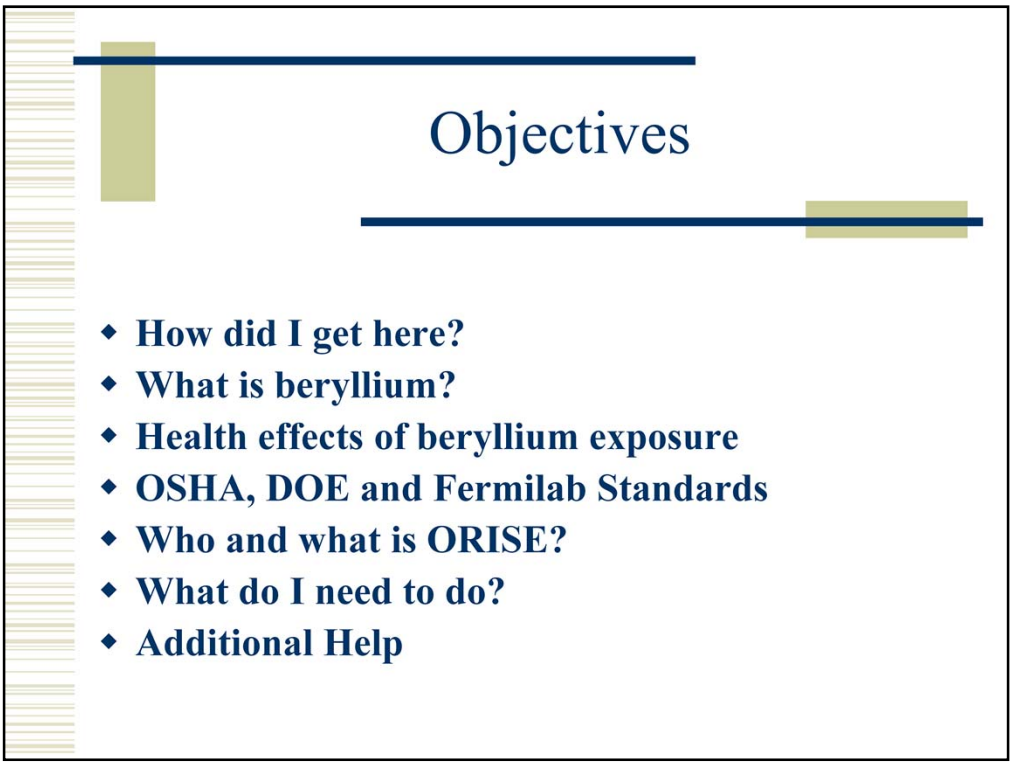
BERYLLIUM-ASSOCIATED WORKER PROGRAM

Introduce yourself!



Establish class Objectives:

How did I get here?

- Doe's Case
- Fermilab historical sampling records
- You said you wanted it through the website questionnaire

What is beryllium?

- Properties of beryllium
- Sources of beryllium at Fermilab

Health effects of beryllium exposure

- Symptoms of beryllium poisoning

OSHA, DOE and Fermilab Standards

- Inventory
- Storage and Labeling
- Hazard Analysis

Who and what is ORISE?

What do I need to do?

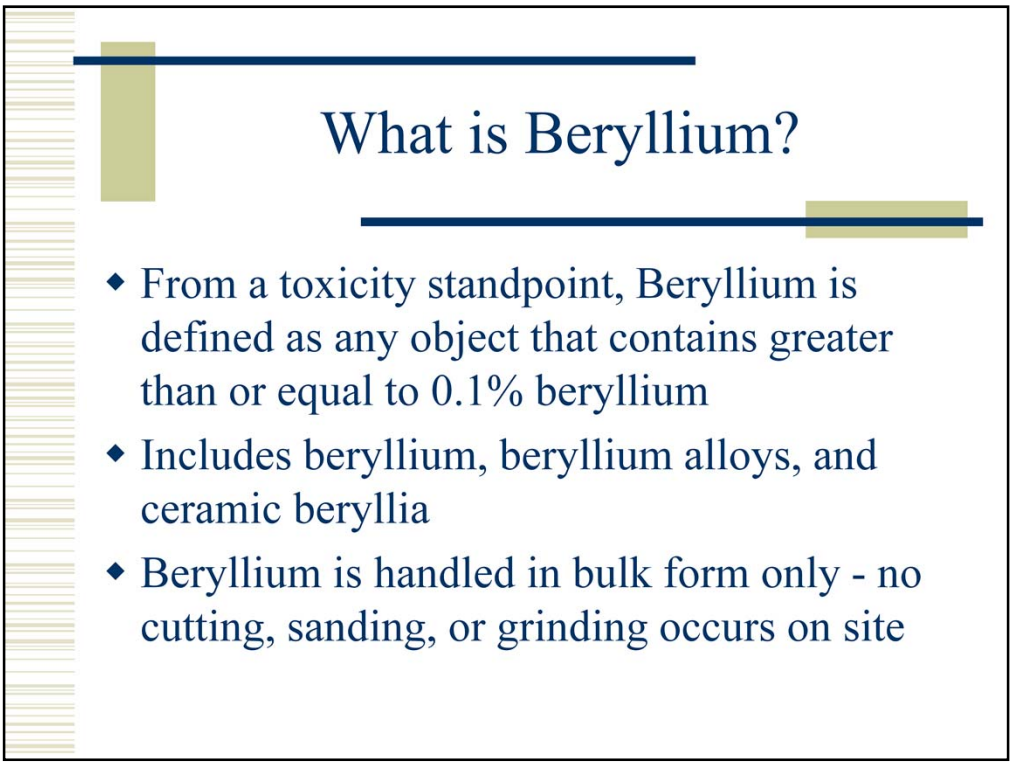
Sign-up for medical surveillance program

Additional Help

SSO’s, Medical Department, Internet, IHS members, ESH Section

How Did I Get Here?

