Dentistry, Respiratory Hazards, and NIOSH

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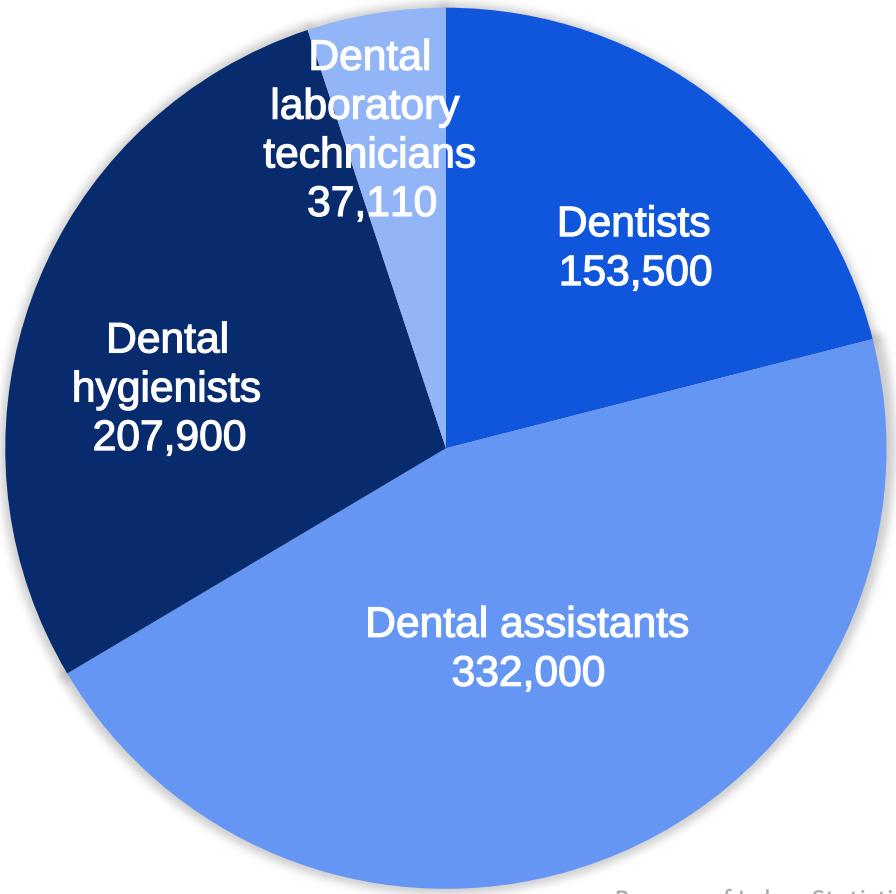
HCSA Sector Council Meeting

August 9, 2019

Dental Personnel

- About 730,000 dental personnel in the United States



Bureau of Labor Statistics, 2016

Respiratory Hazards in Dentistry

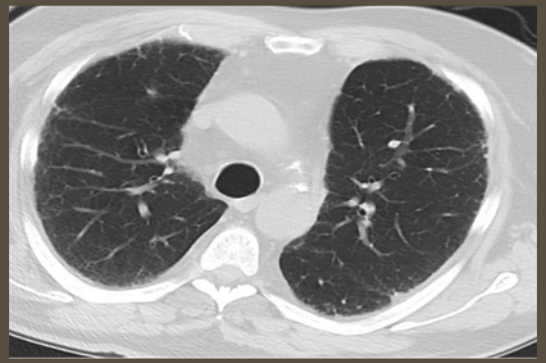
- Infectious agents
- Particulates
  - Dusts
  - Fumes
  - Mists
- Gases
- Vapors
- Radiation
- Other hazards

Occupations and Work-Related Lung Diseases

- Coal worker's pneumoconiosis or "black lung disease"
- Shipbuilders and mesothelioma
- Bakers and occupational asthma
- Bar tenders and chronic obstructive pulmonary disease (COPD)

