

Digging into the Data: Top Occupational Disease Risks in Ontario Mining

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Top Occupational Disease Risks in Mining Industry



1. Silicosis and idiopathic pulmonary fibrosis (lung disease caused by breathing in tiny bits of silica and other very fine dust)



2. Carpal tunnel syndrome (numbness and weakness in the hands)



3. Laryngeal cancer



4. Lung cancer



5. Leukemia and non-Hodgkin's lymphoma



6. Pancreatic cancer



7. Chronic obstructive pulmonary disease (COPD)



8. Colorectal cancer



9. Oral cancer



10. Raynaud's syndrome (decreased blood flow to hands or feet, often due to vibrating equipment or exposure to cold)



11. Acute myocardial infarction (heart attack)



Noise-induced hearing loss (top disease based on approved WSIB claims, but not included in ODSS data)

Key Occupational Diseases to Target for Prevention Purposes



4. **Lung cancer**



2. **Carpal tunnel syndrome**
(numbness and weakness in the hands)



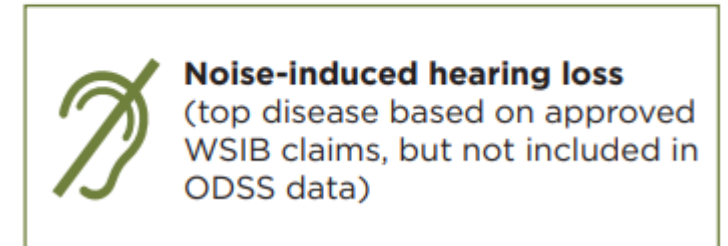
11. **Acute myocardial infarction** (heart attack)



7. **Chronic obstructive pulmonary disease (COPD)**



10. **Raynaud's syndrome**
(decreased blood flow to hands or feet, often due to vibrating equipment or exposure to cold)



1. **Silicosis and idiopathic pulmonary fibrosis** (lung disease caused by breathing in tiny bits of silica and other very fine dust)

- These diseases have well-recognized occupational causes that can be targeted for prevention
- Many of these are common diseases or result in disability or death

Work-Related Cancer and Disease: Occupational Disease Surveillance System

2+ million

workers followed in
Ontario, Canada



**Work history
since 1983**

300+

industries



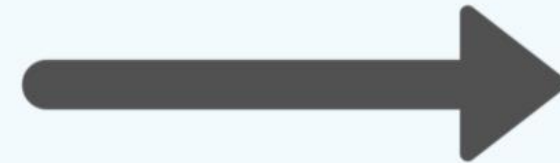
500+

occupations

**Health outcomes
tracked**

28

cancers



9+

non-cancer
diseases



Key Occupational Diseases to Target for Prevention Purposes

	HR (95% CI)
Lung Cancer	1.40 (1.31-1.51)
Chronic Obstructive Pulmonary Disease (COPD)	1.24 (1.13-1.35)
Silicosis	10.6 (6.98-16.1)
Idiopathic Pulmonary Fibrosis	1.84 (1.34-2.51)
Acute Myocardial Infarction (AMI)	1.15 (1.04-1.27)
Carpal Tunnel Syndrome (CTS)	1.59 (1.42-1.78)
Raynaud's Syndrome	1.18 (1.07-1.30)

HR = Hazard Ratio, CI = Confidence Interval

Respiratory Disease in the Mining Master File Compared to Ontario Provincial Rates



Lung Carcinogens

SIR (95% CI)

Lung cancer

1.54 (1.49-1.58)

Chronic Obstructive Pulmonary Disease

2.65 (2.58-2.71)

Silicosis

15.8 (13.2-18.6)