- Historical Sampling Records
- Website Beryllium-Associated Worker Questionnaire
- Known event with the potential for airborne Beryllium exposure



We define beryllium as any object that contains greater than or equal to 0.1 percent beryllium.

Fermilab uses beryllium, beryllium alloys, and ceramic beryllia.

These objects are not hazardous unless they are machined or used in a manner that creates a dust, fume, or mist.

Mostly used as an “article” according to Department of Energy Chronic Beryllium Disease Prevention Program 10 Code of Federal Regulations Part 850 standard definition. A **beryllium article** means a manufactured item that is formed to a specific shape or design during manufacture, that has end-use functions that depend in whole or in part on its shape or design during end use, and that does not release beryllium or otherwise result in exposure to airborne concentrations of beryllium under normal conditions of use.

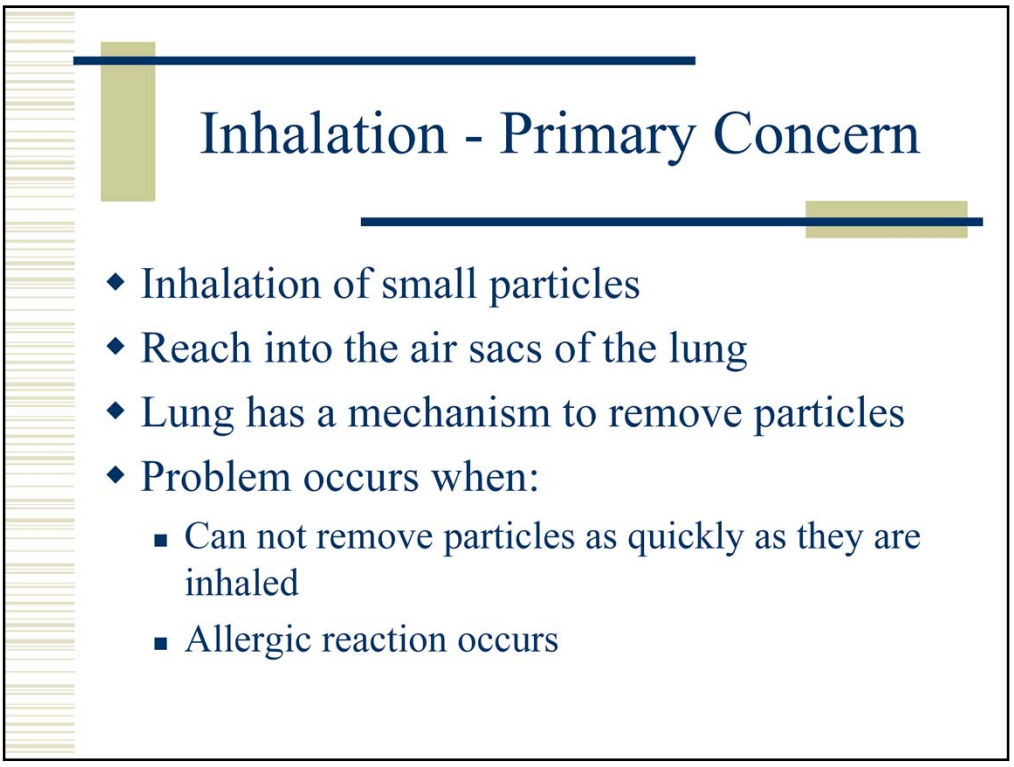
There are a number of health concerns associated beryllium. These fall into two categories (1) skin disorders and (2) lung disease.

Let look at the ways beryllium can causes these effects.

A skin rash, also called dermatitis, can develop when there is contact with water soluble beryllium salts. We do not use these type materials at Fermilab.