Occupations and Work-Related Lung Diseases

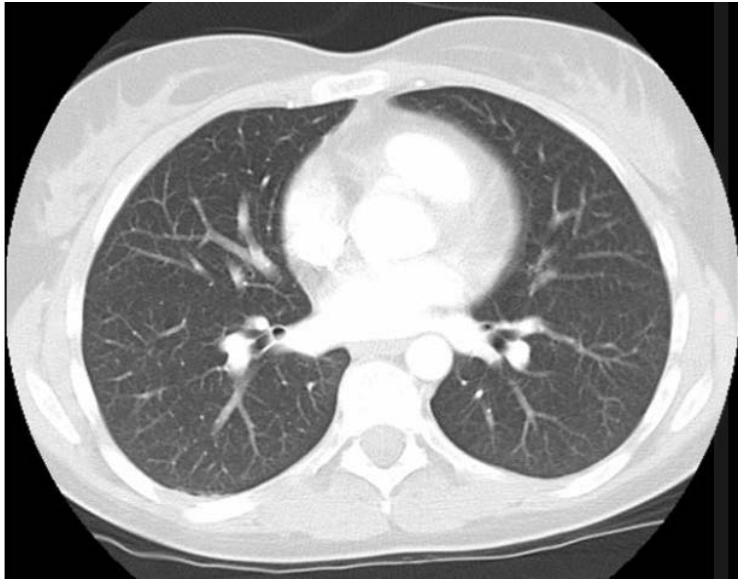
- Coal worker's pneumoconiosis or "black lung disease"
- Shipbuilders and mesothelioma
- Bakers and occupational asthma
- Bar tenders and chronic obstructive pulmonary disease (COPD)
- What about dentists and other dental professionals?



Idiopathic Pulmonary Fibrosis (IPF)

Idiopathic Pulmonary Fibrosis (IPF)

- Chronic progressive lung disease without known cause
- Difficulty breathing that slowly worsens and dry cough
- Likely caused by cycles of epithelial injury and dysregulated repair
- Median survival 2-5 years



https://radiopaedia.org/cases/normal-chest-ct-lung-window-1?lang=us

Antonella Caminati et al. Eur Respir Rev 2017;26:170047

IPF Epidemiology

- Increased incidence and prevalence with increasing age — presentation most common in 50s-60s
- United States
  - Incidence = 0.22 to 0.88/100,000
  - Prevalence = 0.5 to 27.9/100,000
- Risk factors
  - Cigarette smoking
  - Exposure to stone, metal, wood, and organic dusts
  - Gastroesophageal reflux disease

NIOSH

Morbidity and Mortality Weekly Report

Dental Personnel Treated for Idiopathic Pulmonary Fibrosis at a Tertiary Care Center — Virginia, 2000–2015

Randall J. Nett, MD[1]; Kristin J. Cummings, MD[1]; Brenna Cannon[2]; Jean Cox-Ganser, PhD[1]; Steven D. Nathan, MD[2]

In April 2016, a Virginia dentist who had recently received a diagnosis of idiopathic pulmonary fibrosis (IPF) and was undergoing treatment at a specialty clinic at a Virginia tertiary care center contacted CDC to report concerns that IPF had been diagnosed in multiple Virginia dentists who had sought treatment at the same specialty clinic. IPF is a chronic, progressive lung disease of unknown cause and associated with a poor prognosis (*1*). Although IPF has been associated with certain occupations (*2*), no published data exist regarding IPF in dentists. The medical records for all 894 patients treated for IPF at the Virginia tertiary care center during September 1996–June 2017 were reviewed for evidence that the patient had worked as a dentist, dental hygienist, or dental technician; 1988–2005, the estimated annual incidence of IPF varied from 6.8 to 17.4 per 100,000 population, and the estimated prevalence varied from 14.0 to 63.0 per 100,000 population (*3*) and increased with increasing age (*2*). No published data could be found regarding dental personnel and IPF.

