Understanding Your Breathing Test Results

There are many ways that a doctor can tell if your lungs are working properly. First, the doctor can do a physical exam using a stethoscope. The doctor will listen to hear if any of the “breath sounds” are abnormal. For example, wheezing, a high-pitched sound produced by air flow through narrowed airways, is an example of an abnormal sound. The doctor can also take a picture of your lungs using a chest x-ray or CAT scan to look for abnormalities in the structure of the lungs, such as an infection like pneumonia. However, these two tests can still miss important problems. For this reason, a breathing test, called spirometry, is often done to further evaluate the health of the lungs.

Spirometry can tell you how much air is going into the lungs and how rapidly air is inhaled and exhaled in the lungs (airflow).

One of the benefits of spirometry testing (also referred to as “pulmonary function testing”) is that it can detect abnormalities in lung function even when no signs or symptoms of disease are evident. An example of this would be a cigarette smoker without shortness of breath who shows a mild decrease in airflow. In this case, the spirometer can catch the disease early (before the onset of symptoms), so treatment (and smoking cessation) in this case can be initiated earlier. Spirometry can also be used to help establish a medical diagnosis when signs or symptoms of disease are evident. An example of this would be a person who has developed wheezing. If decreased airflow is detected along with wheezing, this can be an indicator of asthma. Spirometry can also be used to assess the effectiveness of medical treatment. If a medication is given to open narrowed airways, it should be monitored by spirometry to ensure that the normal airflow is restored.

Spirometry is performed by deeply inhaling and forcefully exhaling into a spirometer (the device that records the various measurements of lung function). There are two measurements that are crucial in the interpretation of spirometry results. The first is called the forced vital capacity (FVC). This is a measurement of lung size (in liters) and represents the volume of air in the lungs that can be exhaled following a deep inhalation. The second is the forced expiratory volume-one second (FEV1). This is a measure of how much air can be exhaled in one second following a deep inhalation. You will also see another number on the spirometry test results—the FEV1/FVC ratio. This number represents the percent of the lung size (FVC) that can be exhaled in one second. For example, if the FEV1 is 4 and the FVC is 5, then the FEV1/FVC ratio would be 4/5 or 80%. This means the individual can breath out 80% of the inhaled air in the lungs in one second.

The three key spirometry measurements (the FVC, FEV1 and FEV1/FVC ratio) for a given individual are compared to reference values. The reference value is derived from healthy individuals and tells the doctor the values that would be expected for someone of the same age, sex, and height. To find the reference value on your spirometry report, look for the column marked “reference” or “predicted” value.

Interpretations of spirometry results require comparison between an individual’s measured value and the reference value. If the FVC and the FEV1 are both within 80% of the reference value, the results are considered normal. The normal value for the FEV1/FVC ratio is 65-75% (for individuals older than age 65). If the lower measured value is compared to the reference value, the more severe the lung abnormality is. (See table below.)

When the FVC is abnormal, this can be caused by restrictive lung diseases. Restrictive diseases are so named because there is a restriction that is not allowing the lung to fill to normal size. Asbestosis (scarring of the lung due to asbestos exposure) is an example of a restrictive lung disease. Abnormalities of the FEV1 and FEV1/FVC are the result of a decrease in the airflow through the lung. This may be caused by obstructive lung diseases. Examples of obstructive diseases are emphysema and asthma. There can be situations where there are both restrictive and obstructive diseases present.

The Work Health Protection Program includes spirometry as part of their testing program. Participants in the program who have not been limited to the work areas or jobs outlined in the screening program who had reported working with beryllium or in areas with beryllium. In the past, the WHPP program has restricted beryllium testing program. The DOE Inspector General’s office is also investigating this issue.

In the past, the WHPP program has restricted beryllium testing (a blood test) only to individuals who reported working in certain areas of the plants (e.g., the machine shop) or to individuals who had reported working with beryllium. In contrast, the WHPP program has expanded beryllium testing to include all workers at Paducah and Portsmouth.