Idiopathic Pulmonary Fibrosis

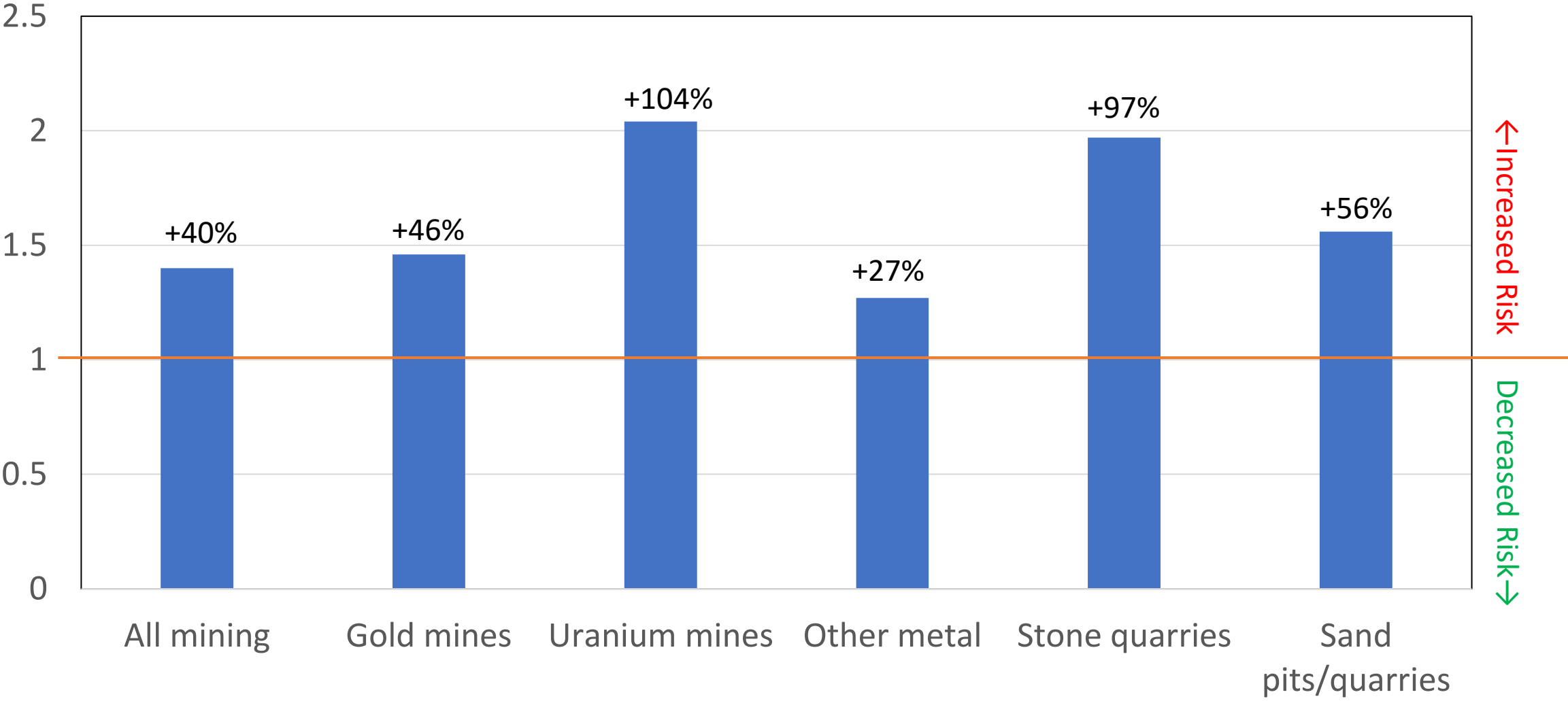
2.69 (2.45-2.95)

SIR = Standardized Incidence Ratio, CI = Confidence Interval

Lung Cancer in Ontario Mining

- Lung cancer is the most common fatal cancer. Approximately 15% of all lung cancers in Canada are due to known, well-studied workplace exposures (24% of male cases, 3.4% of female cases). In mining, these include:
 - Diesel engine exhaust is present at most mines
 - Respirable crystalline silica is common at mines and quarries
 - Nickel from nickel mines and processing
 - Arsenic, which may be encountered in some gold mines
 - Radon was high in uranium mines and may still occur in others
 - Asbestos mines closed long ago, but may still be detected in some mines

