

# Pennsylvania Occupational Safety and Health Surveillance (PennOSHS) Student Research Project

Division of  
Environmental Health  
Epidemiology

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**pennsylvania**  
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# Executive Summary

Many high school students have part-time work positions and may go on to accept jobs in their communities after graduation. In Pennsylvania, according to the U.S. Bureau of Labor Statistics (BLS), 41% of non-institutionalized civilians aged 16-19 years were employed in 2021, not including volunteer or non-paid internships (BLS, July 2022). Both paid and unpaid jobs come with occupational hazards that may lead to injury or illness. Young workers are especially vulnerable due to their lack of work experience and safety training (Centers for Disease Control and Prevention [CDC], August 2022). The Pennsylvania Occupational Safety and Health Surveillance (PennOSHS) Program at the Pennsylvania Department of Health (PA DOH) aims to prepare Pennsylvania youth to optimize their future workplace safety and health. One strategy to accomplish this aim was the facilitation of student research projects focused on occupational health.

In Summer 2022, PennOSHS identified areas in the state where students may be more likely to pursue high-risk trade and blue-collar jobs and contacted local high school teachers/non-profit education organizations to gauge interest in participating in a student research project. For the project, each student was required to choose an industry and write a one-page summary on their selected industry's occupational health and safety (e.g., most frequent injuries/illnesses, identification of hazards and mitigation, and OSHA regulations) and potential community impact. PennOSHS developed support materials for teachers and students, including a comprehensive presentation on occupational health and safety, resource guide with reputable websites, and a project guide with pre-defined research questions and formatting instructions. A monetary incentive was provided to participating teachers.

Four teachers at two trade and one public high school implemented the project during the 2022–2023 school year. Teachers attended a one-hour virtual workshop in October 2022 to review project materials. Following the workshop, teachers shared that they were enthusiastic to participate in the project and engage on occupational health issues with their students. Teachers administered the project to approximately 300 high school students during the remainder of the school year with a timeline that fit their curriculum.

In May 2023, each teacher selected the most comprehensive and well written student project summaries and submitted them to PennOSHS. The following report highlights the schools and courses where the project was implemented, and the 12 industries students chose to research. Ten student project examples are included in the report.

After project submission, PennOSHS administered a survey to gain feedback from the teachers to improve the project for the 2023–2024 school year, including the addition of an occupational health data component and flexibility to allow student creativity when reporting on findings. Increasing high school students' occupational health and safety awareness equips the future workforce with knowledge to advocate for safer and healthier work environments.

# Background

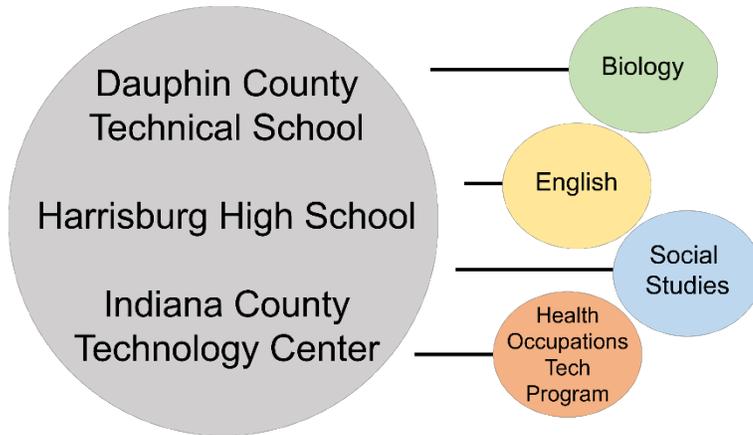
Many young adults seek work experience during high school or following high school graduation. Due to young peoples' limited experience in the workforce and exposure to occupational safety training, they are at greater risk of job-related injury and illness (Centers for Disease Control and Prevention, August 2022). In 2021, there were 24 fatal occupational injuries to workers in the United States under 18 years of age (BLS, December 2022). Compared to the national average of 1.7, the rate of nonfatal work-related injuries and illnesses among all workers that resulted in days away from work, job transfer or restriction in private industry in Pennsylvania (PA) was 1.8 (BLS, October 2023). Further, in 2021, the rate of work-related inpatient hospitalizations of young workers was 8.7 per 100,000 employed Pennsylvanians 16–19 years of age. The rate of work-related inpatient hospitalizations per 100,000 employed persons greater than 19 years of age was 40.4 (PA Health Care Cost Containment Council, n.d.; BLS, July 2022). A comparison of work-related hospitalizations among 26 states in 2017 of workers 16 years and older showed that PA had the 10<sup>th</sup> highest rate of 75 per 100,000 workers, with the highest rate reported by New Mexico of 191.7 and lowest rate reported by New Hampshire of 36.2 (CSTE, October 2023).