In June 2017, the electronic medical records of all 894 patients with a diagnosis of IPF treated at the Virginia specialty clinic during September 1996–June 2017 were reviewed to identify patients having the occupation of dentist, dental hygienist, or dental technician. Available electronic medical records of patients identified as having one of these occupations were reviewed, pertinent data were abstracted, and an attempt was made to interview living patients to ascertain

Reviewed electronic medical records of all 894 patients with IPF diagnosis at Virginia specialty clinic during September 1996–June 2017

↓

Identified patients known to be dentists, dental hygienists, dental technicians, or dental assistants

↓

Abstracted medical records

↓

Conducted patient interviews

↓

Performed descriptive analysis

8 dentists and one dental technician

The # of dentists treated was 23-times higher than the # expected

Morbidity and Mortality Weekly Report

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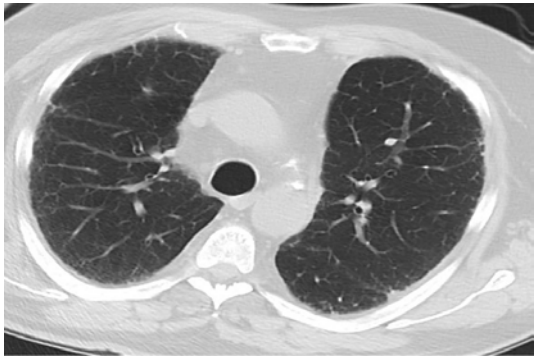

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10 dentists and one dental technician

The # of dentists treated was 29-times higher than the # expected

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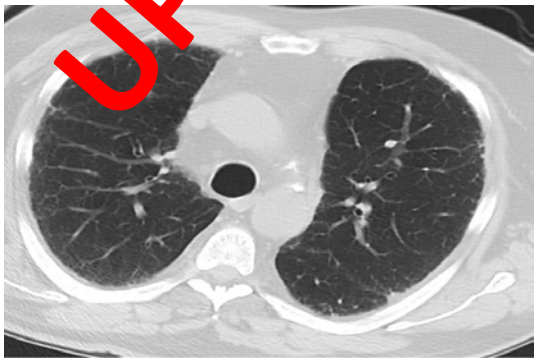
UPDATE



Select Key Findings (n = 11 cases)

- Males = 11 (100%)
- Median age at diagnosis = 65 (range: 49–81) years
- Deceased = 7 (64%)
- Cigarette smoking = 5 (46%)
- Interviewed = 2
  - Polishing dental appliances, preparing amalgams and impressions, assisting or demonstrating denture placement using adhesives, developing x-rays, and using disinfectants/sterilants
  - **No personal protective equipment during 1960s–1980s**

Limitations

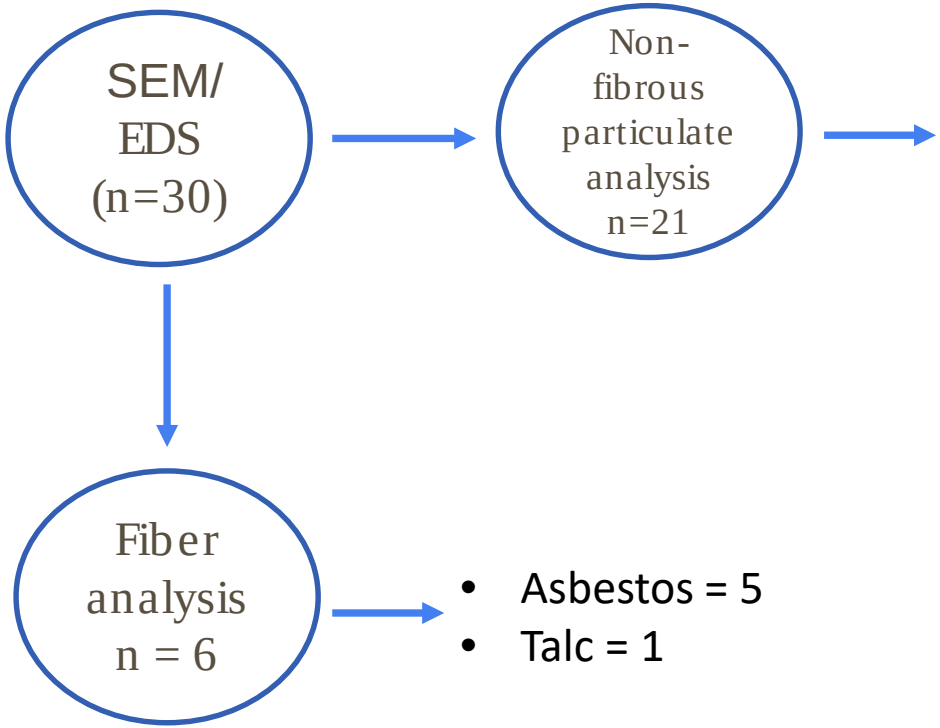
- Single tertiary care facility specializing in IPF
- Only two patients completed interviews
- Multiple patients reported exposures that occurred outside of work
- No biopsy specimens available