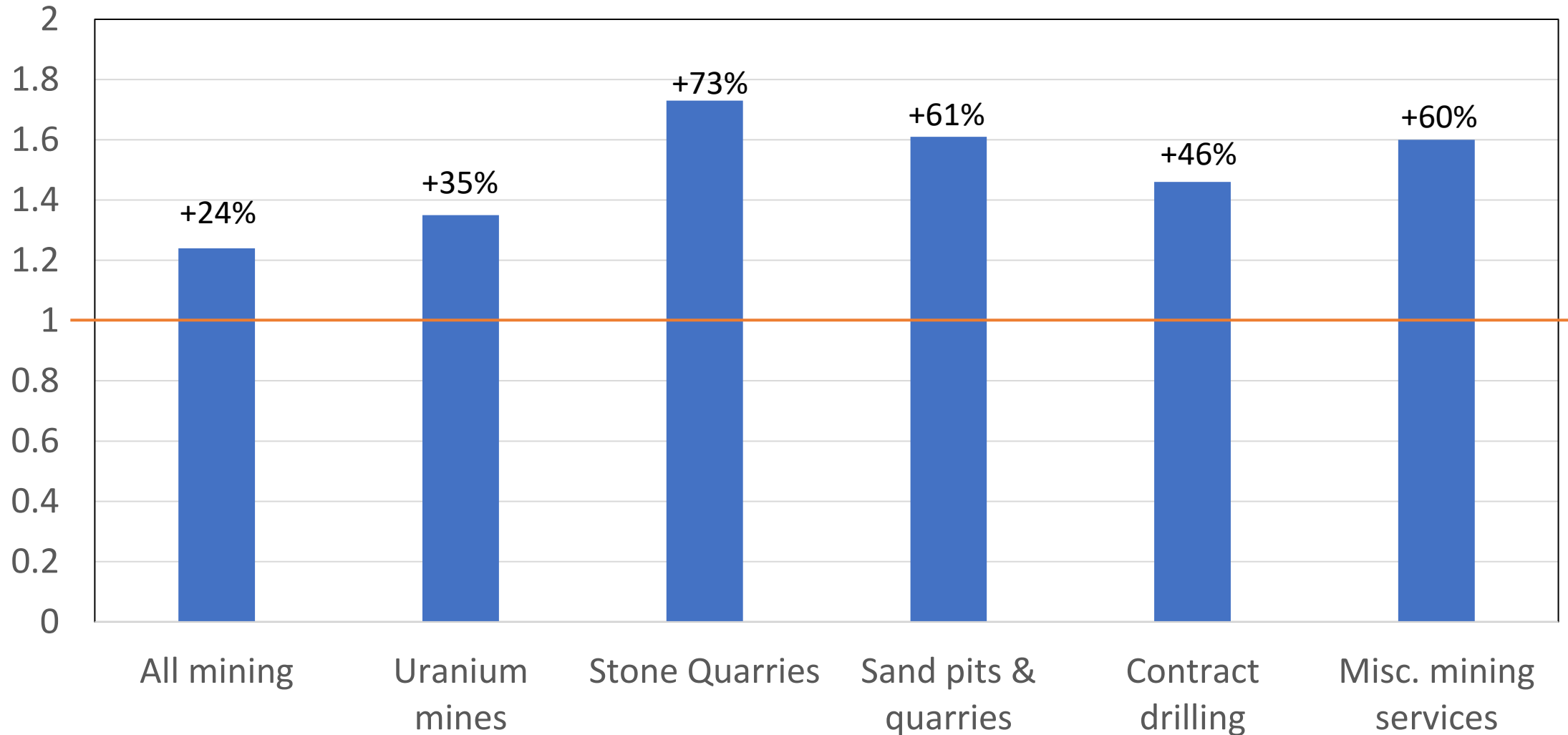
Risk of Lung Cancer by Major Mining Sector



Chronic Obstructive Pulmonary Disease (COPD)

- COPD is the most common chronic respiratory disease in Canada and one of the leading causes of death
- The American Thoracic Society (ATS) and European Respiratory Society (ERS) estimate that 14% of all COPD cases are caused by workplace exposures to dusts, fibres, and fumes. Specific exposures include:
 - Mineral dusts (e.g. silica, coal, and tunneling dusts)
 - Organic dusts (e.g. wood and agricultural)
 - Chemicals (e.g. organic solvents, coke oven emissions, and fumes)

