

# NIOSH Mining Program

Safe mines - Healthy miners



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*The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention or the National Institute for Occupational Safety and Health.*

**NIOSH Mining Program**



# Presentation Outline

- Mining research and regulatory environments
- Mining industry statistics
- The NIOSH Mining Program
- Setting research priorities

# NIOSH – focus and interaction with other federal agencies



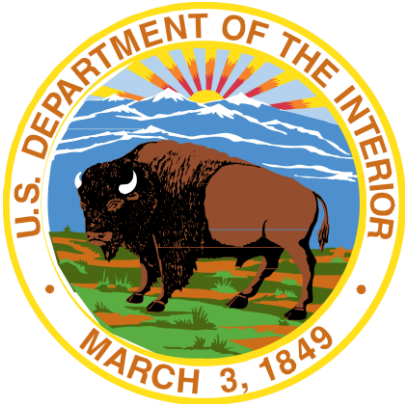
Research  
Innovative Solutions



Regulation  
Enforcement

Notes:  
Both NIOSH and OSHA  
were created by the OSH  
Act of 1970  
NIOSH was assigned the  
MHRAC by HEW (HHS)

# Mining Enforcement History; Enforcement- Research Separation



Interior

Labor



Federal Mine Safety and Health Act of 1977

1910



1973 Admin Action  
MESA



- 1941 - Inspections, investigations
- 1952 - Imminent danger NOVs, OOW
- 1966 - Unwarrantable failure NOVs
- 1970 - FCMHSA of 1969
- 1973 - MESA
- 1995 - Closure

Health and Human Services



*H&S Research Only*

# Why the Mining Program is a separate Office within NIOSH

The fiscal year 1997 H. R. conference bill and report for the Omnibus Consolidated Appropriations Act, 1997 (Public Law 104-208, approved 9/30/96) stated that:

*“while NIOSH has had responsibility for occupational health and safety research aimed at industry in general, the Committee understands that **many mine safety and health needs are either unique to mining or require mining-specific emphasis.** The Committee, therefore, expects NIOSH to **preserve the integrity of mine safety and health research unit of the Bureau so that the collective experience and expertise of that group can be maintained within NIOSH.** To further ensure the maintenance of this unit and its mission, the Committee recommends that NIOSH move forward with establishing a new Associate Director for Mining Safety and Health Research who reports directly to the NIOSH Director.”*

NIOSH has maintained a separate and distinct identity for the mine health and safety program since that time.

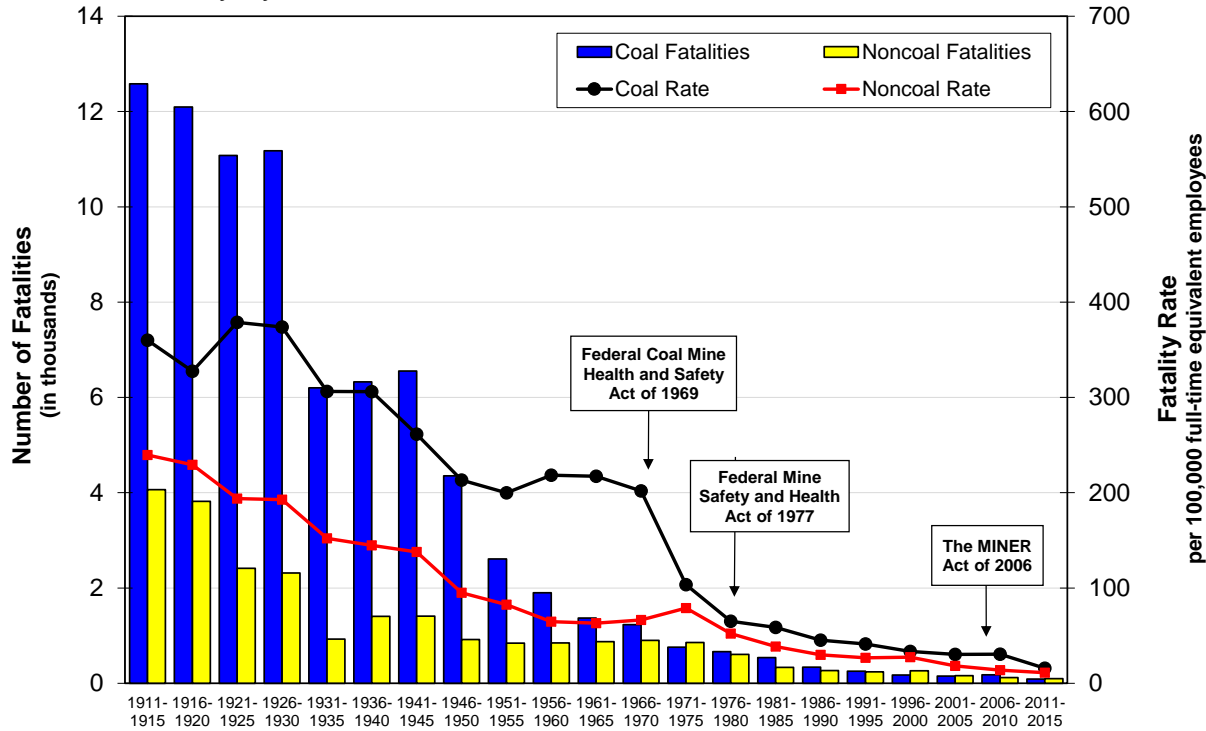
Sec. 2 [§801]. Congress declares that -

(a) ***“The first priority and concern of all in the coal or other mining industry must be the health and safety of its most precious resource—the miner.”***

From FINDINGS AND PURPOSE, the first section of the Federal Mine Safety and Health Act of 1977 and an expansion of that stated in the Federal Coal Mine Health and Safety Act of 1969



Number of fatalities and fatality rates (5-year aggregates) in the mining industry by sector, 1911-2015