Pace/Queens College WHPP Health Watch
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Worker Health Protection Program Participates in International Consortium on the Early Detection of Lung Cancer

Our early detection lung cancer project is now the largest such program in the United States. Through the enormous work of PACE union local and international personnel as well as the medical screening staff, we have screened 4,500 workers for lung cancer at three DOE sites since November 2000. We take great pride in this program, which is larger than any lung cancer screening program offered by any medical center, medical school, or hospital in the country. No other union or employer even offers lung cancer screening, to our knowledge.

It is essential that our program findings contribute to improved understanding of the usefulness of chest CT scans for the early detection of lung cancer. Consequently, we have joined the International Early Lung Cancer Action Project (I-ELCAP), a group of 24 medical centers in the United States, Europe and Asia that are conducting lung cancer screening using the use of a low dose CT scan. Selected results of each program are being pooled in order to allow an improved and more powerful statistical portrait of the results of this screening technique. The consortium, led by Cornell University Medical School, meets twice per year.

The results of I-ELCAP are excellent. Among I-ELCAP centers, 26,577 people were initially screened with a chest CT scan, and there have been an additional 19,555 annual repeat screenings. Of the total of 376 lung cancers detected through these screenings, 82% of cancers were at the earliest stage of development (Stage I). Of the 376 people with lung cancer, 81% underwent surgical removal. Among those followed for the next 8 years, only 4% have died of lung cancer. For lung cancer, normally a highly lethal disease, these results are very encouraging.

However, the use of the low dose chest CT scan for early lung cancer detection is not yet an accepted screening technique in the general population and has not yet been endorsed by the American Cancer Society and other authorities. We await final proof of its effectiveness in reducing the death rate from lung cancer. But, working on a global basis, we hope to obtain critical answers sooner rather than later. With 160,000 people expected to die of lung cancer in the U.S. in 2004, there is no time to waste.

Screening Begins for Construction Workers at Paducah and Portsmouth GDPS

A consortium led by Eula Bingham, PhD, professor, environmental health, at the University of Cincinnati Medical Center, that includes the National Building & Construction Trades research arm, the Center to Protect Workers’ Rights; Duke University; and Zenith Administrators, began providing work history interviews and medical screening exams for former Paducah Gaseous Diffusion Plant (GD) construction workers in January 2004. An office in Paducah, KY opened April 14, 2004 for an identical work history, interview and medical screening program for former Paducah GD construction workers.

Former Portsmouth and Paducah GD construction workers may call the Program Office toll-free at 1-888-864-0009 for more information. This consortium has been providing medical screenings of former construction workers at the Oak Ridge Reservation since 1999. The Oak Ridge program is phasing out and will end by June 1, 2004.

WHPP Success At-A-Glance (as of 05-30-04)

- No. of callers: 12,046
- No. of exams completed: 10,058
- No. of workshops completed: 339
- No. of participants who attended workshops: 3,406

If you haven’t taken advantage of the WHPP free medical screening exam, you should call 1-888-864-1199, to schedule an appointment. Once you have had your exam and interview, additional screening is available in Paducah.

Senator Jim Bunning (R-KY) and Jeff Bingaman (D-NM) led the effort to pass this legislation. The legislation enjoyed bi-partisan support from Sens. Lamar Alexander (TN), George Voinovich (OH), Mike DeWine (R-OH), and Pete Domenici (NM) and Democrats such as Ted Kennedy (MA), Patty Murray (WA), Tom Harkin (IA) and Hillary Clinton (NY). Senator Bunning chaired two hearings of the Senate Energy Committee in Washington, DC and one in Paducah, Kentucky to explore the cause and cure for the snail’s pace in processing claims, and to find a way to ensure a “willing payor” for valid claims accepted by the Energy Department’s physicians panels. He noted at the March 30, 2004 hearing: “I hope our hearing today will bring to light a way for us to end the backlog of thousands of cases that have not received compensation.” The hearings indicated that there was support for moving the program to DOL across the political spectrum.

During the debate on the floor of the Senate, Bunning repeatedly pointed to the Department of Labor (DOL) as a model. Under Subtitle “B” of EEIOCPA, DOL has paid $830 million to over 10,000 of the 55,000 claimants thus far. Another 16,000 have been sent to NIOSH for radiation dose reconstruction. DOE has processed over 95% of the 55,000 federal claims with its area of responsibility. In contrast, DOE has issued medical determinations for work-related illnesses from the Department of Energy (DOE) to the Department of Labor. The amendment will direct the Department of Labor to pay the so-called Subtitle D claims directly, instead of requiring claimants to go through state workers’ compensation programs. This legislation was attached to the FY’05 Defense Authorization Act (S. 2400) on June 17, 2004 after debate and a voice vote.