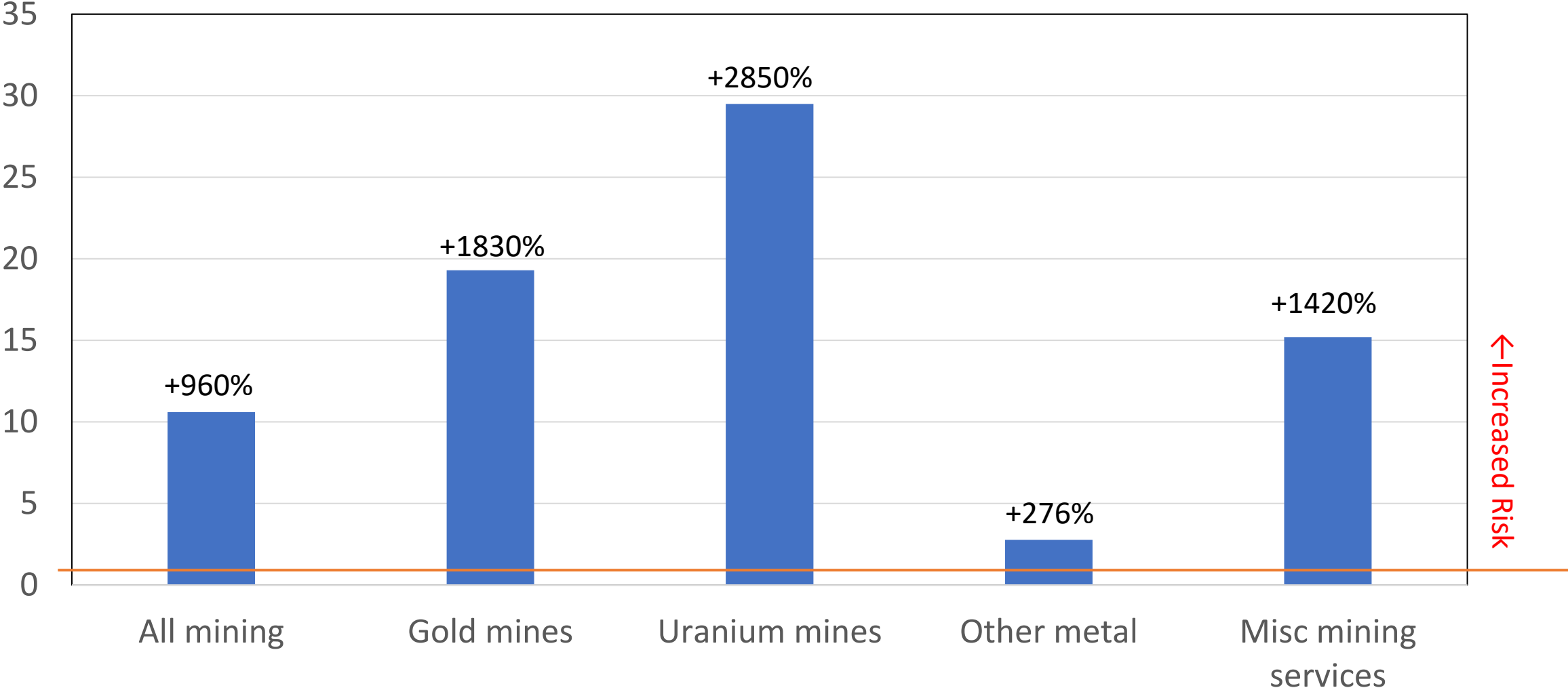
Risk of COPD by Major Mining Sector



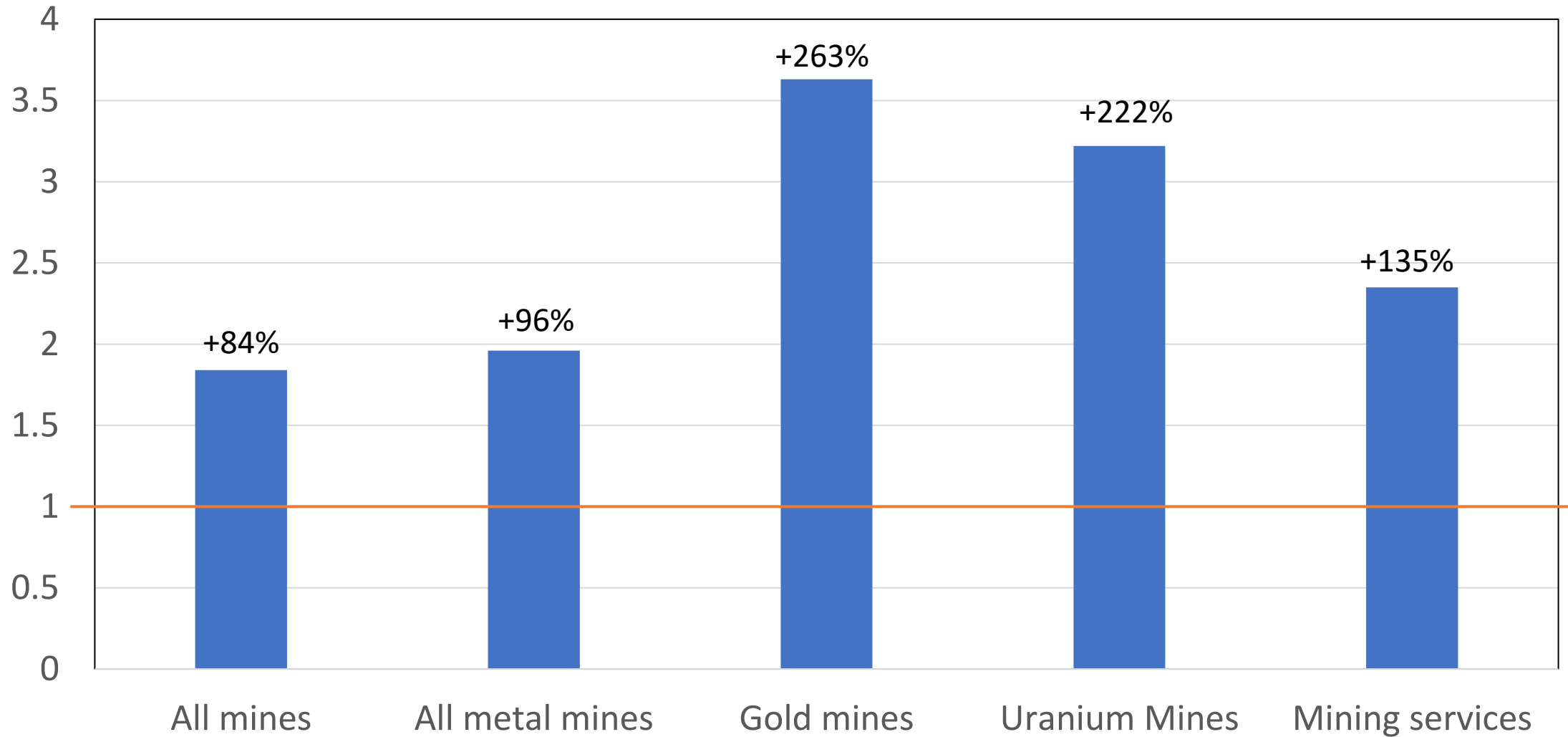
Silicosis and Idiopathic Pulmonary Fibrosis (IPF)

- Silicosis is scarring of the lungs caused by respirable crystalline silica
- Idiopathic pulmonary fibrosis (IPF) is a similar disease where the cause is not known. However, ATS and ERS estimate that 26% of all IPF cases are caused by workplace exposures. Specific exposures include:
 - Metal dust and mineral dusts
 - Organic dusts, such as wood and agricultural
 - More broadly vapours, gases, dusts and fumes (similar to COPD).