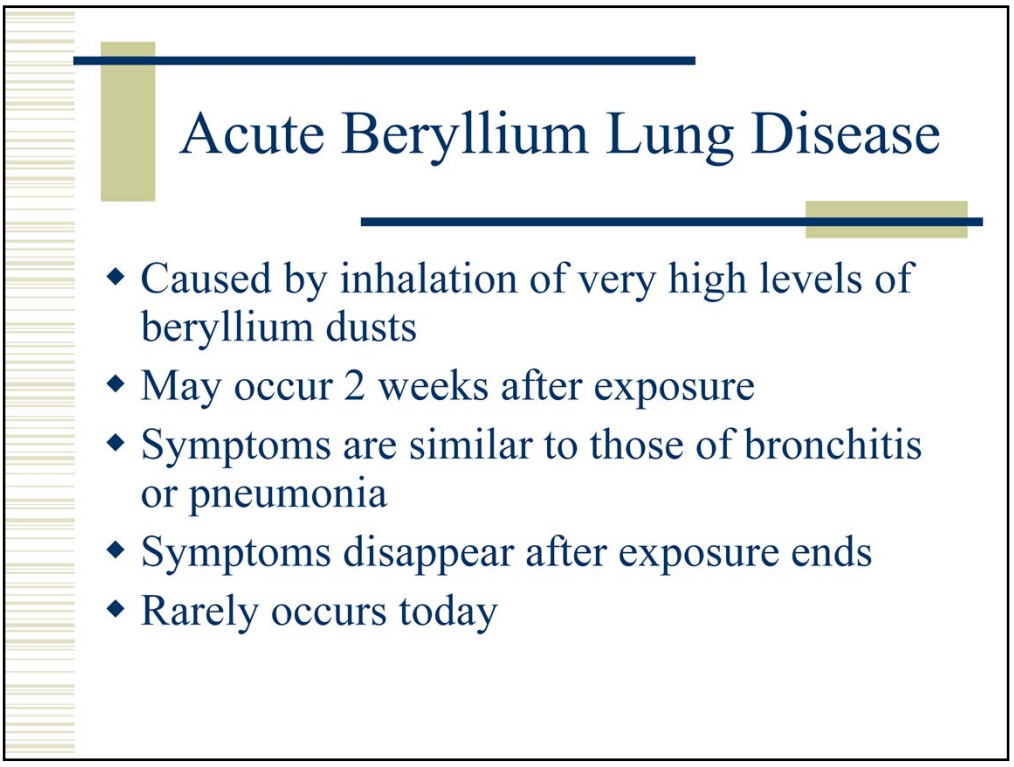
If beryllium becomes imbedded in the skin, an ulcer or corn-like lesion can develop.

These disorders usually heal completely once the beryllium is removed.



There are a number of health concerns associated with the inhalation of beryllium particulate. When very small particulates, less than 10 micrometers, are inhaled they reach the airsacs of the lung.

The lung has a mechanism to remove particulate, however, when that mechanism is overwhelmed or if there is an allergic reaction to beryllium, then lung disease can develop.

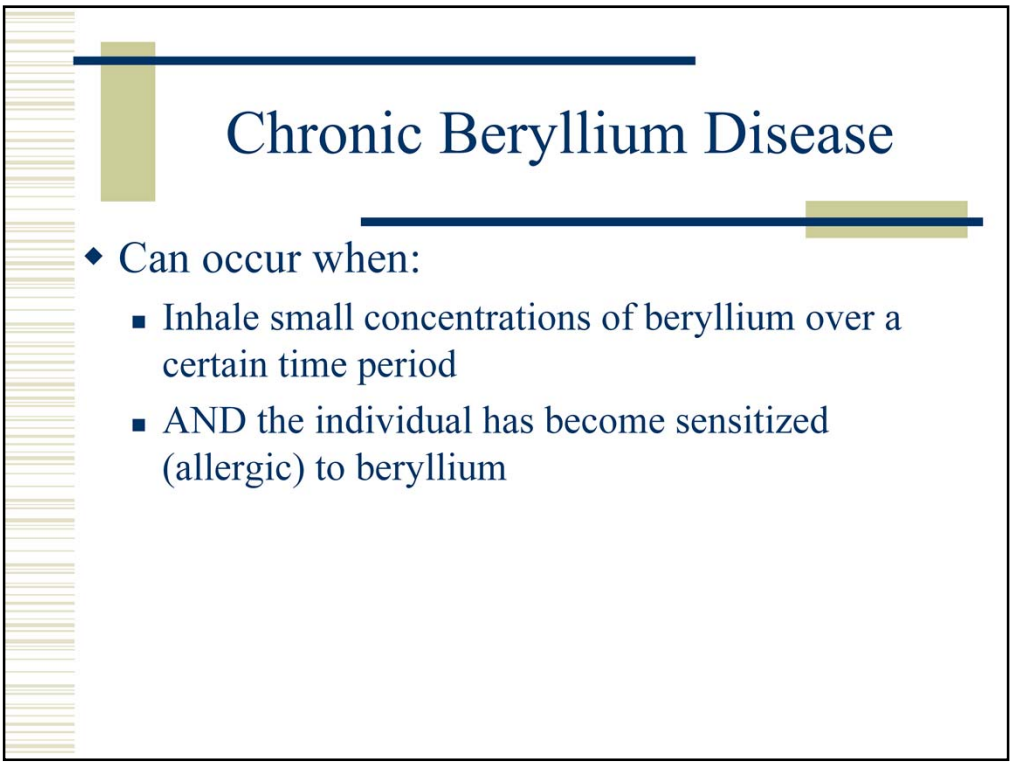


When very high concentrations of beryllium are inhaled for a short duration, pneumonia-like symptoms may occur. This is called Acute Beryllium Disease.

