

# Pratt & Whitney Cancer Study

Summer 2006

*A Publication of the Communications Facilitation Workgroup*

## *An Important Message from the Communications Facilitation Workgroup*

### **We Need Your Help!**

If you have been contacted by researchers to participate in the Pratt & Whitney Cancer Study, please know that it is extremely important that each and every person respond in order for the case-control study to be scientifically valid.

If you have already sent in your forms, and completed your interview, thank you. If you have been contacted and have NOT sent in your package, **we still need you!**

The process to participate in the study is simple:

1. Complete the authorizations in your information packet, and return it to the researchers.
2. Researchers will contact you to participate in a short phone interview.
3. ALL INFORMATION IS STRICTLY CONFIDENTIAL

If you have misplaced your information packet, please contact the toll-free number or e-mail address below for a new one. Remember, the case-control study will only produce valid results if a large enough number of people agree to participate. Thank you!

Zb Bornemann  
Case-Control Study Manager  
University of Pittsburgh  
Toll-free: (866) 621-1172  
[zbornema@pitt.edu](mailto:zbornema@pitt.edu)

## SAVE THE DATE

WHAT: Community Update/Pratt & Whitney Cancer Study

WHEN: Wednesday, October 18, 2006 at 7:00 pm

SITE: Crowne Plaza Hotel

100 Berlin Road

Cromwell, CT

## Communications Facilitation Work Group

The Pratt & Whitney Brain Cancer Study Communications Facilitation Workgroup is comprised of staff from the Connecticut Department of Public Health (DPH), labor and management representatives of Pratt & Whitney, family members of Pratt & Whitney employees, members of the research teams, and others with an interest in this ongoing study. The purpose of the group is to facilitate open communications about the study, and to serve as a conduit between the researchers and the public.

The group meets on a regular basis with the research teams to keep apprised of the status and progress of the study. In addition to organizing community meetings to update the Pratt & Whitney community about the status of the study, the Communications Facilitation Workgroup works on other ways to provide the public and interested parties with information about the study.

### CONTACT US

For more information, please visit the DPH website at [www.dph.state.ct.us](http://www.dph.state.ct.us) or contact the following individuals:

William Gerrish  
Director of Communications  
Connecticut Department of Public Health  
(860) 509-7270  
[william.gerrish@po.state.ct.us](mailto:william.gerrish@po.state.ct.us)

Debra Belancik  
Environment Health & Safety Coordinator  
IAMAW District 26  
(860) 565-4766  
[debra.belancik@pw.utc.com](mailto:debra.belancik@pw.utc.com)

Cynthia Forbes  
Public Affairs Manager  
Pratt & Whitney  
(860) 565-6023  
[cynthia.forbes@pw.utc.com](mailto:cynthia.forbes@pw.utc.com)

Carol Shea  
(203) 634-4410 (home)  
(203) 500-5416 (cell)  
[cshea21819@cox.net](mailto:cshea21819@cox.net)  
[www.workedtodeath.net](http://www.workedtodeath.net)

Zb Bornemann  
Case-Control Study Manager  
University of Pittsburgh  
Toll-free: (866) 621-1172  
[zbornema@pitt.edu](mailto:zbornema@pitt.edu)

P&W Environment Health & Safety  
Chief Representatives:  
Paul Dickes, Middletown LL 700  
(860) 345-2098  
John Tronier, East Hartford LL 1746  
(860) 565-3738  
Chuck O'Neal, Cheshire LL 1746A  
(203) 250-4463

## **UPDATE ON PROGRESS OF BRAIN CANCER STUDY AT PRATT & WHITNEY**

### **Summary**

This update is the seventh in a series to inform those interested in the progress of the study to investigate a suspected brain cancer cluster at Pratt & Whitney. The Principal Investigator for each component of the study has prepared a summary of their team's progress. Previous updates and other information related to the study can be found on the Connecticut DPH website ([www.dph.state.ct.us](http://www.dph.state.ct.us)).