Risk of Silicosis by Major Mining Sector

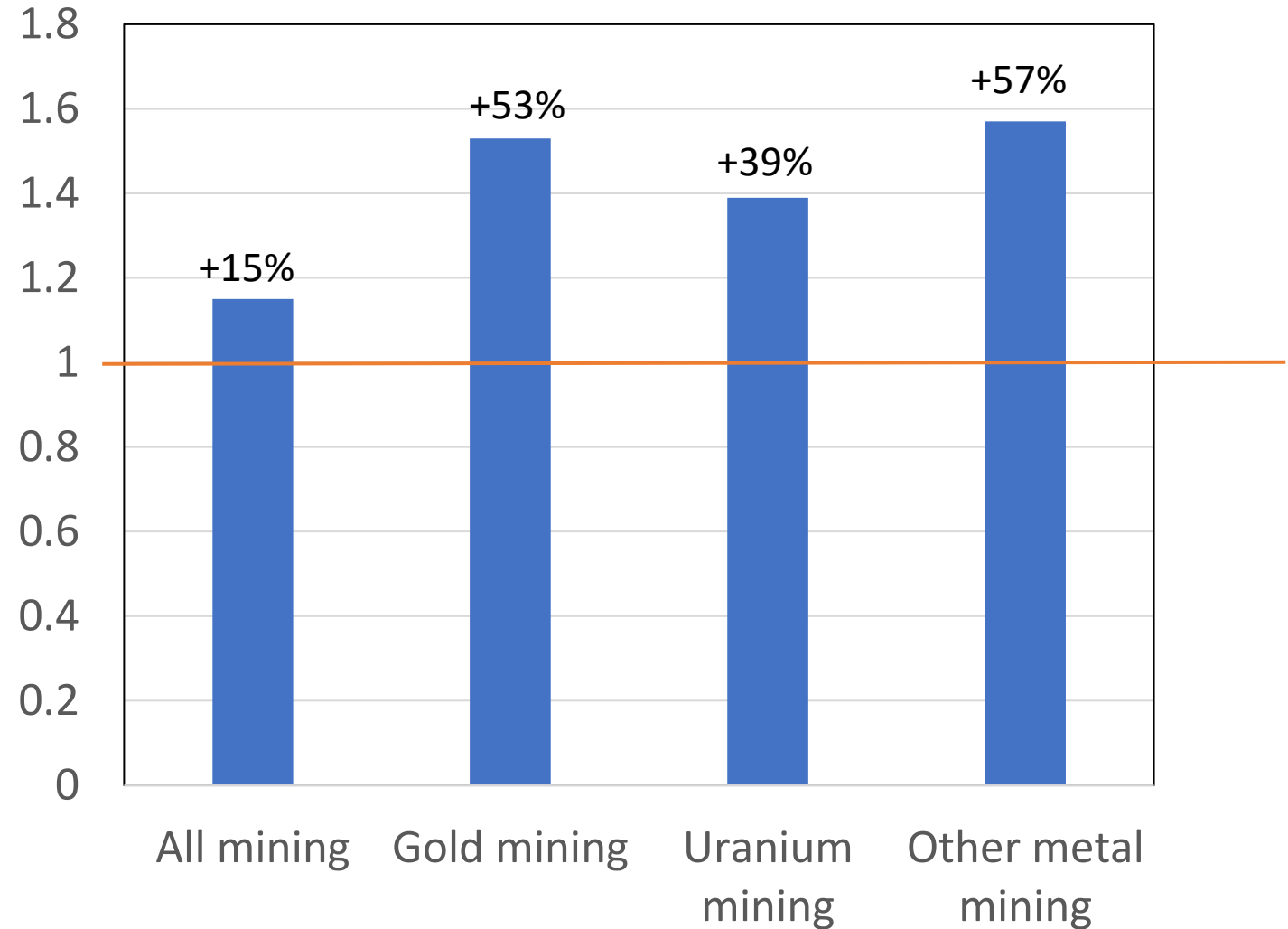


Risk of Idiopathic Pulmonary Fibrosis by Major Mining Sector



Risk of Acute Myocardial Infarction by Major Mining Sector