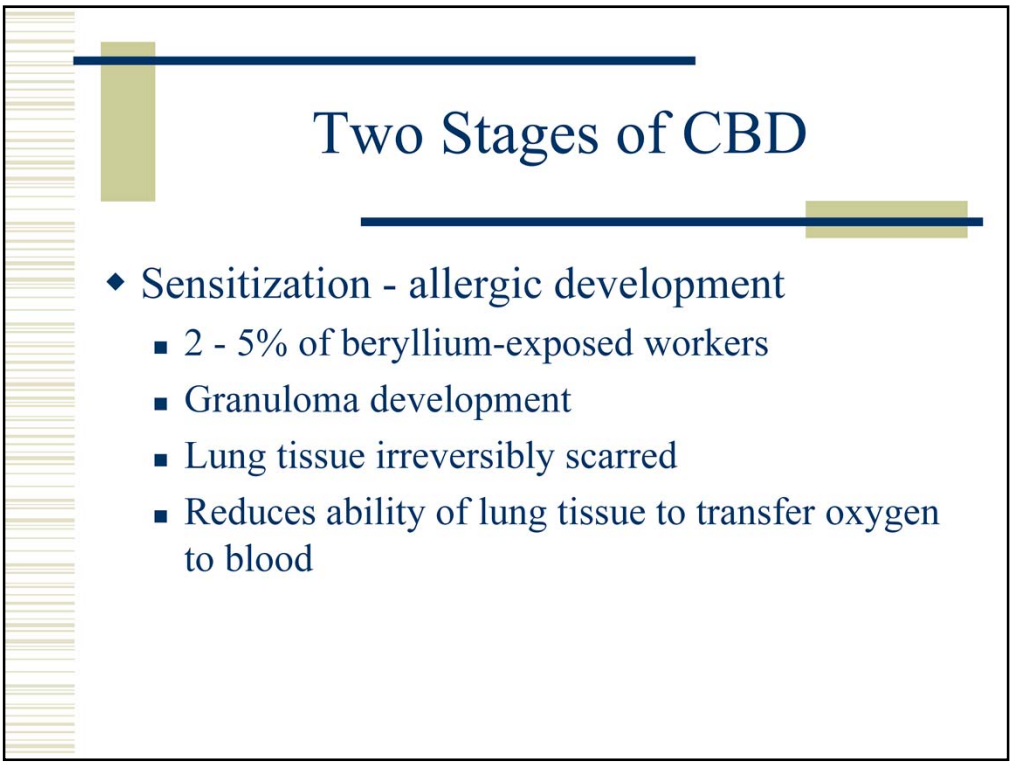
The symptoms may not occur for 2 weeks after the exposure.

Acute Beryllium Disease is treatable and is completely reversible.

Such large exposures occur very rarely today.



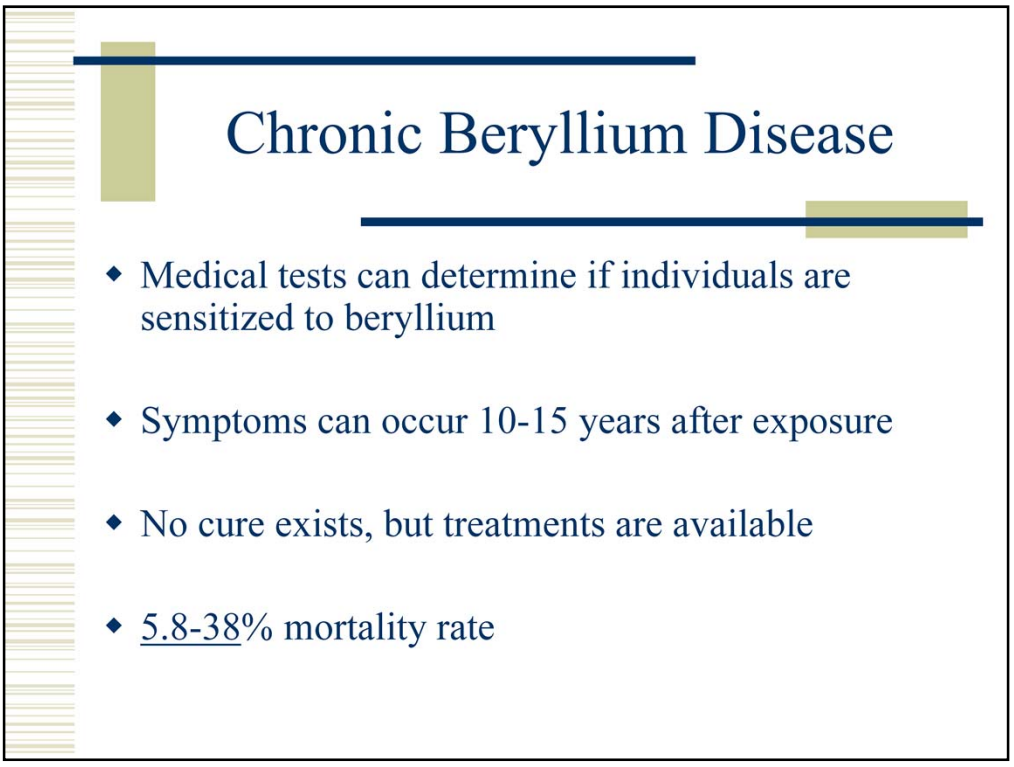
Chronic Beryllium Disease, however, is not reversible. It can occur when small concentrations of beryllium have been inhaled over a certain time period. It can only occur if the individual has become sensitized to beryllium.