Since the last update in February 2004, researchers at the University of Pittsburgh have completed the identification of over 250,000 individuals who will be included in the study. These individuals worked during any year and for any length of time between 1952 – 2001 at any one or more of eight Pratt & Whitney plants in Connecticut (North Haven, East Hartford, Cheshire, Middletown, Rocky Hill, Manchester Foundry, and both Southington plants). This group is the study cohort. The team is now identifying people with brain cancer through state tumor registry programs and tracing the cause of death for all deceased individuals in the study.

Researchers at the University of Illinois at Chicago have continued to collect and review information for the exposure assessment part of the study. The team is currently focused on completing the collection and analysis of documents regarding part and process manufacturing operations and on examining over 300,000 unique work history entries received from the University of Pittsburgh. University of Oklahoma researchers have received scanned images of over 50,000 pages of company industrial hygiene records and continue to characterize this information. The exposure measurements in these records will be provided to the University of Illinois at Chicago as part of the exposure reconstruction effort.

The genetic component of the study is being conducted at the University of Pittsburgh. In early 2005, Dr. Frank Lieberman assumed the role of Principal Investigator and Dr. Sydney Finkelstein remains involved as Co-Principal Investigator. Recently Dr. Lieberman's team began to receive brain tumor tissue specimens for DNA analysis. These specimens are from individuals that worked at Pratt & Whitney and underwent surgery as part of their treatment for brain cancer.

### **Data Collection & Cohort Enumeration**

Data collection and cohort enumeration are complete for the epidemiological component of the Pratt & Whitney (P&W) study. There are more than 257,000 unique individuals enumerated in the cohort. Data were collected from several sources: P&W human resources databases, microfilmed employee records, and microfilmed work cards after an exhaustive search of P&W facilities and archives.

### **Work History Information**

Data processing of work history records has also been completed. Using all available sources, we have more than one million work history entries for all P&W employees included in the study. There are 312,305 unique occupational group, department title, department code, job title, and job code combinations from the work history entries in the database.

### **Vital Status Tracing**

The University of Pittsburgh (UPitt) uses a two-stage vital status tracing protocol to identify deaths among P&W employees. Phase one consists of sending the names of all employees not known to be alive to the Social Security Administration (SSA). The SSA identifies living, unknown, and deceased vital status. Names of employees identified as having died prior to 1979 are sent to the health department of the state of death to obtain a death certificate. Phase two consists of sending the names of employees identified as vital status unknown or deceased after 1978 to the National Death Index (NDI) to obtain the coded cause of death.

To date, the entire cohort has been traced through the SSA. Approximately 80,000 deaths have been identified among all cohort members over the total study period. Twenty percent of these are prior to 1979 and will need death certificates; the remaining 80% were sent to NDI-Plus for cause of death code in March 2006. Death certificate requests are being sent in batches to the states of death for deaths occurring before 1979.

### **Cancer Incidence Tracing**

To date, UPitt has submitted and received matching information for brain cancer cases for the entire cohort from the Connecticut Department of Public Health tumor registry. To ensure that brain cancer cases diagnosed in other states are included in the study, UPitt has also submitted or will submit applications to other state tumor registry programs.

### **Case-Control Study**

The case-control study is an important part of the epidemiology component of the study. A case-control study matches people who have a disease (cases), with other people who have similar characteristics but do not have the disease (controls). This approach allows researchers to examine factors that may contribute to the development of the disease. For the P&W case-control study, current and former P&W workers who have or had cancer in the area of the brain or spinal cord are the cases. The controls will be other P&W workers who have not had cancer in the brain or spinal cord. There are three main components to the P&W case-control study: a telephone interview, a medical records review, and an

examination of brain cancer tumor tissue (part of the genetic study component described below). People in the control group will only be asked to agree to the telephone interview.