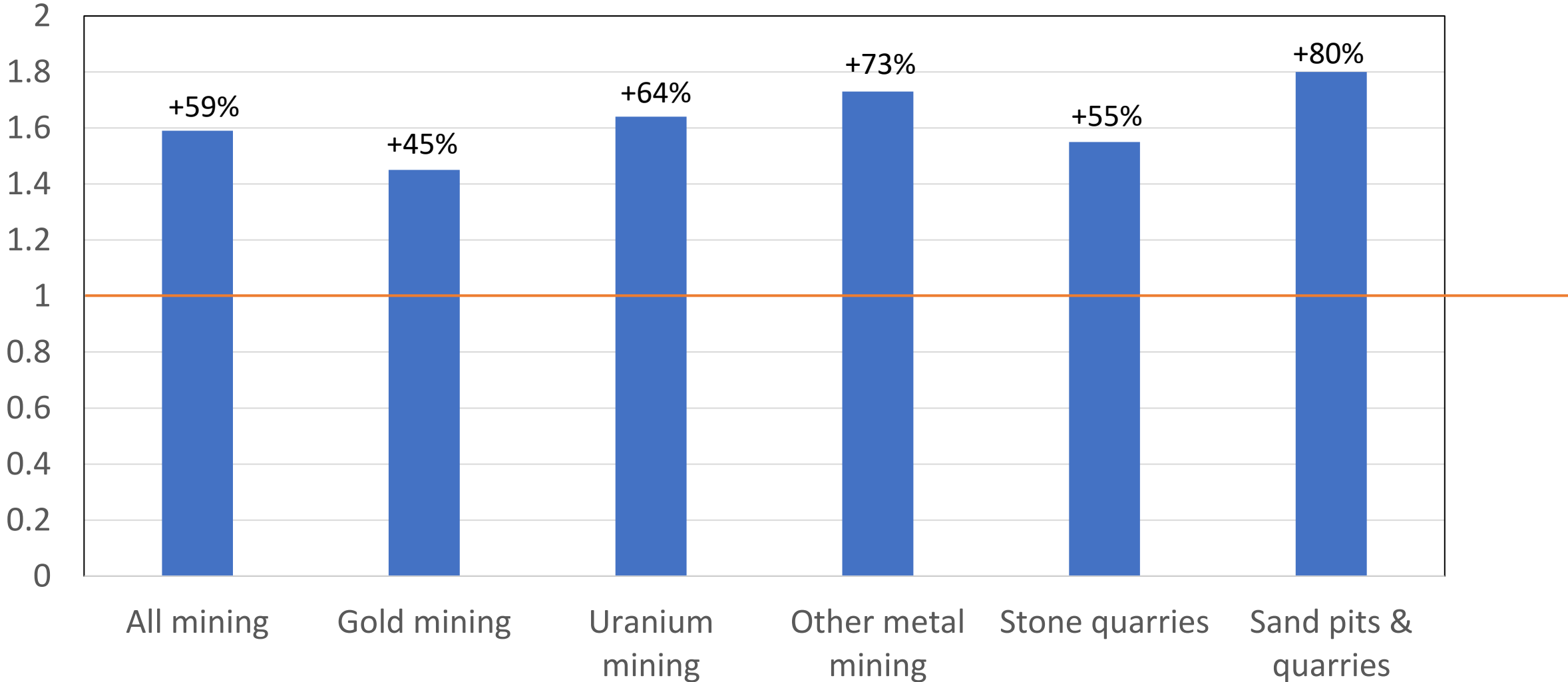
- Acute myocardial infarction, or heart attacks, have been associated with high exposures to:
 - Noise
 - Diesel engine exhausts
 - Fine dust and particles