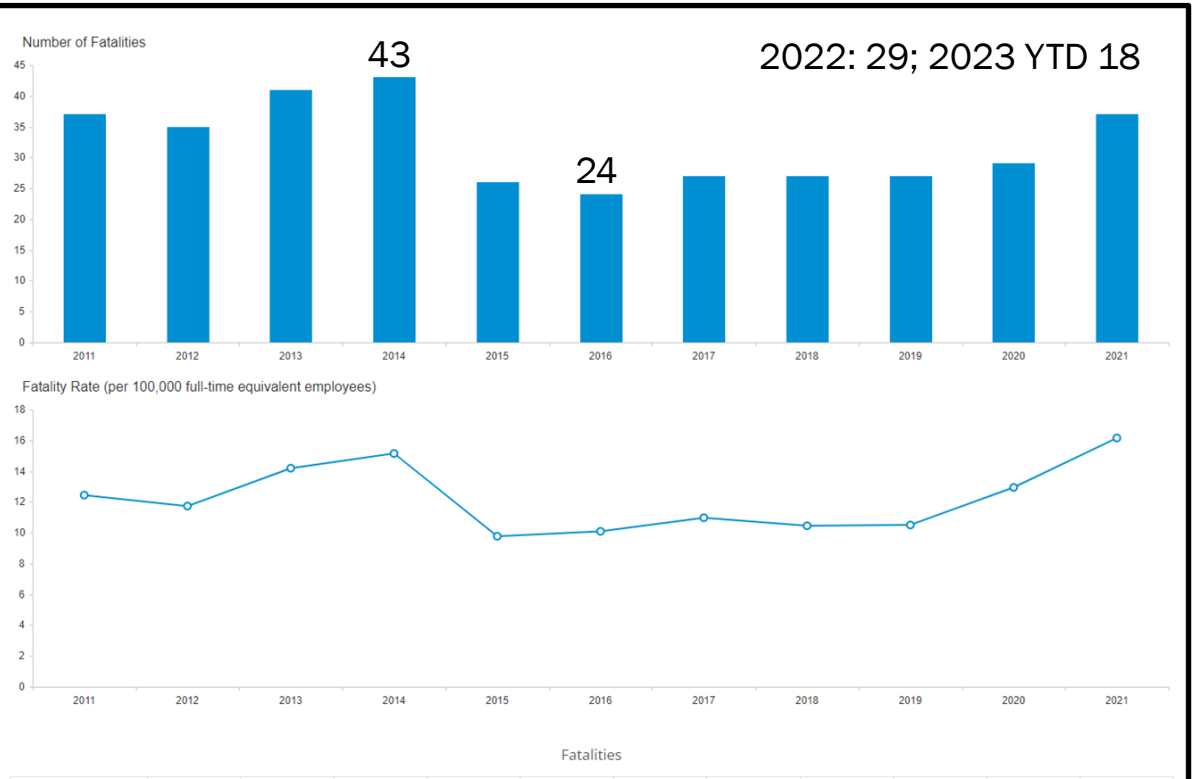
NOTE: Excludes office employees. Noncoal includes metal, nonmetal, stone, and sand & gravel operations. Sand & gravel miners included starting in 1958. Hours for 1911-1923 computed on assumption that weighted average length of workday was 9.36 hours. Full-time equivalent employees (2,000 hours = 1 FTE employee). Data source: USBM and MSHA