UPitt researchers are currently identifying and contacting cases or their next of kin. Once the group of cases has been finalized, UPitt will begin to identify and contact people to be in the control group. If you are contacted, either as a case (or family member of a case) or as a control, please seriously consider participating. The case-control study will only produce valid results if a large enough number of people agree to participate.

So far, UPitt researchers have sent packets to 80% of the known cases' families. They are doing more intensive tracing to locate contacts for the remaining 20% of cases. Thirty-two percent of people contacted have agreed to participate and 20% have refused; the rest are outstanding. This percentage of participation is very low for a study of this kind. For the case-control study to be valid, at least 60% of people contacted must participate.

One of the reasons people have given for refusing to participate is that their loved one worked at P&W a long time ago or for only a short time and they do not think it had anything to do with the cancer. Cancer can take a very long time to develop and even longer to be detected. To be as accurate as possible, UPitt researchers must get information regarding anyone who had brain or spinal cord cancer and worked at P&W, even if it was a long time ago or only for a short time.

The good news is 97% of the people that have agreed to participate in the case-control study have consented to the release of medical records, 93% have consented to the interview, and 92% to the genotyping study. Eighty percent of the interviews for those currently participating have been completed. UPitt has received 35% of the medical records they have requested. Because some of them are quite old, medical records for about 6% of those who consented to their release will not be available.

**Exposure Assessment**  
**Nurtan A. Esmen, PhD**  
**Principal Investigator**

**University of Illinois at Chicago**  
[nesmen@uic.edu](mailto:nesmen@uic.edu)

### **Data Collection**

Records relating to industrial hygiene (IH), environmental health and safety (EH&S), radiation, job descriptions, and plant layouts have been collected and scanned and are in the process of review and data entry. Records containing process information for parts manufactured over the years of the study (1952 – 2001) have been collected and will continue to be located and retrieved from company archives through this year. The University of Oklahoma, under the direction of Dr. Tom Hall, will analyze all IH and EH&S data, while the University of Illinois at Chicago (UIC) will analyze all other records for the exposure reconstruction.

### **Development of Job Dictionary**

A job dictionary is being created for future integration with the University of Pittsburgh (UPitt) health outcome database. This integration is how information on worker exposures and worker health outcomes from the two universities will be connected. The job dictionary in its final form will contain multiple job classes and their exposures over time.

A job class is a set of job titles that are expected to have similar patterns of exposure. Forming job classes helps reduce the study's several thousand job titles into a more manageable number of groups. Having these fewer job classes will reduce the number of statistical comparisons that may be made among workers, exposures, and possible health outcomes. Making fewer statistical comparisons is important because the researchers want to minimize the likelihood of finding relationships between exposure and possible health effects by chance as opposed to finding actual relationships, should they exist.

Currently there are 312,305 unique work history entries in UPitt's database. We have begun examining these entries and estimate that more than 81% will be sorted relatively easily into job classes. The remainder will require additional investigation to resolve. Due to the scale of the work, the job dictionary will probably be fully completed in 2008.

### **Reconstruction of Exposures: Part and Process Approach**

Additional searches for information on chemicals used at all of the plants in the study led the researchers to discover that, over the past decades, there have been several thousand chemicals used in the plants. This created scientific and operational problems with the commonly used approach of combining chemical and physical agents into similar groups and then evaluating exposure to each group. Examining each of these several thousand chemicals for assignment to the proper group would have been excessively time consuming. Assigning exposure to a chemical group may not have provided detection of possible interactions of multiple chemicals and may have led to false answers. Another commonly used approach of considering exposure to each agent individually would have been even more time consuming. This approach may have resulted in false positive or negative associations and masked potential health effects if they are present.

In order to address these issues, a new approach was developed in which the parts a worker manufactured and the processes a worker used to create them would be treated as the exposures instead of groups of agents. The “part” and “process” as exposure strategy allows a comprehensive and manageable approach for exposure assessment that includes all agents used within a process or to make a part over time. The parts and processes considered cover all study plants from 1952 -2001. If a particular health effect is discovered to be related to working with any part/process combination, further investigation may proceed.