It is estimated that two to five percent of beryllium-exposed workers will develop the potential of hypersensitivity to beryllium.

When sensitized, it seems the lung's particle removal mechanisms don't work as they should. Instead of removing the beryllium particulate, scar tissue begins to form around the particles. The scar tissue, called granuloma, gradually increases in size, reducing the amount of healthy lung tissue.

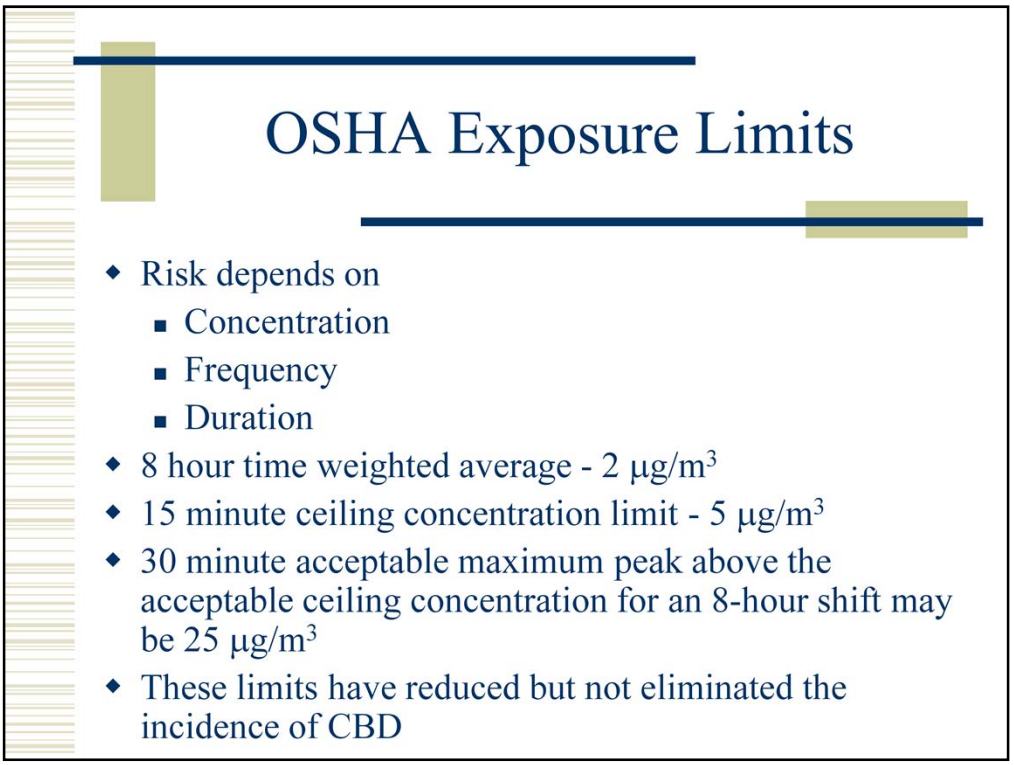
As the disease progresses, it becomes more difficult to breath.



These symptoms occur for ten to fifteen years. Some as ling as 25 years after last exposure while other sensitized workers never progress to the granuloma stage.

Lung Cancer

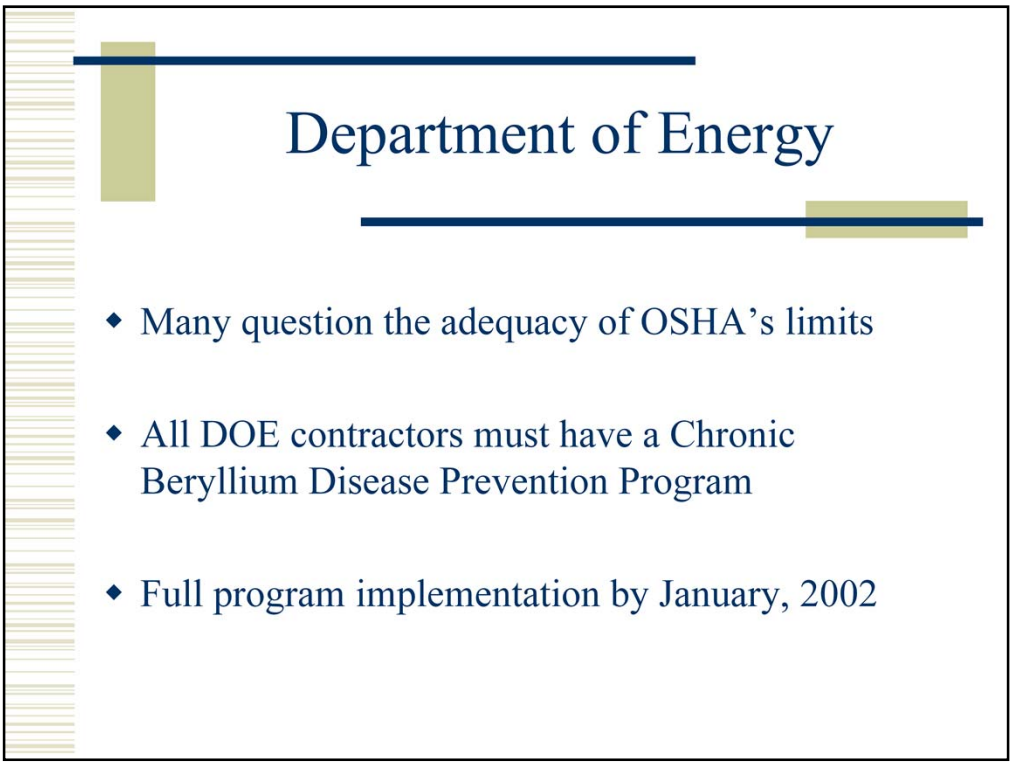
- Classifications
  - ACGIH: Confirmed Human Carcinogen
  - IARC: Carcinogenic to Humans
  - NIOSH: Potential Occupational Carcinogen
  - EPA: Probable Human Carcinogen
  - NTP: Know to be a Human Carcinogen
  - OSHA: Suspected Carcinogen
- Research continues