Proportionate mortality from 'other interstitial pulmonary diseases with fibrosis' by industry and occupation classification for select years, National Occupational Respiratory Mortality System

Industry/occupation classification	Diagnostic code*	Years	Number of decedents	Proportionate mortality ratio (95% CI)
Worked in office of dentists	J84.1	1999, 2003, 2004, 2007	35	1.52 (1.05–2.11)
Occupation of dentist	J84.1	1999, 2003, 2004, 2007	19	1.67 (1.01–2.61)

* *International Classification of Diseases, Tenth Revision* (ICD-10) code J84.1, 'other interstitial pulmonary diseases with fibrosis'

Are All Cases of IPF Truly “Idiopathic”?



- Aluminum silicates = 7
- Metals = 6
- Aluminum silicates and metals = 4
- Silica = 2

- Asbestos = 5
- Talc = 1

Zhao Z, Abraham JL [2012]. Poster presented at the 2012 United States and Canadian Academy

Dentistry-related exposures

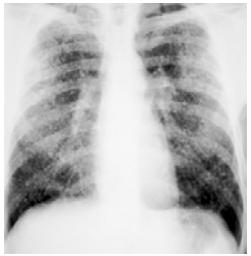
?

IPF

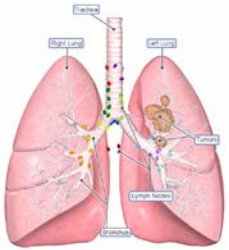
Other Respiratory Conditions

- Asthma

- Pneumoconioses
  - Asbestosis
  - Silicosis
  - Dental technician’s pneumoconiosis