The legislation is now headed to the House-Senate conference committee on the defense bill where, over the summer, the fate of the legislation will ultimately be decided. DOE and the Office of Management and Budget have opposed this legislation. Sick workers, unions, and many state workers’ compensation agencies support this legislation. The outcome of the conference committee deliberations is anybody’s guess.

Senators Bingaman and Bunning, has found that for 20-33% of its cases DOE lacks a “willing payor” – an entity it can direct to pay state workers’ compensation claims. Without a willing payor, claims determined to be work-related by the DOE physician panel may not ever be paid. These cases can and will be rejected by the individual state compensation boards, and there is nothing that DOE can do to ensure the claim is actually paid. Claims in Ohio, Kentucky, Alaska, Iowa, Colorado and several other states do not appear to have a willing payor, according to GA0. Report can be obtained at www.gao.gov/new.items/d04515.pdf

The Senate Finance Committee, led by Charles E. Grassley (R-IA), questioned whether DOE lawfully hired a claims processing contractor, SEA, on a non-competitive basis through the Navy, Grassley obtained records showing SEA was charged up to $401,000 per year for certain individuals working on claims processing, and developed a software system costing nearly $5 million that DOE contractors indicated could be bought off the shelf for roughly $50,000.

Leon Owens, former president of PACE Local 5-550, twice testified before the Senate Energy Committee urging comprehensive reforms that would transfer the DOE program to DOL as a means to speed state claims processing and assure that claimants will be paid. Leon serves on the NIOSH Advisory Board on Radiation and Worker Health. (See sidebar on Advisory Board). The Advisory Board audits the quality of radiation dose reconstructions for claims filed under Subtitle B. It also advises NIOSH on whether there are individuals who are DOE employees who should be designated as members of the Special Exposure Cohorts (SEC), and given an automatic presumption in favor of compensation for 22 listed cancers.
The Advisory Board on Radiation and Worker Health

The Advisory Board on Radiation and Worker Health was created by Congress in 2000 to advise the Secretary of Health and Human Services and the National Institute of Occupational Safety and Health on the energy workers' compensation program. The Advisory Board's membership must reflect "a balance of medical, scientific and worker perspectives." Several Board members have familiarity with concerns of radiation-exposed workers, including: Mark Griffon, a health physicist, who advises the PACE Worker Health Protection Program; Leon Owens, former president of PACE Local 5-550 (Paducah); and Mike Gibson, former president of PACE Local 5-4200 (Mound facility). The Advisory Board:

- Provides advice on dose reconstruction and the criteria for deciding compensation for radiation-related cancers;
- Audits dose reconstruction cases. The Board has announced it will audit 2% of dose reconstructions and has hired Sanford Cohen & Associates to support their audit; and
- Advises whether to approve or deny special exposure cohort petitions.

As of June 2004, the Advisory Board has held 25 meetings. Meetings are open and the Board receives public comments. The Board presently has 12 members; at least 8 of the 12 members have conflict of interest waivers which allow them to serve, but they must excuse themselves from the decision making process for certain sites where they have been employed.

NIOSH Site Profiles Provide Technical Information For Use in Dose Reconstruction for Radiation-Related Cancers

Under the Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA), the National Institute for Occupational Safety and Health (NIOSH) is the federal agency charged with estimating individual radiation doses among workers with radiation-related cancers at Department of Energy (DOE) nuclear weapons sites and their predecessor agencies. The NIOSH has contracted with Oak Ridge Associated Universities (ORAU) to develop Site Profiles that will be used as a supplement to, or substitute for, individual monitoring data. The Site Profiles will summarize and document historical practices at the various DOE sites and will be used by NIOSH to evaluate the total occupational radiation dose for individual EEOICPA claimants.

The Site Profiles are divided into five major Technical Basis Documents:
- Site Description
- Occupational Medical Dose
- Occupational External Dose
- Occupational Environmental Dose

The occupational medical dose is the cumulative dose from x-rays administered as part of the site physical examination program.