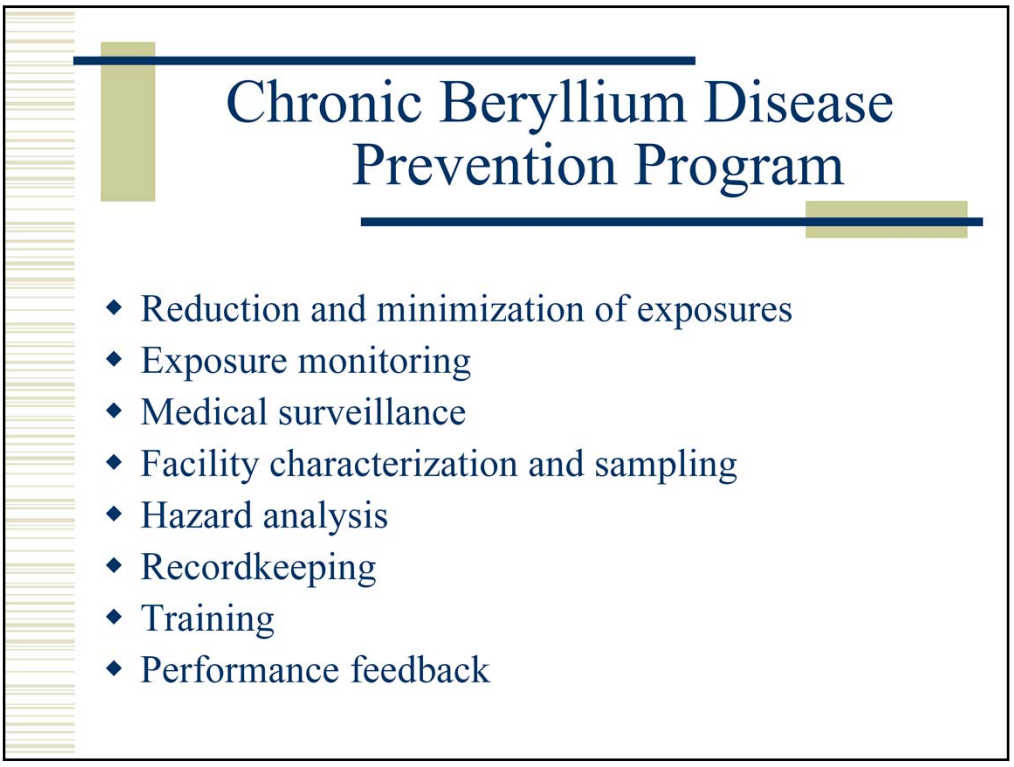
OSHA has established a permissible exposure limit for beryllium of 2 micrograms per cubic meter of air.

This exposure limit is very small. If you evenly distributed an amount of beryllium metallic powder the size of a pencil tip into a box that is six feet high and as wide and long as a football field, that would be equal to two micrograms per cubic meter.

This is an eight hour time weighted average which takes into account the concentration, frequency of exposure, and duration of the exposure. While this Permissible Exposure Limit has greatly reduced the incidence of Chronic Beryllium Disease, this disease is still occurring.



At Department of Energy facilities where beryllium is machined, a 1998 survey of 9000 workers showed that approximately 100 had Chronic Beryllium Disease and 200 had become sensitized. As a result, many people have questioned whether the OSHS Permissible Exposure Limit is protective enough. The Department of Energy, in response, has required its contractors to develop a Chronic Beryllium Disease Prevention Program to address these concerns.