- Lung cancer

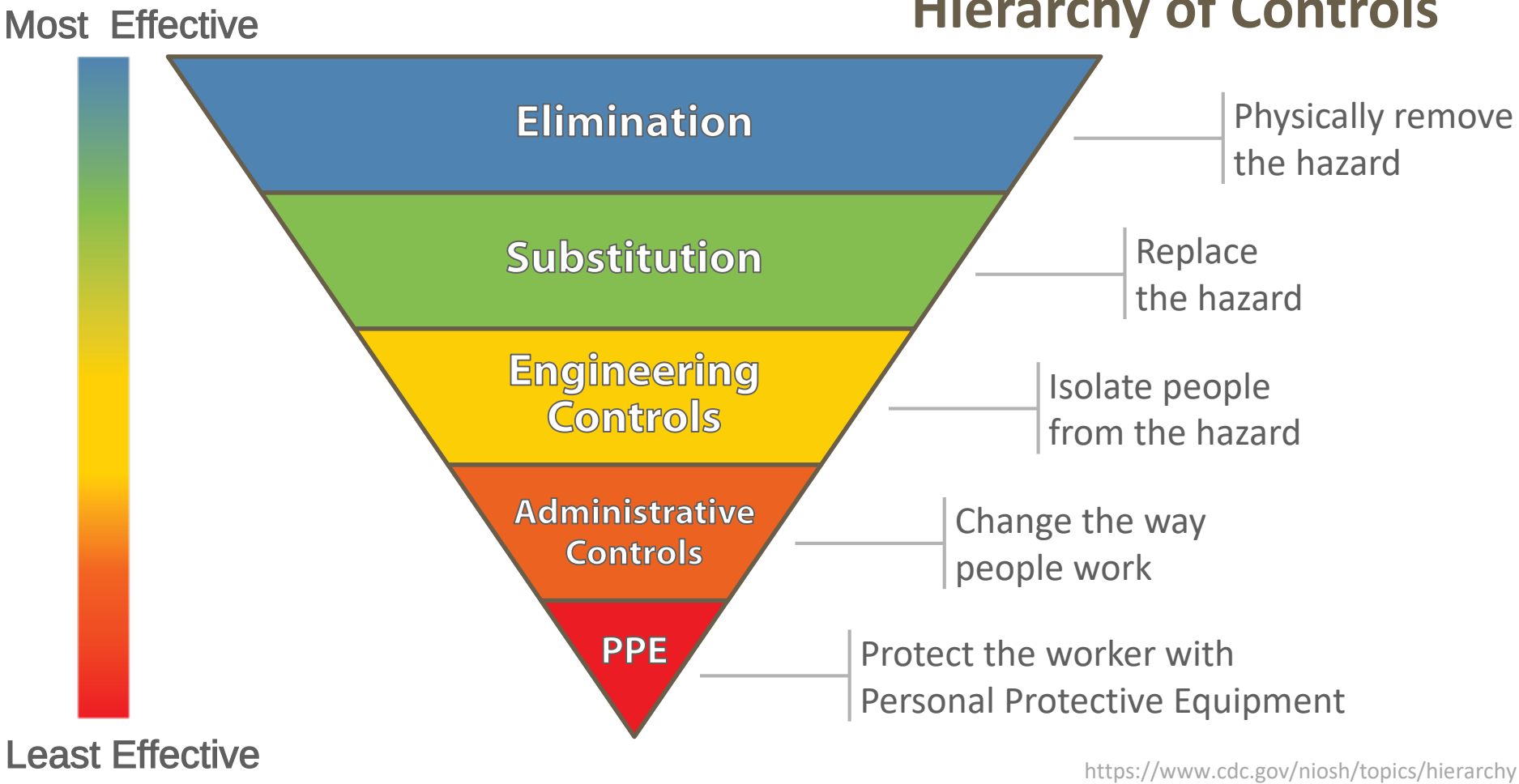


https://www.safetyandhealthmagazine.com/articles/11804-workers-avoid-talking-to-doctors-about-job-related-asthma-niosh-says

https://ctsurgerypatients.org/lung -esophageal-and-other-chest-diseases/lung-cancer

Reducing Occupational Hazards

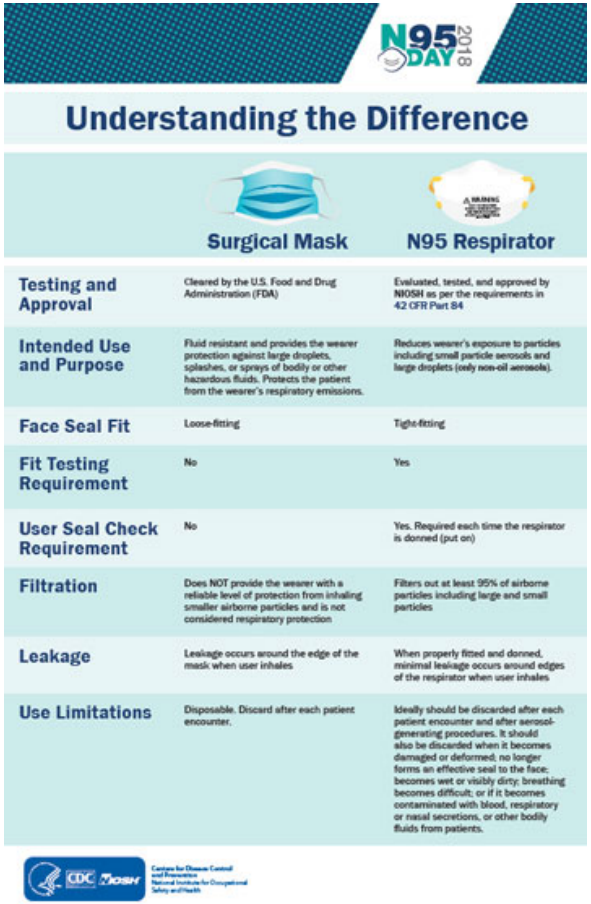
Hierarchy of Controls



https://www.cdc.gov/niosh/topics/hierarchy

Surgical Masks Are Not Respirators!