### **Reconstruction of Exposures: Specific Agents**

In addition to the part/process approach, examination of exposure to several specific agents is underway. Their selection was based upon their potential to reach the brain, their potential to affect the brain, or having suspected association with brain cancer in general based on animal studies.

The specific agents currently being examined are ionizing radiation (presently the only known cause of human brain cancer reported in the scientific literature), metal working fluids in high speed operations (which provide the potential for chemical changes), hexavalent chromium, and electromagnetic fields.

### **Spatial Information Database**

Given the immense amount of data collected for the study that requires organization and analysis, the researchers have developed a unique information storage and retrieval system. The computerized system serves as a repository for a variety of different data sources, provides connections between these sources, allows quick access to the data, and has the ability to connect data with spatial information such as plant layouts.

### **Worker Interviews**

The worker interview component of the exposure assessment part of the study was temporarily suspended while operational and budgetary concerns were resolved. The research team has returned its attention to preparing the survey designed to obtain operator knowledge of tasks and of the workplace. Upon completion, the survey will go to UIC’s Institutional Review Board (IRB) for approval. The IRB oversees participant rights and confidentiality protection.

Recruitment has not yet started for these interviews. When it begins, Pratt & Whitney and the Unions will assist the researchers in the process. If you would like to volunteer to be considered for selection for these interviews, please contact Kathleen Kennedy at UIC ([kkenne4@uic.edu](mailto:kkenne4@uic.edu), 312-413-9849) to receive an Interview Request Form. Since the interviews are based on needs for understanding and defining historical process variables, please note that not all volunteers would be selected for an interview.

**Genetic Component of the Study**  
**Frank S. Lieberman, MD**  
**Principal Investigator**

**Cancer Institute at the University of Pittsburgh**  
[liebermanf@upmc.edu](mailto:liebermanf@upmc.edu)

### **Genetic Study of Brain Tumors**

During the past month, our laboratory group has begun to receive tissue specimens from patients who underwent surgery as part of the treatment for their brain tumor. Our goal is to study specimens from 20 patients as the first step in determining if the tumors that arose in Pratt & Whitney (P&W) workers are similar to or different from the same type of tumor occurring in the general population. We are using a technique called microdissection-based genotyping. This technique uses a chemical process called polymerase chain reaction to increase the amount of DNA contained in the tumor cells on the microscope slide to an amount which can be studied. We are studying genes that are known to be involved in the development of malignant brain tumors to determine the patterns of genetic change in the tumors from P&W workers. We will compare this information with the results of studies from our brain tumor bank at the University of Pittsburgh (UPitt).

We are planning to have the first 20 cases completed by the summer of 2006, but this depends on how rapidly we are able to obtain the specimens from the hospital pathology departments where the surgery was done. In addition to the studies we are performing now, we will be storing some of the tissue slides for future study. In the fall of 2005, a new research group, led by Dr. Emanuela Taoli, arrived at UPitt. Dr. Taoli's group uses molecular genetic techniques similar to our group, focusing on identifying specific types of carcinogen exposures by looking at the genetic injuries that occur to the DNA of cells exposed to the carcinogen. We are working with Dr. Taoli and her colleagues to develop techniques for determining if the agents Dr. Esmen is looking at in the workplace at P&W produce genetic changes that could be looked for in the tissue samples.

We look forward to having preliminary information from the genetic studies of the tumor samples obtained from the P&W cases. The epidemiology group led by Dr. Marsh, and spearheaded by Jeanine Buchanich and Zb Bornemann, has been working with the pathologists at the hospitals in Connecticut and Massachusetts where most of the cases were treated to obtain the tumor specimens as soon as we receive consent from the family members or patients themselves.

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