



## National Institute for Occupational Safety and Health Announcement of Findings Occupational Energy Research Program

July 2008

### A Cohort Mortality Study of Chemical Laboratory Workers at Department of Energy Nuclear Plants

#### Who did this study?

The National Institute for Occupational Safety and Health (NIOSH) is a federal research agency that works to improve the health and safety of workers. This study was done by NIOSH researchers.

#### What was the purpose of our study?

Many laboratory workers are often exposed to toxic chemicals and ionizing radiation. Some studies have found the likelihood of dying of certain cancers is higher among lab workers.

In this study, we examined the different causes of death in chemical lab workers who worked at certain Department of Energy (DOE) facilities.

#### What workers did we include?

We included 6,157 men and women chemical lab workers in this study.

Workers we classified as “chemical lab workers” included:

- Biochemists
- Chemists
- Chemical operators
- Electricians
- Instrument mechanics
- Lab analysts
- Lab technicians
- Metallurgists
- Process engineers

These workers worked for at least one day between January 1, 1943 and December 31, 1998, at one of four DOE facilities.

These facilities included:

- 1) East Tennessee Technology Park (formerly K-25)
- 2) National Security Complex (Y-12)
- 3) Oak Ridge National Laboratory (X-10)
- 4) Savannah River Plant

#### How was the study done?

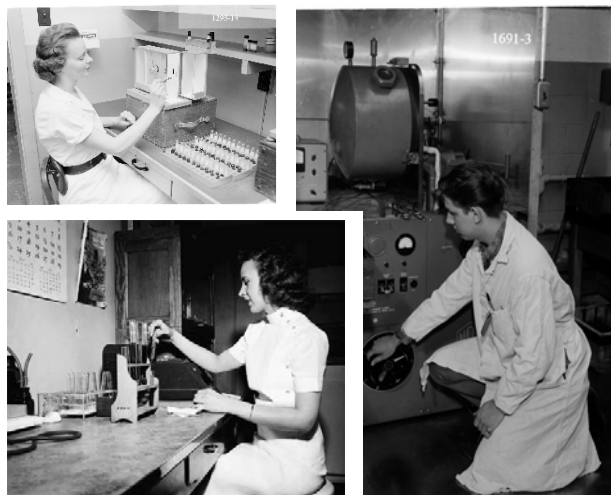
We used work records to identify chemical lab workers. Using death certificates, we then identified workers who had died, and the causes of death. We determined the number of workers that died from each cause of death and compared each to the number of deaths that would be expected in the U.S. general population. We also compared workers to other workers in the study. We did not compare workers to other chemical lab workers outside of these facilities.

We were most interested in studying chemical exposures in these workers, but little information existed. Instead, we examined the amount of time each worker was employed as a chemical laboratory worker.

We were also interested in radiation exposures to these workers. Work records were available for us to examine (e.g., dosimeter badges, bio-monitoring).

## What did we find?

- The overall death rate among these workers was lower than that of the general population. This may be because working people tend to be healthier than the general population.
- The overall cancer death rate among these workers was also lower than that of the general population. This may also be because working people tend to be healthier than the general population.
- Deaths from multiple myeloma (a cancer of the blood) were higher among women chemical lab workers at these facilities compared to women in the general population.
- Compared to the general population, workers were less likely to die of leukemia (a cancer of the blood). We also compared workers to other workers in the study, based on length of employment. In doing so, we found the likelihood of dying of leukemia went up slightly the longer workers were employed at these facilities.
- Compared to the general population, workers were less likely to die of lung cancer. We also compared workers to other workers in the study, based on length of employment. In doing so, we found the likelihood of dying of lung cancer went up slightly the longer workers were employed at these facilities.
- Internal exposures to ionizing radiation (radiation that is inhaled, ingested, or absorbed through the skin) did not seem to increase the likelihood of dying of lung cancer in these workers.



Chemical lab workers included men and women who worked in processing and in non-processing areas. *Photos courtesy of Department of Energy.*

Please note that our study looked at chemical laboratory workers as a group, and therefore cannot predict the future health of any one person.

## What were the study limitations?

- We were not able to look at actual chemical exposures to workers.
- Though we found multiple myeloma deaths were higher in women chemical lab workers, this was based on a small number of deaths.
- Smoking information was not available for each worker. This made it difficult to interpret results about smoking-related cancers, especially lung cancer.
- Workers in the study were mainly Caucasian, making it difficult to examine effects on workers of other ethnic backgrounds.

## What should you do?

Share this information with your doctor if you are concerned about your health or have questions about these illnesses.

## Additional Information

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**What is cancer?** Cancer occurs when cells in parts of the body begin to grow out of control. Normal cells divide and grow, but cancer cells do this much faster.

**What is leukemia?** Leukemia is a type of cancer. The cancer starts in blood-forming tissue such as bone marrow and causes large numbers of abnormal blood cells to be produced. The cancer cells interfere with the body's production of healthy cells, making the body unable to fight off infections. There are many different types of leukemia. Each type is different depending on what blood-forming cells become cancerous and how quickly the cancer progresses.

**What is lung cancer?** Lung cancer is a type of cancer that starts in the lungs. Most lung cancers start in the bronchi, but can also start in other parts of the lungs. Often, lung cancer takes years to develop. There are two main types of lung cancer: small cell and non-small cell cancer.

**What is multiple myeloma?** Multiple myeloma is a type of cancer that affects the plasma cells in blood. Plasma cells work to protect the body from infection by making proteins called antibodies, which attack and help kill germs. When plasma cells grow out of control they can form a tumor, usually in bone marrow. This type of tumor is called a myeloma. If there are many of them, they are called multiple myeloma.

**To learn more about types of cancer, symptoms, or treatment, contact:**

The American Cancer Society at [www.cancer.org](http://www.cancer.org) or call 1-800-227-2345

The National Cancer Institute at [www.cancer.gov](http://www.cancer.gov) or call 1-800-4-CANCER (1-800-422-6347)

## Compensation Program for Nuclear Weapons Workers

If you have developed an illness you think might be related to exposure from working at a Department of Energy (DOE) site or a DOE contractor facility, you could be eligible for benefits under the Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA).

EEOICPA, administered by the Department of Labor, provides compensation and medical benefits for certain civilian nuclear weapons workers (and their survivors) who may have developed certain work-related illnesses, including cancer. NOTE: Not all DOE workers will be eligible for this compensation.

The NIOSH Office of Compensation Analysis and Support (OCAS) helps the Department of Labor (DOL) by reconstructing radiation doses for certain claimants who have developed cancer.

To learn more about EEOICPA, visit [www.cdc.gov/niosh/ocas](http://www.cdc.gov/niosh/ocas) or [www.dol.gov/esa/regs/compliance/owcp/eoicp/main.htm](http://www.dol.gov/esa/regs/compliance/owcp/eoicp/main.htm).

To learn how to file a claim, contact DOL at (866) 888-3322. Workers from Oak Ridge can also contact Oak Ridge DOL Resource Center by calling (865) 481-0411 or toll-free (866) 481-0411. Workers from Savannah River can also contact Savannah River DOL Resource Center by calling (803) 279-2728 or toll-free (866) 666-4606.

## Centers for Disease Control and Prevention (CDC)

CDC is the federal agency that works to promote health and quality of life by preventing and controlling disease, injury, and disability. For more information, visit [www.cdc.gov](http://www.cdc.gov) or call 1-800-CDC-INFO (1-800-232-4636).

## National Institute for Occupational Safety and Health (NIOSH)

NIOSH is the federal agency within CDC that is responsible for conducting research and making recommendations for the prevention of work-related injury and illness. For more information, visit [www.cdc.gov/niosh](http://www.cdc.gov/niosh).



## Study Information

This study was done by the NIOSH Occupational Energy Research Program (OERP) and was funded by the Department of Energy (DOE). To learn more about OERP, this study, or to get more copies of this worker notification, visit: [www.cdc.gov/niosh/oerp/](http://www.cdc.gov/niosh/oerp/) or call 1-800-CDC-INFO 1-800-232-4636

## Study Publication

Kubale T, et al. A cohort mortality study of chemical laboratory workers at Department of Energy nuclear plants. *American Journal of Industrial Medicine* 2008.

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