The internal dose profile includes information on internal exposures from primary radionuclides of concern (such as neptunium or uranium), areas at the site that may be of concern for potential internal exposures, and a description of the bioassay monitoring program over time and the limitations of detection for the radionuclides of concern.

The occupational external doses include information on the primary sources of external dose (gamma, neutron, beta, or x-rays) on the site over the time. The document also includes a history of the monitoring program (e.g. film or TLDs, frequency of use, detection limits and other relevant data).

The occupational environmental dose is that which a worker received from working outside where there was environmental exposure.

In general, the documents produced to date have been superficial in describing the sites and the internal and external dose data. The documents assume the best possible scenario—that the contractors had reliable and adequate dose monitoring programs and do not take into account deviations from normal operations.

NIOSH has been holding meetings for the workers at the various sites to explain the documents and how they will be used to reconstruct dose for cancer claimants. The meetings give workers a chance to critique the document and point out gaps such as failure to include accident/incident databases, any errors, whether all processes are covered and the failure to include tiger team reports. Tiger team reports are results of comprehensive investigations of a site's health safety and radiological program that were conducted in the early 90's. NIOSH is taking minutes of the meetings and these will be posted on the web site (Mark: what is address?)

Two WHPP sites have taken an active role in these meetings so far: the Portsmouth, OH gaseous diffusion plant and the Idaho Environmental and Engineering Laboratory (INEEL) in Idaho Falls, ID. Another PACE site, Hanford, also had representatives attending the meeting and preparing comments. At all three meetings, the workers were vocal in their criticisms of the document and specified just where omissions and errors occurred. Both sites took their own minutes and are submitting them in writing along with action items to NIOSH and the President's Advisory Board on Radiation and Worker Health. (See Advisory Board sidebar and list of Board members in this issue of HealthWatch).

Workers Requesting Assistance from DOE Office of Worker Advocacy for State Workers’ Compensation Claims

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<tr>
<th>Site</th>
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<tr>
<td>Paducah GDP</td>
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<tr>
<td>Oak Ridge GDP</td>
<td>1,064</td>
<td>945</td>
</tr>
<tr>
<td>INEEL</td>
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UPDATE ON FEDERAL COMPENSATION CLAIMS

<table>
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<tr>
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<tr>
<td>Total number of payments made</td>
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<tr>
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<td>Claims tentatively approved</td>
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<tr>
<td>Claims on the way to NIOSH for dose reconstruction</td>
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After more than 3 years, interest in the WHPP Early Lung Cancer Detection Program has remained very strong. The toll-free number still rings all day long, keeping our main scheduler, Rosa, very busy. We continue to scan new people and to do repeat CT scans for those needing follow-up. As of May 2004, over 4,500 former and current gaseous diffusion plant workers have been scanned or are scheduled to be scanned the next time the mobile unit returns to the needed location.

The Early Lung Cancer Detection Program appointment show rate is also incredibly high, according to Ms. Manowitz. Nine out of ten who are kept for a checkup those who do not show for a particular appointment the first time around, are rescheduled and subsequently scanned.

About one third of the lung cancer program participants who are scanned learn that they have nodules (spots) on their lungs that need further evaluation and are asked to come back for a follow-up scan. If the nodule seen on the initial scan is neither immediately suspicious nor obviously benign, we call this an “indeterminate” nodule and the individual is invited back for a full-dose scan just at the level of the nodule. If after this closer look, the nodule is still indeterminate, a 3 and/or 6 month and a 12 month follow up scan is done. Our program has been very successful in encouraging participants to stay with the program once they need follow-up. When we looked at the compliance rates, we found that, in every instance, whether it was the first noduleography or the 3, 6, or 12 month follow up appointment, over 95% return for the scheduled scan.

In addition, we had a very limited number of people who dropped out of the program after their initial scan showed an indeterminate nodule. Only 47 people have dropped out so far which means 97% of the participants with indeterminate nodules completed their follow up. The main reason participants dropped out was that they decided to follow up with their own doctors, in some cases because the mobile unit was too far for them to make repeated trips.

Several factors contribute to the extremely high participation and compliance rates in the WHPP Early Lung Cancer Detection Program. First, given the concern about past exposures at the gaseous diffusion plants, the GDP workers who we screen have a heightened concern about the risk of lung cancer. Secondly, the union involvement in the program does not end when a worker is scanned or referred. The WHPP offers the CT’s at no cost also contributes to the high participation rates.

With regard to follow up compliance, the Queens College staff tracks this special group and is very persistent in calling people to encourage them to come to their appointments. Also, when we are having trouble locating a person because their telephone number has changed or they have moved, the union hall staff has been extremely helpful in tracking people down, sometimes even driving long distances to actually knock on someone’s door or calling a friend of that person so that we do not “lose” anyone who needs follow-up. And finally, the fact that DOE fully funds the program and allows us to reduce bureaucratic hurdles and often see them gain monetary compensation. Even more rewarding, is the experience of an office visit or a “thank you” call from someone whose life was saved by the physical exam or CT scan.

This has been one of the most rewarding experiences of my life. I just wanted to take a few moments and write a short letter of thanks to your fine group. Because of the alertness and the expertise of the radiologist, it is very possible that my life was extended.”

“...I joined the Worker Health Protection Program soon after the medical testing it started in 1999. I helped the Oak Ridge Ground Team set up an office and assistance program for the medical screening program participants. My two days per week soon grew to four, sometimes even more. I also spend many evening and weekend hours answering questions and concerns at home, in stores and almost everywhere I go, after people learned that I am associated with the program.

My office works closely with the Department of Energy Department of Labor Resource Center in Oak Ridge. We are often the first point of contact for participants filing workers’ compensation claims. We refer many cancer victims and their surviving spouses to the Center after explaining the Energy Employees Occupational Illness Compensation Program Act. At the same time, we get referrals from the Resource Center for the WHPP program. We often explain to the participants how to respond to information requests from DOL/DOE, and suggest ways to find information needed by potential claimants. We also assist people with their exposure histories since many do not remember most of the chemicals or toxic substances at K-25. Although the amount of compensation is not as much as it should be, many times it can make a great difference in the life of a pensioner or widow who is barely surviving. Their gratitude is heartwarming and uplifting.

Bruce Lawson, K25 Retiree and WHPP Ground Team Member

I am a 58 year-old retiree from the K-25 Site. I worked for 21 years in site maintenance, with the last nine also serving a United Food & Safety Representative.

I joined the Worker Health Protection Program soon after the medical testing it started in 1999. I helped the Oak Ridge Ground Team set up an office and assistance program for the medical screening program participants. My two days per week soon grew to four, sometimes even more. I also spend many evening and weekend hours answering questions and concerns at home, in stores and almost everywhere I go, after people learned that I am associated with the program.

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Gregory Rucker Portsmouth GDP worker

Gregory Rucker Portsmouth Gaseous Diffusion Plant Worker

Letter from Gregory K. Rucker, WHPP ELCD Participant, June 11, 2004

Thanks to the PACE program, the WHPP mobile CT unit and Queens College, I am a cancer survivor. I had a CT scan at Oak Ridge on June 12, 2003. I was called back for a second scan June 17. My family doctor, Dr. Donnie Parker, received the reports from Queens College on the second scan. The next morning, Dr. Parker made an appointment with Dr. Henschen, a pulmonary specialist. By the time I went to see Dr. Henschen, I had received films from Queens College and Dr. Henschen looked at the films and scheduled a PET scan to verify what was spotted.

“The PET scan confirmed cancer. An appointment was made with Dr. Barry Frame, the lung surgeon. I had a check-up with my heart doctor, Dr. Harry Bishop, to see if my heart could stand the stress of the operation. Dr. Frame checked the lymph nodes to see if the cancer had spread. Dr. Frame called me into his office and reported the lymph nodes were clear. This was on Friday; we set up the operation for three days later on Monday, July 21, 2003. Dr. Frame removed the upper lobe of my left lung. I went home on the afternoon of the fifth day.

I urge all nuclear workers to join the WHPP program. It could give them more years of life.

Thank you, WHPP, Earl Pate
K25 Gaseous Diffusion Plant Worker

Letter from Bruce Lawson, K25 Retiree and WHPP Ground Team Member

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