The program must contain the following elements:

Reduction and minimization of exposures

Exposure monitoring

Medical surveillance

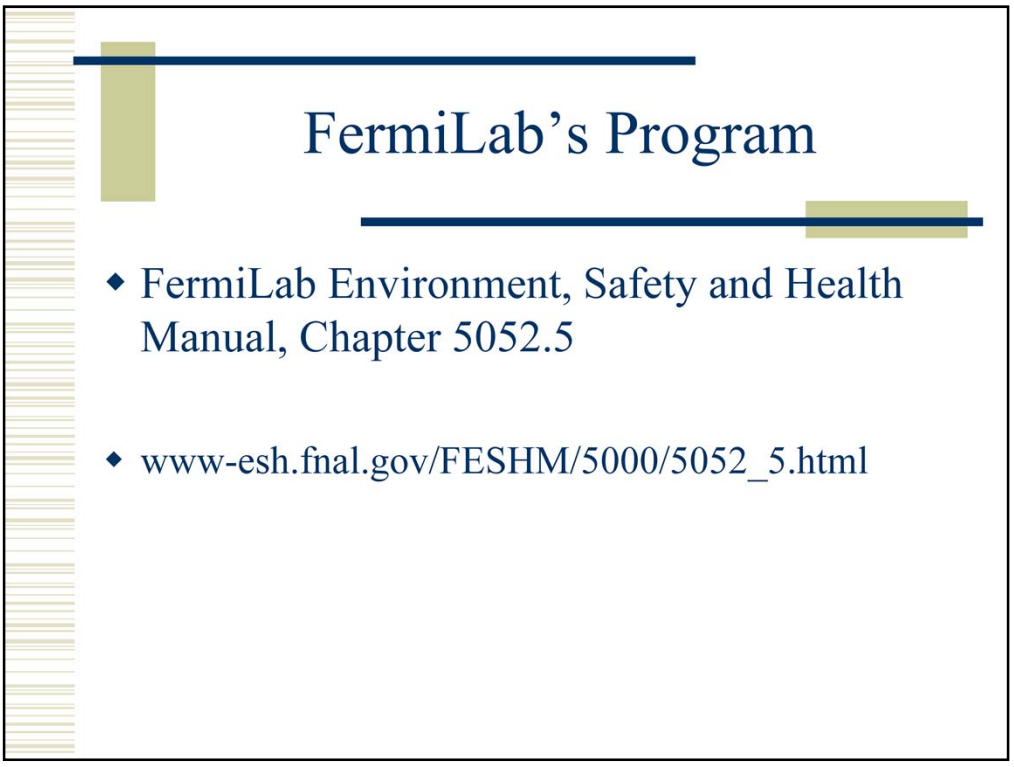
Facility characterization and sampling

Hazard analysis

Recordkeeping

Training

Performance feedback



FermiLab's Chronic Beryllium Disease Prevention Program is Chapter 5052.5 of the FermiLab Environment, Safety, and Health Manual. It can also be found at the website given.

Beryllium-Associated Worker Training

Is given to those employees who either “self identify” through the web-based application or based on Fermilab historical sampling data have performed beryllium activities which created or may have created exposures above detection limits. ES000249 / CR

Beryllium Handling Training

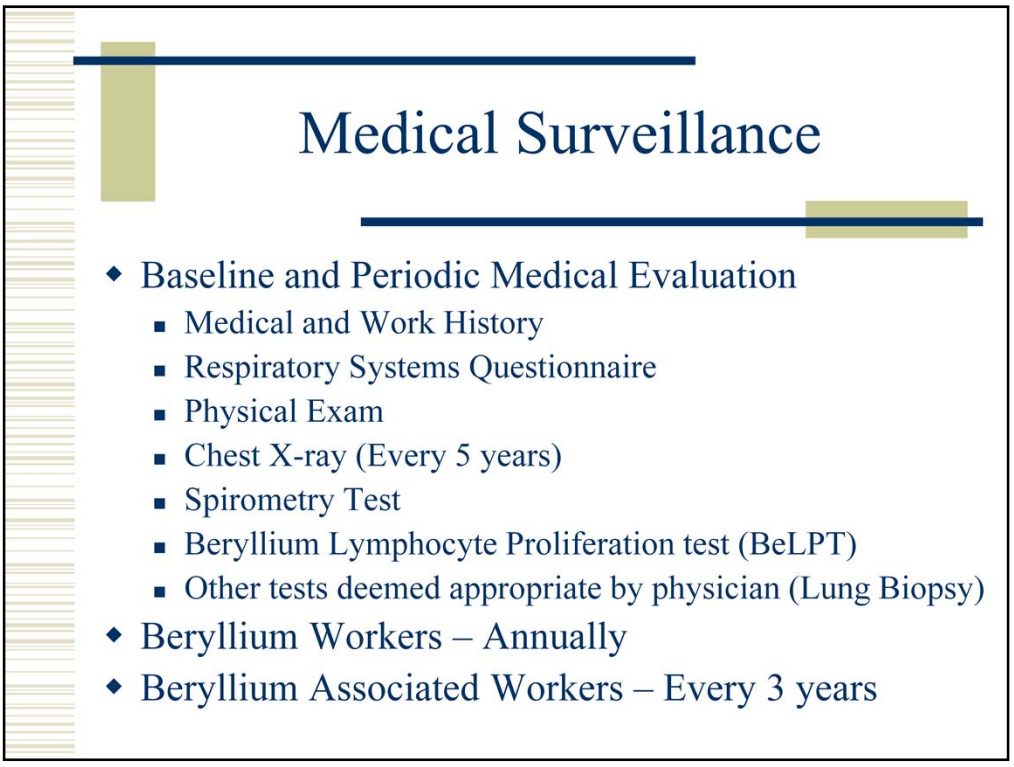
Is given to those employees who are involved in the handling of beryllium articles? (Note: A beryllium article means a manufactured item formed to a specific shape or design during end use and that does not release or otherwise result in exposure to airborne concentrations of beryllium under normal conditions of use). FN000196 / CR