- Physical barrier
- Protects against droplets
- Do not protect against:
  - Small particles
  - Gases
  - Vapors
  - Fumes



The Right PPE Must Be Worn Correctly!

The National Institute for Occupational Safety and Health (NIOSH)

Health Hazard Evaluations (HHEs)

Promoting productive workplaces through safety and health research NIOSH

Health Hazard Evaluations (HHEs)

en Español

Request an HHE

Find an HHE Report

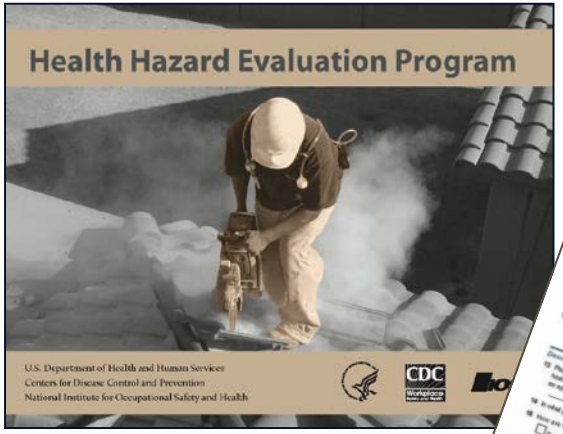
NIOSH Health Hazard Evaluations

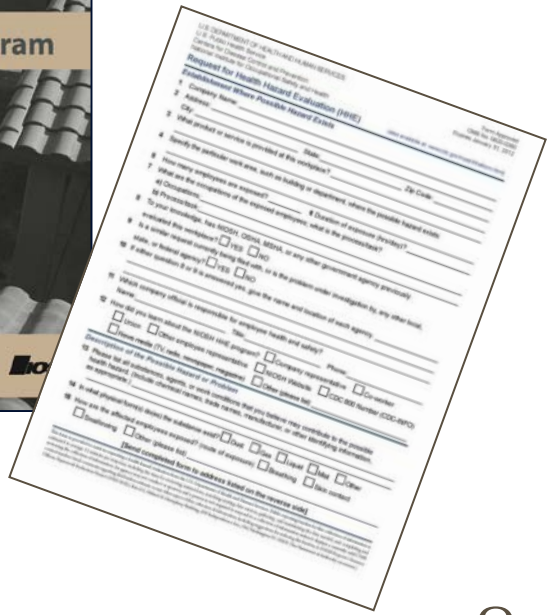
- Worksite epidemiologic/industrial hygiene investigation in response to a request from employees, employers, or unions
- Determine whether harmful exposures, processes, or conditions exist OR cause injuries or illnesses
- Involve employees at every step
- No cost to the employer or employees
- Public final report

NIOSH Health Hazard Evaluations

- Can be requested by:
  - 3 current employees (can be confidential)
  - Union
  - Employer
- Requests for technical assistance
  - Other government agencies
  - State and local health departments

How are Health Hazard Evaluations (HHEs) Requested?





By requesting a form by calling 513-841-4582

On the NIOSH HHE Website
http://www.cdc.gov/niosh/hhe/request.html

Information Gaps

- Prevalence of morbidity and mortality
- Dental assistants and dental hygienists
- *Current* work-related exposures
- Associations between inhalational exposures and respiratory health outcomes

Planned future studies

- Health
  - Expanded case-series
  - Tissue analysis
  - Mortality study
- Exposure
  - Exposure assessment study
- Exposure-health study

Questions or comments?

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(304) 285-6255

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov