



**Investigation of a Possible Brain Cancer Cluster at  
Pratt & Whitney's Connecticut Plants**

**Background**

The Connecticut Department of Public Health (DPH) began an investigation into a suspected cluster of brain cancer at the Pratt & Whitney (P&W) North Haven plant in May 2000. The investigation was instituted with the assistance of the IAMAW Local 707 and P&W officials. A working group was set up to assist in the investigation. This group included representatives of DPH, The University of Connecticut Department of Occupational and Environmental Medicine, health and safety representatives of Local 707, and P&W personnel from the medical, human resources and environment health and safety departments.

By April 2001, the working group realized that a comprehensive evaluation of the situation required dedicated resources and researchers who would bring to the study expertise on a variety of technical issues. Therefore, the working group encouraged P&W to hire an epidemiologist to conduct a comprehensive study. In August 2001, at the recommendation of DPH and the National Institute for Occupational Safety and Health (NIOSH), P&W contacted the University of Pittsburgh (UPitt) and the University of Oklahoma (UOK) to perform the study.

P&W asked Drs. Gary M. Marsh of the Department of Biostatistics at UPitt and Nurtan A. Esmen of the Department of Occupational and Environmental Health at UOK to evaluate the feasibility of conducting a formal epidemiologic investigation of the suspected brain cancer excess. The feasibility study found that sufficient data are available on worker characteristics and work history to conduct a study on the cause of deaths and brain cancer incidence study among former and current workers from North Haven and the other P&W manufacturing sites. Other plant sites were chosen to increase the likelihood of producing reliable information about whether the number of brain tumors at P&W North Haven was higher than what would be expected, and if so, what might be associated with the increased risk.

The Department of Public Health is committed to seeing that this study is conducted in an objective, scientific and timely manner. Epidemiologists at DPH will review all aspects of the study and will be active collaborators. In addition, a group has been created that includes members of the former working group, two family members of workers who had brain cancer, and additional union members to ensure representation for workers at all P&W plants. The purpose of this group will be to facilitate communication from the researchers to the community and from the community to the researchers.

## University of Pittsburgh Project Overview

The UPitt investigation will collect information on all workers at all plants beginning in 1952, or later if the plant opened after this date. The study will include the following:

- An analysis of the cause of death for all workers
- An analysis of the number of brain tumors, both malignant and benign, to determine if the number is higher than would be expected
- A case-control study that will look at information about workers with brain tumors and compare it to workers who did not have brain tumors. Information on the workers' exposure will be used in this analysis to examine if there is a relationship between brain tumors and the past working environment of the P&W study plants.

### Specific Aims

The primary research objectives of the investigation are:

- To identify the people who were ever employed at the North Haven plant from its start-up in 1952 until the end of 2001, and also those employed at the other plants in East Hartford, Middletown, Southington, Rocky Hill, Cheshire and the Manchester Foundry, beginning in 1952, or later if the plant opened at a later date
- To identify and confirm any additional malignant, primary brain cancer cases and deaths that may have occurred among the P&W workforce not covered by the DPH preliminary investigation
- To determine whether the total number of observed malignant and/or benign brain cancer cases and/or deaths is greater than the number expected based on comparisons with the general populations of the total U.S., the State of CT and the local counties where the workers lived, and to determine whether any observed excesses are likely to be due to chance factors alone
- To examine the relationship between worker characteristics, work history and occupational exposures, and the occurrence of malignant and benign primary brain cancer
- To investigate the total and cause-specific (other than primary brain cancer) death experience of current and former P&W workers as compared to the experience of the total U.S., the state of CT and the local counties where the workers lived
- To provide a basis for ongoing cause-of-death and cancer incidence surveillance of the P&W CT workforce

Since little is known about the cause of brain cancer, exposures to specific agents or particular job assignments have not been implicated as risk factors for the suspected brain cancer excess. With the exception of ionizing radiation and possibly a certain class of chemicals, there is no evidence that any particular agent may be involved.

Thus, the case-control study will be *exploratory* in nature and will not attempt to test any specific cause theory. As an exploratory investigation, the case-control study will examine a number of general occupational factors associated with working at one or more of the study plants (e.g., year of hire, work area, job title, duration of employment and the time since first employment). It will also examine specific occupation exposures using data from the companion UOk exposure assessment project.

While the UPitt studies may provide useful clues about the reason for the suspected brain cancer excess at the North Haven plant, there is no guarantee that useful clues will be identified. In fact, no single epidemiologic study, despite its size or scope, can guarantee that one or more causes for brain cancer will be identified.

### **University of Oklahoma** **Project Overview**

The purpose of this exposure reconstruction study is to develop assessments of processes used in the past and exposures in seven P&W facilities involved in various aspects of jet engine development, manufacture and repair. This information will be used in conjunction with the epidemiology study conducted by UPitt to identify possible causes of a possible excess incidence of brain cancer. The study will reconstruct potential worker exposures for a wide variety of process-related substances (solvents, metals, oils, etc.), tasks and operations. As in any estimation process, the model estimates will have to be verified by existing exposure data, where available or appropriate, and/or by actual physical modeling of the task when data are not available. From these verified models, exposure estimates for each distinct task will be developed. Task exposure estimates will then be assigned to occupations based on the tasks performed and the time spent performing each task.

The final product of this project will be a “job/exposure dictionary,” in which each job title in each time period will be assigned an estimated exposure to each identified toxicant. These estimates will be used by the UPitt group in its epidemiologic analysis to develop a cumulative exposure estimate for each individual that will reflect their historical exposure.

### **Specific Aims**

- To identify and describe the production processes used at the seven production facilities
- To identify all materials used in the production processes
- To define each specific task associated with the production processes for each end product
- To identify occupations and their associated tasks
- To collect all available exposure data and enter it into databases
- To define the expected range of exposures for each task and time period using both mathematical and physical modeling
- To verify model estimates with exposure and physical modeling data
- To develop task and time-specific estimates of exposure for each toxicant
- To develop cumulative exposure estimates for job title during each time period

## **Overall Research Plan**

This investigation will be conducted over a six-year period beginning July 2002 and ending June 2008. During this period, UPitt and UOk principal investigators will submit semi-annual reports to P&W describing the operational progress of the study. P&W will share summaries of these reports with the DPH, and other parties as appropriate. Any unusual or unexpected findings will be reported immediately to P&W and DPH.

During project years 2002 to 2006, UPitt will collect and process study data beginning with the North Haven plant. Each of the remaining plants will provide a comparison to North Haven, as they were involved in many similar operations and manufacturing processes. In 2007, UPitt will begin analyses of the study data. In 2008, UPitt will begin to put together the worker database with the exposure estimates compiled by UOk. Exposure-related statistical analyses of the data will be conducted in 2008. In 2009, UPitt will release and submit for publication the final results for all study plants.

## **Resources for Questions or to Report Cases**

If you have questions or would like more information about this investigation,  
Please contact:  
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