# 1911-2015 Fatalities

## Coal

## Noncoal

# 2011-2021 Fatalities - All Mining



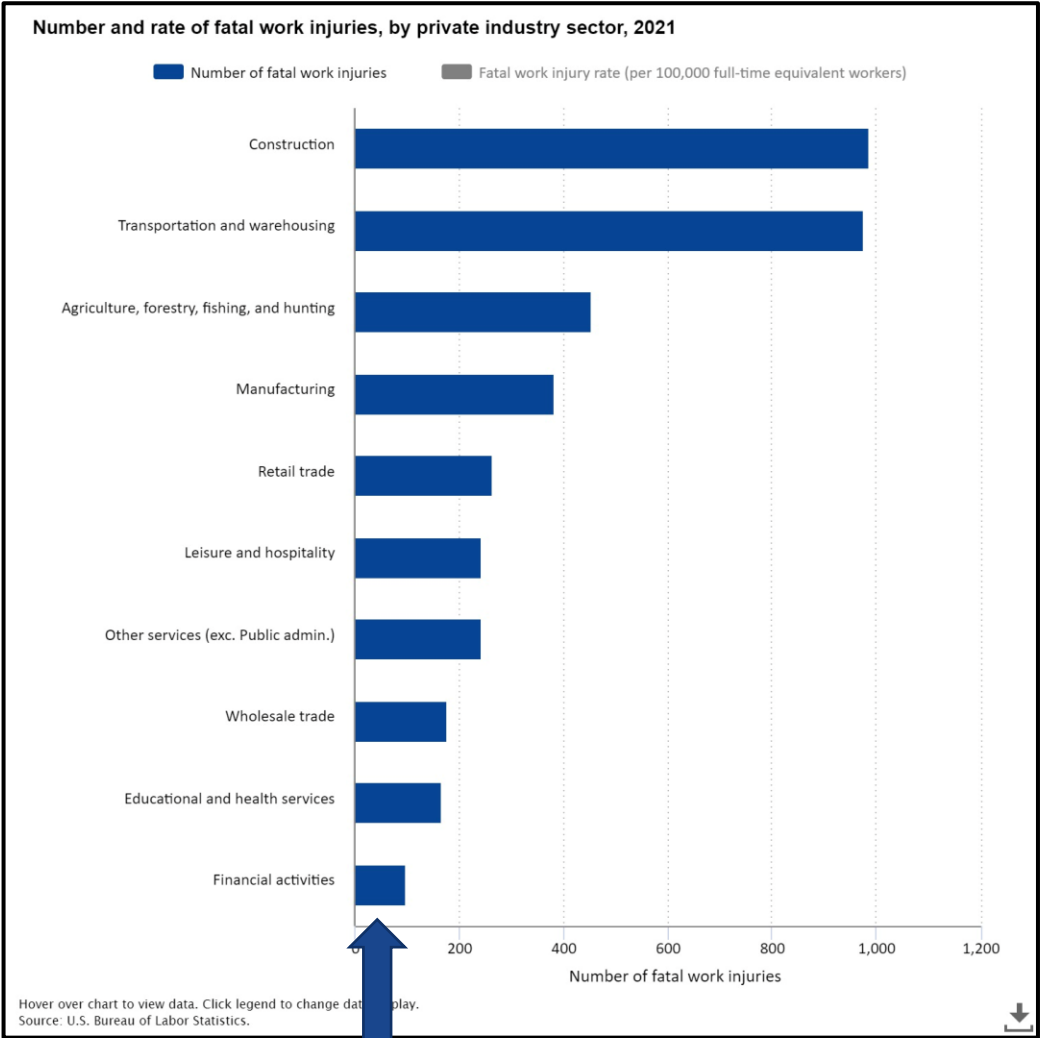
1971-1975	
Coal	103
Non-coal	79

Rates



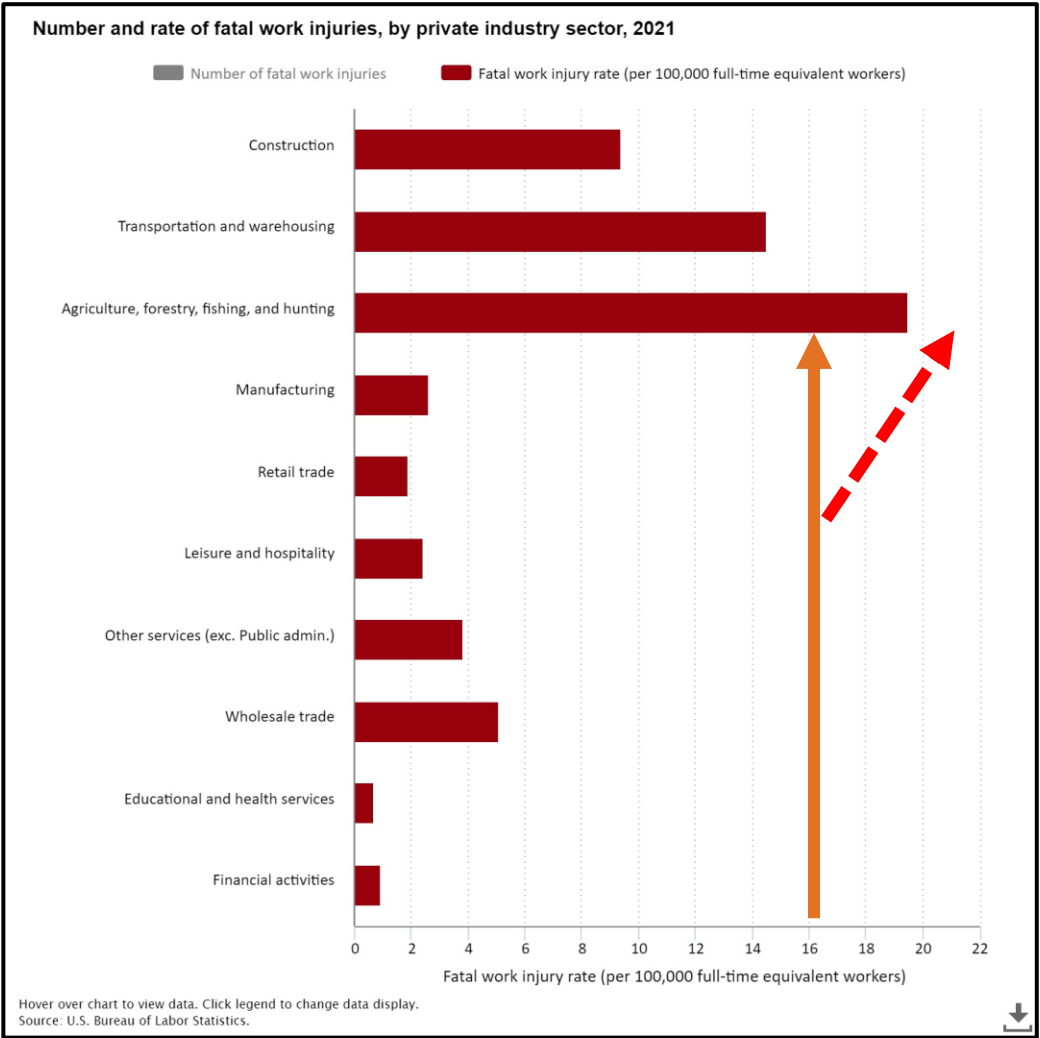
2021	
Coal	21.0
Non-coal	17.3
Cont.	11.3

# Sector Comparison - Fatalities and Fatal Work Injury Rate - 2021



**Number**

Mining 37  
 Coal – 10; M/NM 27  
 O&G 58 - BLS

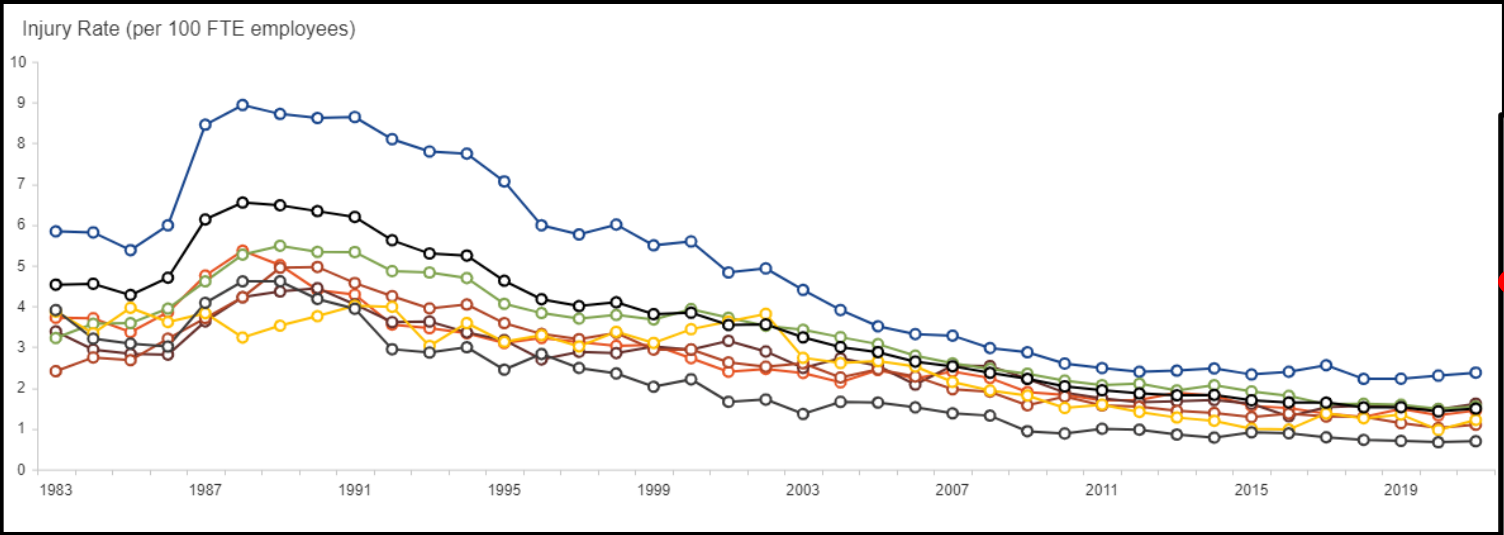


**Rate**

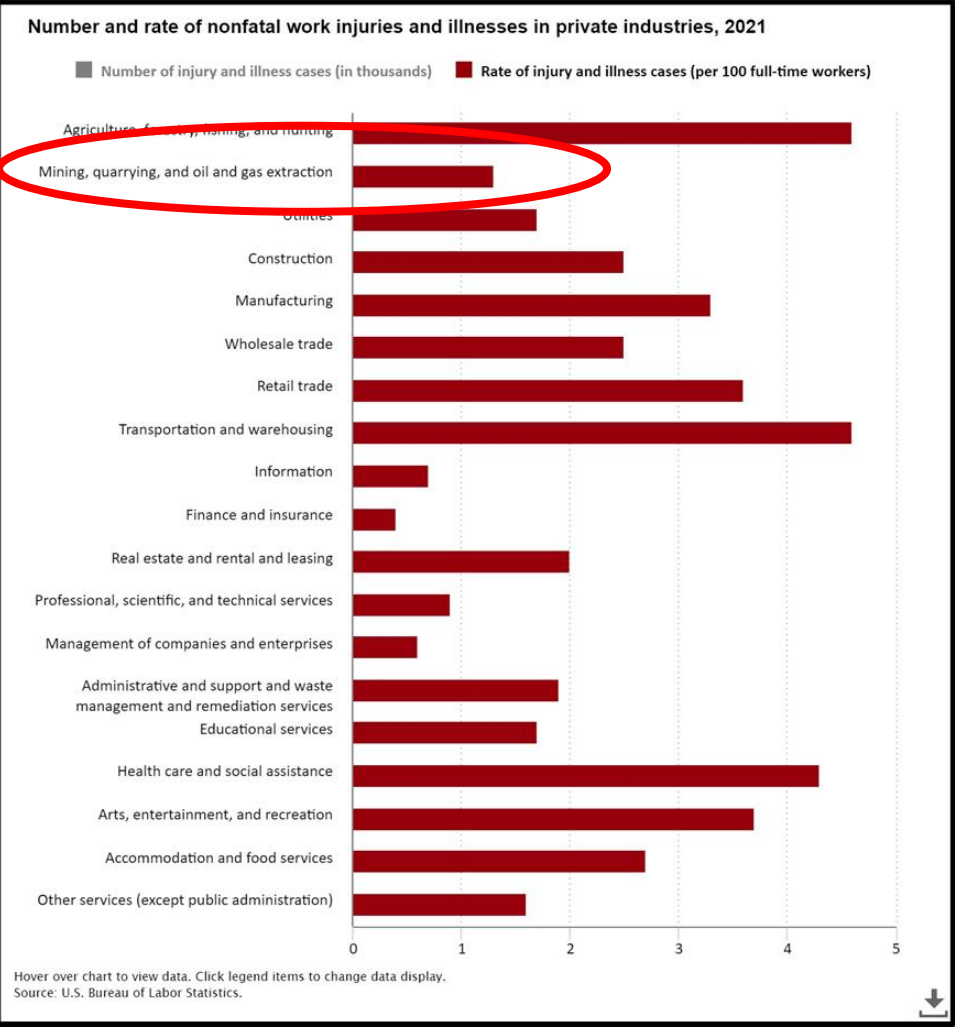
Mining 16.15  
 Coal 21.04  
 All Industries 3.6; O&G 9.8



# Industry Injury Rate (per 100 FTEs) 1983 – 2021



- Coal rate
- Metal rate
- Nonmetal rate
- Stone rate
- Sand & gravel rate
- Coal contractor rate
- Noncoal contractor rate
- All mining rate



# Mining has a high prevalence of occupational respiratory disease and exposures



## Coal dust (RCMD)

- 78,620 black lung deaths in 1968-2016
- \$48 billion in black lung benefits since 1970 (\$200+ million 2021)

## Respirable crystalline silica (RCS)

- Mining listed on more (28.1%) silicosis death certificates than other industries



## Diesel particulate matter (DPM)

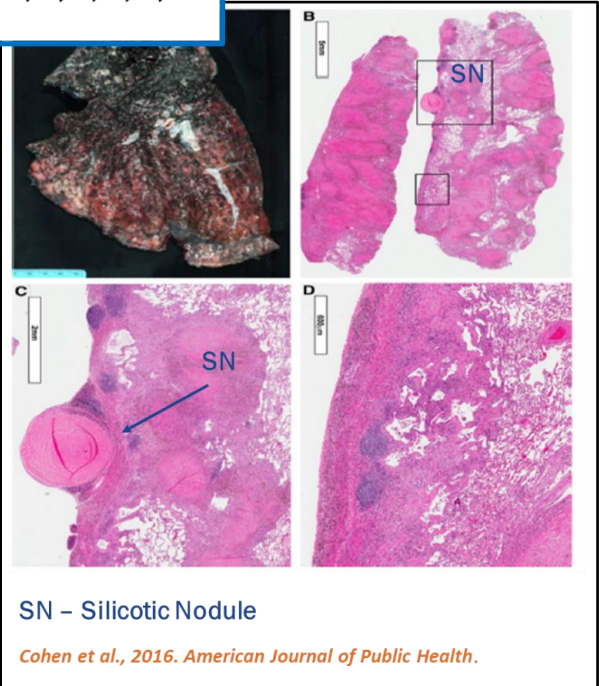
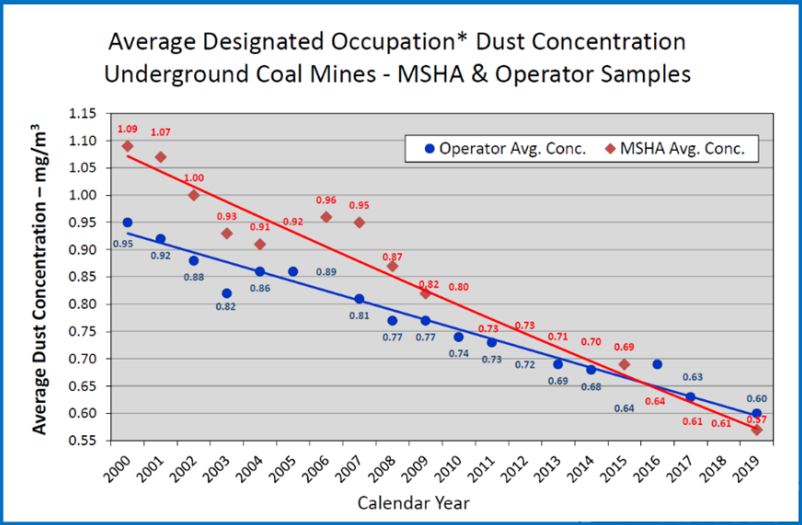
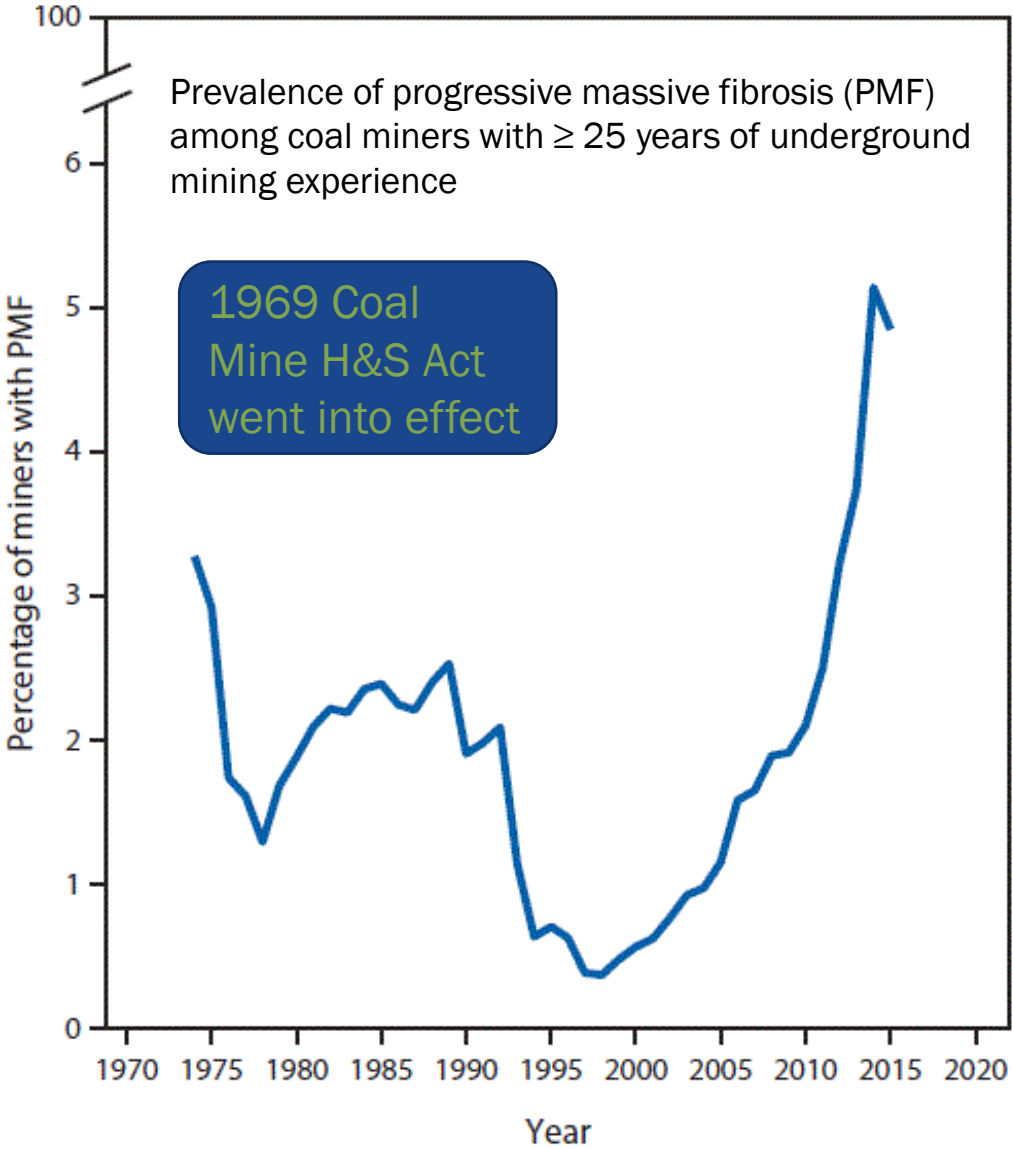
- Linked to lung cancer and other disorders
- 15,000 underground coal miners and 13,000 M/NM miners are exposed



## Elongate Mineral Particles (EMP)

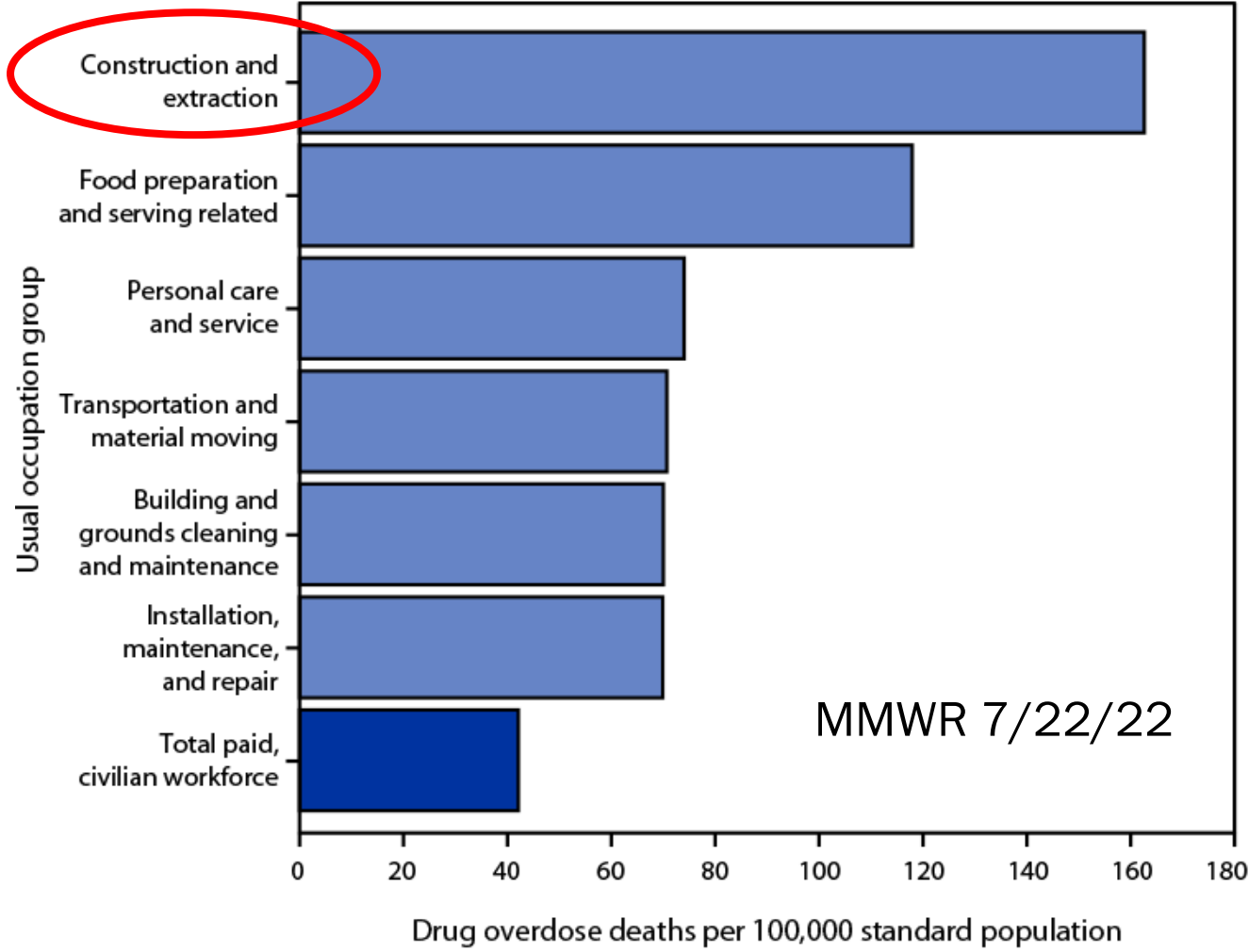
- 10% of M/NM mines from 1979-2015 exceeded the NIOSH REL (0.1 f/cc) for asbestos (NY, MN, CA)

# Black Lung is on the rise according to data collected through the NIOSH Coal Worker's Health Surveillance Program

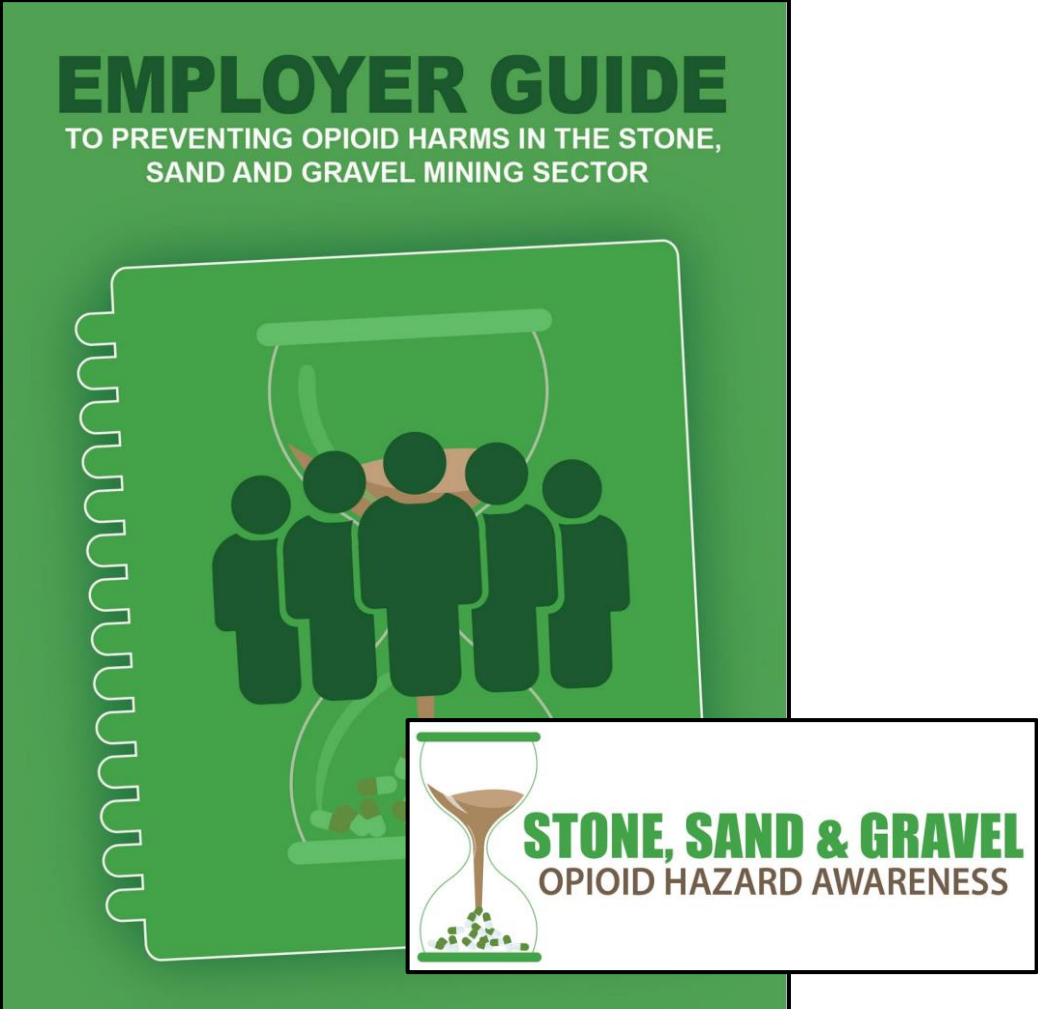


Blackley DJ, Crum JB, Halldin CN, Storey E, Laney AS. 2016. MMWR. 2018;65(49).

# Drug Overdose Issues



Aged 16–64 Years in Usual Occupation Groups with the Highest Drug Overdose Death Rates – National Vital Statistics System, United States, 2020



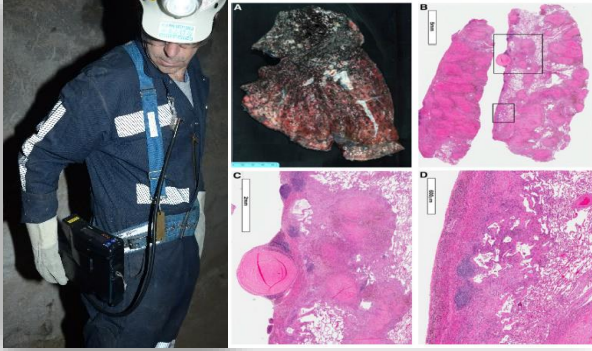
University of Massachusetts Lowell under an Alpha Foundation grant

**The NIOSH Mining Program's mission is to eliminate mining fatalities, injuries, and illnesses through relevant research and impactful solutions.**



*Safe mines - Healthy miners*

# Three overarching strategic goals



Health

Reduce mine worker's risk of **occupational illness and disease**



Safety

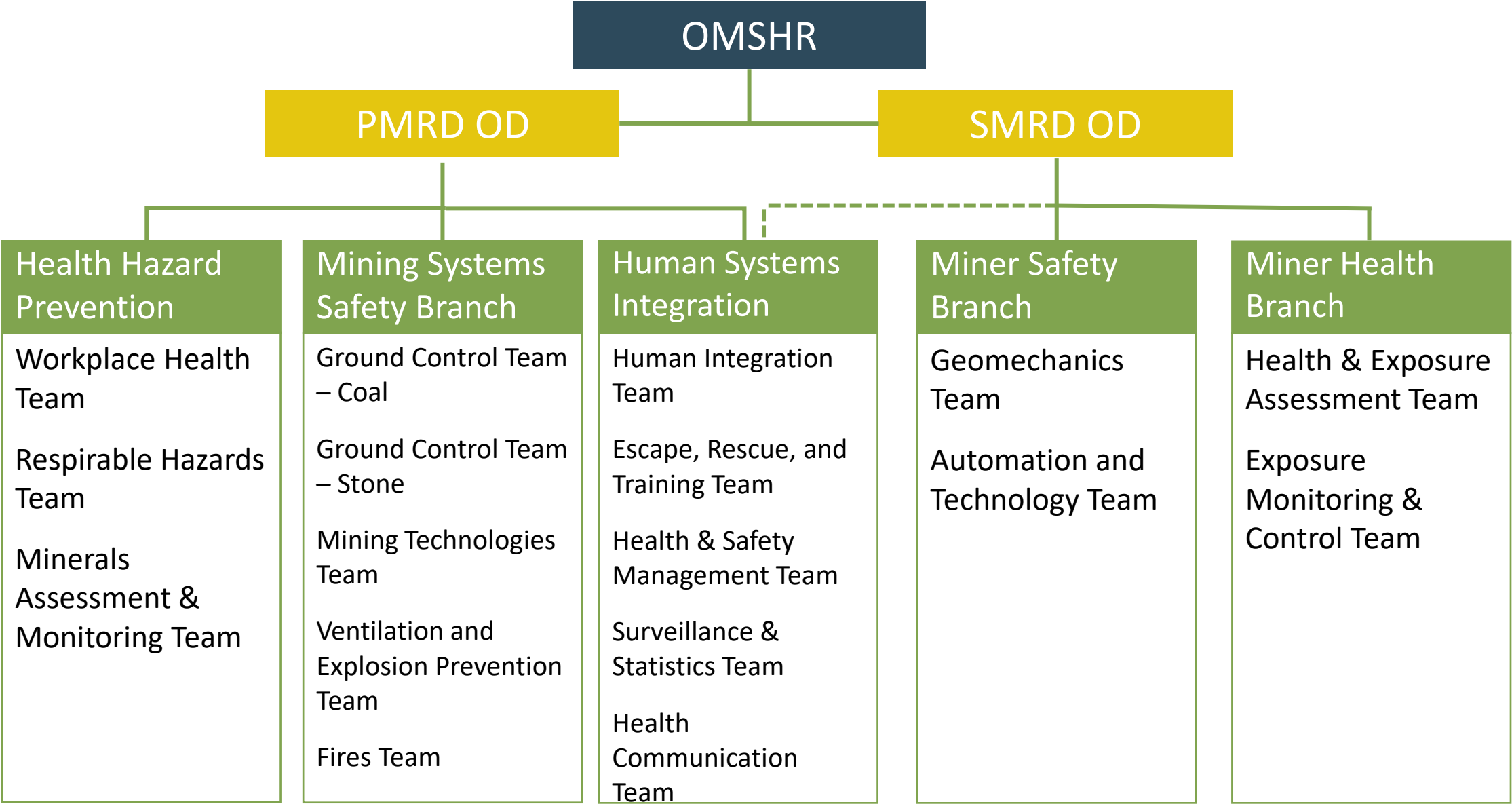
Reduce mine worker's risk of **traumatic injuries and fatalities**



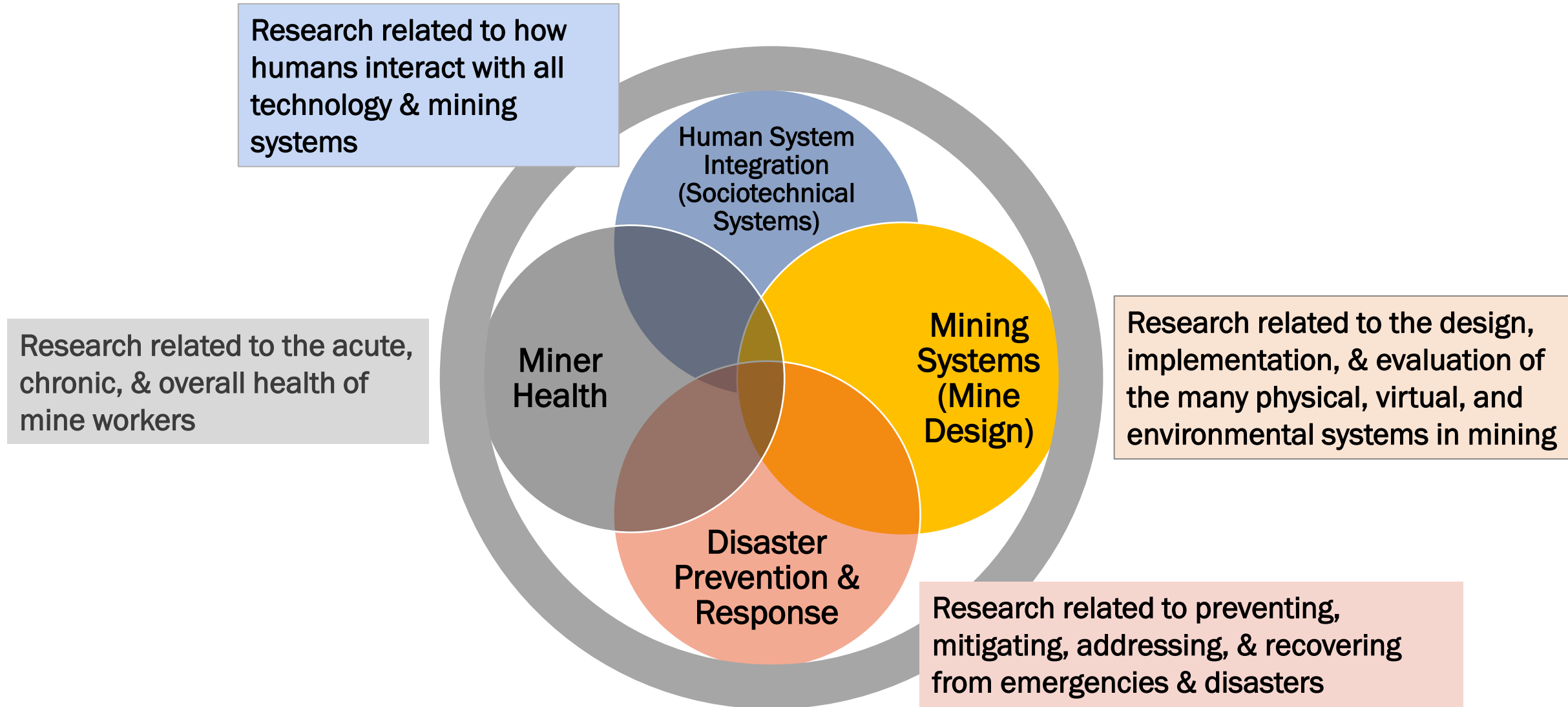
Disaster  
Prevention

Reduce the risk of **mine disasters** and **improve survivability** of mine workers

# NIOSH Mining Program



# Research Systems Orientation - Work Organized by Domains



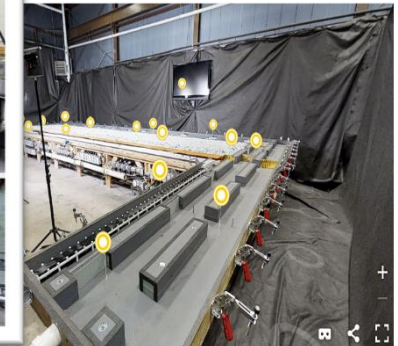
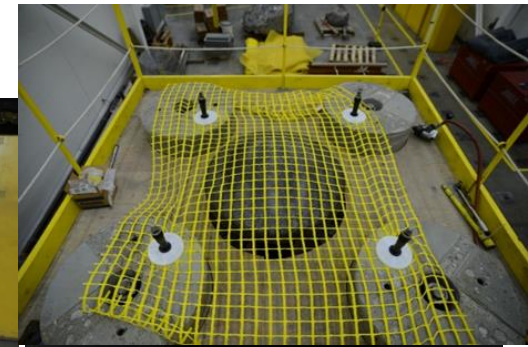


# One-of-a-kind, state of the art research facilities

## 120 researchers, 20 technicians

### • Unique Laboratory Facilities

- Virtual Immersion and Simulation Laboratory
- Longwall Instrumented Aerodynamic Model
- Automated Breathing and Metabolic Simulator Laboratory
- Mine Roof Simulator
- High-Energy High Displacement Test Frame
- Walk-In Temperature and Humidity Environmental Chamber
- Full-scale Continuous and Longwall Mining Galleries
- Diesel Research Laboratory
- Marple Aerosol Test Chambers



### • Mobile Units

- CWHSP Mobile Respiratory Health Screening Unit
- Audiology

### • Underground Mines

- Bruceton Safety Research Coal Mine and Experimental Mine
- Lake Lynn Experimental Mine (LLEM, closed 2012)
- Underground Mine Safety & Health Research Laboratory Mace, WV (in development)



# Extramural Program

- **Grants**

- Western Mining Safety and Health Training
- Underground Mine Evacuation Technologies and Human Factors Research
- Robotic and Intelligent Mining Technology and Workplace Safety Research

- **Contracts (MINER Act; 2007 forward)**

- 143 contracts executed; Proposals from 210+ companies and 40 universities

- **Contracts (OSHA Capacity Build)**

- 34 contracts, 12 universities;

- **Interagency Agreements**

- National labs (Sandia)
- Government (NASA KSC, JPL; NSWCC)



# Setting Priorities for Mining Research - diverse inputs



Stakeholder Input



Policy & Rulemaking



Burden, Need & Impact

# Research priorities are guided by stakeholder input

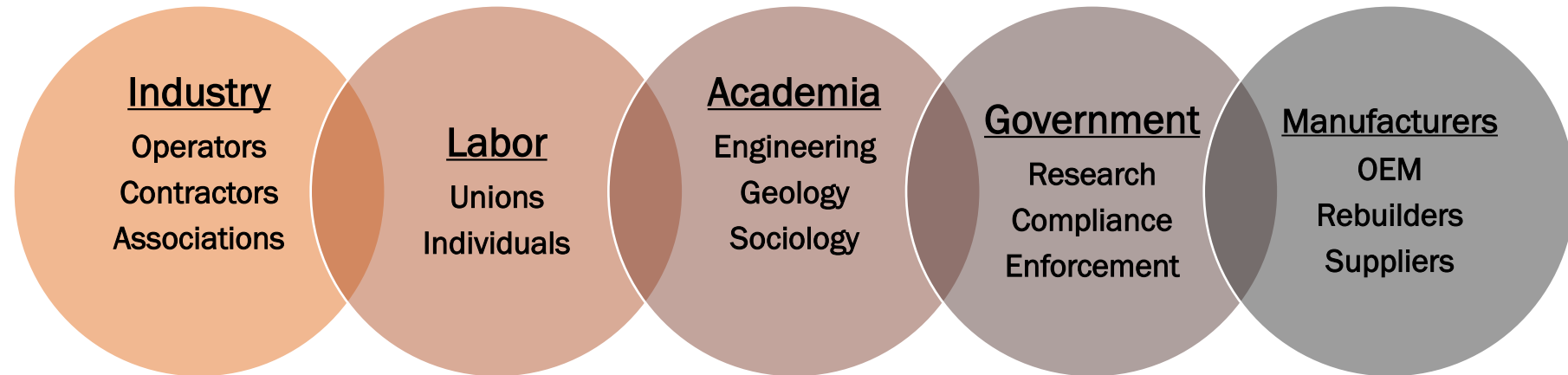
- NORA Mining Sector Council – NORA National Mining Agenda
- Mine Safety and Health Research Advisory Committee (MSHRAC)
- External Program Reviews (2007, 2019)
- National Academy of Sciences Consensus Study & Other Reports
  - *Mining Safety and Health Research at NIOSH, 2007*
  - *A Review of the NIOSH Roadmap for Research on Asbestos Fibers and other Elongate Mineral Particles, 2009*
  - *Improving Self-Escape from Underground Coal Mines, 2013*
  - *Monitoring and Sampling Approaches to Assess Underground Coal Mine Dust Exposures, 2018*
- Multi-Stakeholder Partnerships

# Our Partnership Model for Research

- **NIOSH-MSHA Respirable Mine Dust Partnership**
- MSHA-NIOSH Diesel Exhaust Health Effects Partnership
- **NIOSH Automation & Emerging Technologies H&S Partnership**
- NIOSH Proximity Detection Partnership (completed)
- NIOSH Refuge Alternative Partnership (completed)
- NIOSH Breathing Air Supply Partnership
- NIOSH Rock Dust Partnership
- **NIOSH Miner Health Partnership**



*“Mining research is most effective when it has been done in cooperation with the ultimate users of the research.”*



# Priorities are also guided by policy and the regulatory agenda

Federal Coal Mine Health and Safety Act of 1969, amended 1977

- Established the Coal Workers' Health Surveillance Program

Mine Improvement and New Emergency Response Act (MINER Act) of 2006

- Established the Office of Mine Safety and Health Research (OMSHR) to
  - enhance the development of new mine safety technology
  - expedite technology commercialization and implementation



MSHA current rulemaking topics

- Respirable Crystalline Silica
- Safety Program for Surface Mobile Equipment
- Testing, Evaluation, and Approval of Electric Motor-Driven Mine Equipment and Accessories
- Exposure of Underground Miners to Diesel Exhaust
- Retrospective Study of Respirable Coal Mine Dust Rule (2014)



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**NIOSH Mining Program**  
[www.cdc.gov/niosh/mining](http://www.cdc.gov/niosh/mining)