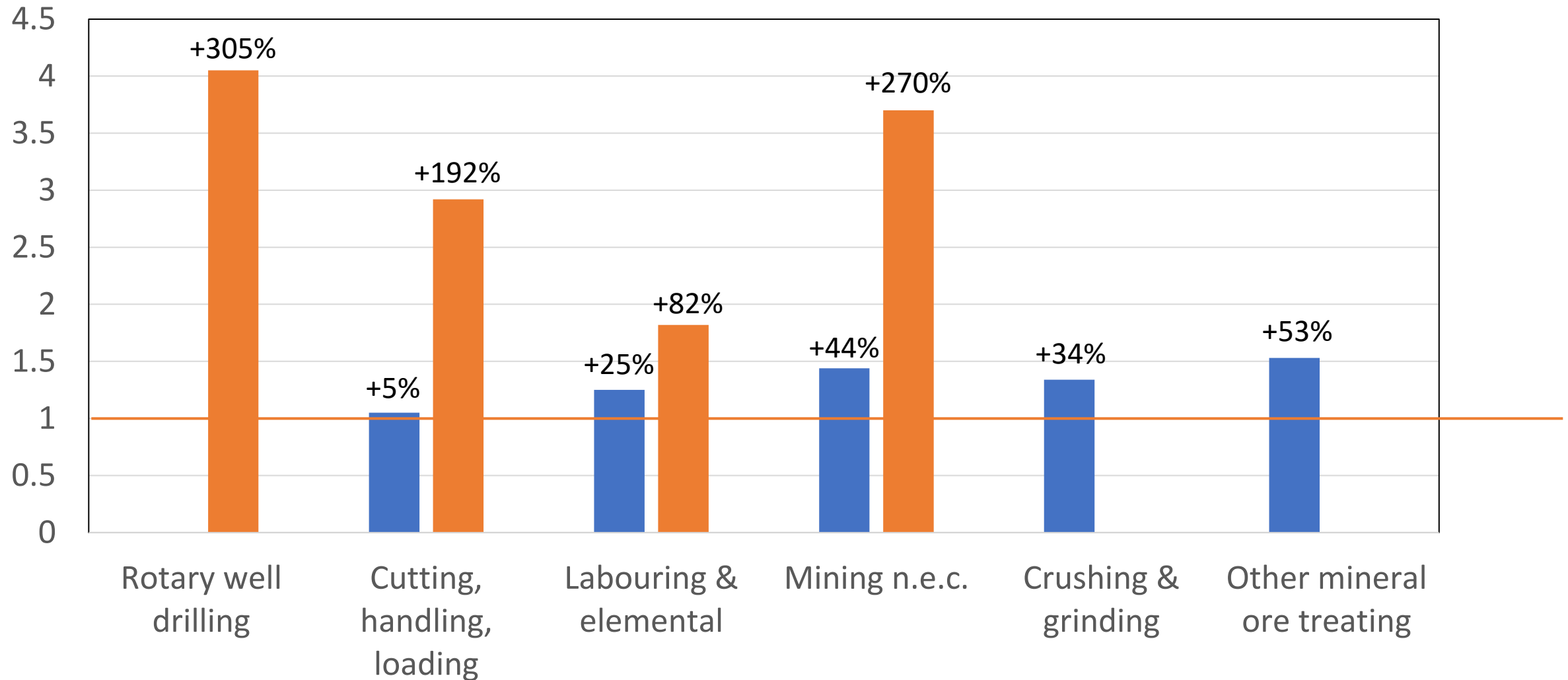
Carpal Tunnel Syndrome and Raynaud's Syndrome

- Carpal tunnel syndrome is caused by compression of the median nerve at the wrist, which can cause numbness, tingling, and pain
 - In mining, it can be caused by repetitive, awkward, and forceful hand movements, vibration from hand-held tools, or mechanical stress on the palm
- Raynaud's syndrome, some time called Raynaud's phenomenon or disease, or white finger is due to poor blood circulation in the fingers
 - In mining, it can be caused by exposure to hand-arm vibration, such as from hand-held power tools or pneumatic rock drills. It can also be caused or exacerbated by cold

Risk of Carpal Tunnel Syndrome by Major Mining Sector



Risk of Raynaud's Syndrome & CTS by Mining Occupation



Conclusions

- Levels of many hazards in mining have decreased over time but an increased risk of occupational disease remains
- Decreasing a single exposure can sometimes reduce risk of multiple diseases, for example:
 - Silica – lung cancer, silicosis, IPF, and COPD
 - Diesel engine exhaust – lung cancer, acute myocardial infarction, and COPD
 - Noise – hearing loss and acute myocardial infarction
 - Vibration – Raynaud's syndrome and carpal tunnel syndrome

Thank You!
Questions?