Beryllium Worker Training

Is given to those employees who are involved in Beryllium Activities? (Beryllium Activities include but are not limited to cutting, grinding, housekeeping (contamination clean-up), sanding, soldering, sorting and welding of insoluble beryllium compounds or alloy containing beryllium that may have the potential to release beryllium as an airborne particulate.) FN000320 / CR

Definitions (FESHM Chapter 5052.5)

- **Beryllium-associated worker:** means a current worker who is or was exposed or potentially exposed to airborne concentrations of beryllium above detectable limits, including:
  - A beryllium worker;
  - A current worker whose work history shows that the worker may have been exposed to airborne concentrations of beryllium.
  - A current worker who exhibits signs or symptoms of beryllium exposure; and
  - A current worker who is receiving medical removal protection benefits.



Beryllium Associated Workers are required to be provided medical exams every 3 years, however Fermilab provides physicals every 2 years.

Beryllium LPT

- Beryllium lymphocyte proliferation test (BELPT)
  - Tests lymphocytes (white cells) from blood sample
  - Expose lymphocytes to beryllium and measure growth
  - Rapid growth (proliferation) is a positive or abnormal test
  - Two positive tests: DOE considers you SENSITIZED to beryllium

Other Medical Surveillance Provisions

- No cost to employee
- Multiple Physician Review
- Sharing of Results
- Alternate Physician determination
- Written Medical opinion and recommendation
- Medical Removal

And Still More Provisions

- Medical consent
  - Provide employee with summary of medical surveillance program
    - The type of data to be collected
    - How the data will be collected
    - Purpose of collecting the data
    - How data will be protected
  - Provide employee of the benefits and risks
  - Obtain employee signature
- Counseling and Worker's Compensation

ORISE

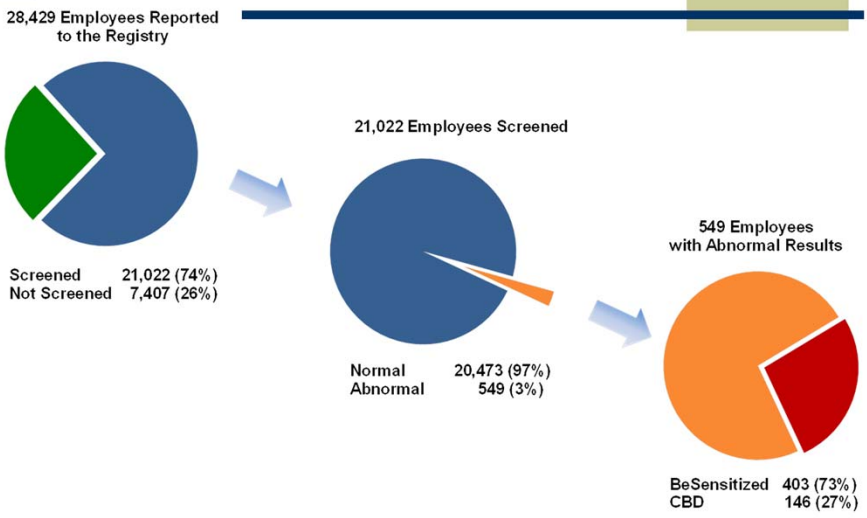
- Oak Ridge Institute for Science and Education
- Center for Epidemiologic Research
- Oversees Medical Surveillance for **Former** Beryllium-Associated Workers

Participating Sites

- Advanced Mixed Waste Treatment
- Ames Laboratory
- Argonne National Laboratory
- Brookhaven National Laboratory
- DOE Oak Ridge Office
- East Tennessee Technology Park
- Fermi National Accelerator Laboratory
- Hanford Site
- Idaho National Laboratory
- Kansas City Plant
- Knolls Atomic Power Laboratory
- LATA Environmental Services of KY.
- Lawrence Berkeley National Laboratory
- Lawrence Livermore National Laboratory
- LLNL BU, Clean Harbors, Envirocon Inc.
- Los Alamos Nat. Lab
- Nevada National Security Site
- Oak Ridge National Laboratory
- Pacific Northwest National Laboratory
- Pantex Plant
- Sandia National Laboratories
- Savannah River Site
- Stanford Linear Accelerator Center
- Wackenhut Security Services Inc.for ETTP, ORNL, and Y-12 (WSI)
- Y-12 National Security Complex
- Y-12 Navarro Research and Engineering
- Y-12 URS Corporation

Progression from BeLPT Testing to "Sensitized" to CBD

Data Cumulative Through 2012*



*Some sites provided data that predates the 2002 start date of the Registry.

What Do I Need to Do?

- Understand the activities and hazards associated with beryllium.
- Contact supervisor, ESH Group or ESH&Q IH if you have any questions or concerns.
- If you decide to self-identify then contact the Medical Department for Follow-up.

Summary

- How did I get here?
- What is beryllium?
- Health effects of beryllium exposure
- OSHA, DOE and Fermilab Standards
- Who and what is ORISE?
- What do I need to do?
- Additional Help