up work stations at VRMC in space already identified. The training and set-up periods will take about a month to complete. Thus, we anticipate starting to test taconite workers and spouses in spring 2009 and continuing through fall 2009. It is expected that all subjects will be tested by the end of 2009.