Given young workers' vulnerability to adverse occupational health and safety outcomes, PennOSHS facilitated a student project at PA high schools to prepare youth to maximize and protect their workplace safety and health. Students were asked to conduct a literature review for an industry of interest and answer at least one of the following research questions:

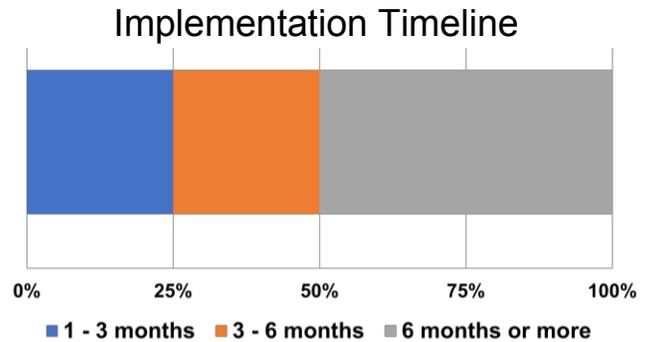
- *What are the top 10 occupational injuries and illnesses associated with your industry?*
- *What are the OSHA guidelines and regulations associated with your industry?*
- *As an employer in your industry, how can you increase occupational health for your employees?*
- *As an employee in your industry, what workplace hazards should you be aware of and how can you mitigate the risks associated with those hazards?*
- *Looking at the broader picture, how does increasing occupational health impact overall wellness?*

This report describes the results of the implementation of this initiative and includes a 2022–2023 project summary and student project examples. For other states looking to explore a similar occupational health project with students, please see the Appendix for PennOSHS project support materials (including a PDF of an occupational health presentation, student-project guideline and template, teacher responsibilities, and industry-specific resources for students).

# 2022–2023 Academic Year Project Summary



**Four** teachers implemented the project to ~ **300** students



## Student Research Findings

PennOSHS received 98 student projects that examined the 12 industries shown in the table below. The table also displays the most common injury or illness associated with each industry, aligning with one of the possible research questions students were given.

Table 1: Most Commonly Reported Injury or Illness by Selected Industry

Industry	# of Projects	Most Common Injury/Illness Reported
Health Care and Social Assistance	24	Stress (7; 29%)
Construction	22	Fall-related injuries (13; 59%)
Professional, Scientific, and Technical Services	18	Muscle pain (10; 56%)
Other Services	16	Fall-related injuries (5; 31%)
Accommodation and Food Services	6	Cuts (5; 83%)
Public Administration	4	Stress (3; 75%)
Manufacturing	3	Cuts (2; 67%)
Administrative and Support & Waste Management and Remediation Services	1	Heat exhaustion (1; 100%)
Agriculture, Forestry, Fishing and Hunting	1	Pesticide poisoning (1; 100%)
Arts, Entertainment, and Recreation	1	Respiratory illness (1; 100%)
Educational Services	1	Carpal tunnel syndrome (1; 100%)
Transportation and Warehousing	1	Muscle strain (1; 100%)

## Teacher Evaluation Findings

A 17-question teacher evaluation survey was fielded in May 2023. All four teachers who participated reported that adequate support was provided by PennOSHS, guidelines were easy to understand, and that they would participate in the project again the following year. All teachers reported that student engagement with the project was a 3 or greater on a 1 – 5 scale (with 5 being most engaged). To increase student engagement teachers recommended offering prizes for best projects and allowing for additional creative ways to complete the project, such as a data component.

## Student Project Examples

The following pages provide examples of student projects from the 2022–2023 school year. The content of these projects are in the words of the student and reflect true project submissions to the PennOSHS program. Additionally, projects shown highlight the many avenues students took in answering the research questions. Project authors are anonymous.

Industry: Masonry	6
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## Industry: Masonry

This research was completed by five senior students in a Health Occupations Technology program. The students presented their research findings to peer students in the masonry program to raise awareness of the occupational hazards in their chosen field.

**Research Question:** *What are the top ten occupational injuries and illnesses associated with your industry?*

- Silica is a mineral found in sand, quartz, and rock.<sup>1</sup>
- Approximately 2.3 million people in the United States are exposed to silica at work.<sup>2</sup>
- Many materials that a mason works with has the ingredient silica in it.<sup>3</sup>
- Silicosis is a form of pulmonary fibrosis that causes lung scarring related to silica exposure.<sup>1</sup>
- Silicosis is preventable but is not an irreversible lung disease.<sup>2</sup>

**Research Question:** *What are the OSHA guidelines and regulations associated with your industry?*

- About two million construction workers are exposed to respirable crystalline silica in over 600,000 workplaces.<sup>4</sup>
- Small dust particles are created from crystalline silica when it is broken down. These particles can travel into workers' lungs and cause silicosis, which is an incurable and sometimes deadly lung disease.<sup>4</sup>
- A control method or plan is used as a standard to protect construction workers by measuring the amount of exposure.<sup>4</sup>
- Maintaining dust control systems and using wet control methods limits dust present in the work area.<sup>5</sup>
- Using an efficient respirator when the exposure levels are below the NIOSH recommended exposure limit (REL) can limit the amount of exposure to the lungs.<sup>6</sup>

**Research Question:** *As an employer in the industry, how can you increase occupational health for your employees?*

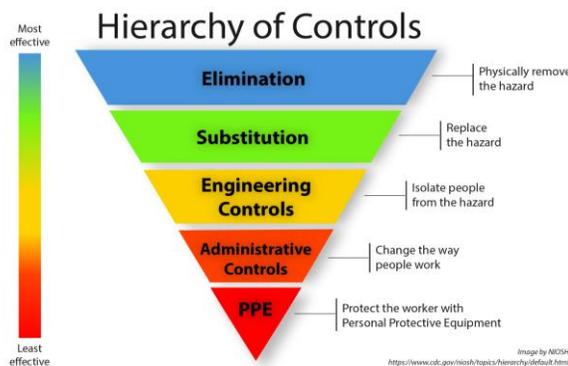
- Elimination is removing a hazard from the workplace, and it is the number one technique in the Hierarchy of Controls. When hazards are removed, they no longer can harm employees.<sup>6</sup>
- Substituting a hazardous material with a less hazardous material is the second most effective way to increase occupational health of your employees. It serves a similar purpose as elimination and can oftentimes be less expensive.<sup>6</sup>
- Engineering controls are a way to physically separate employees from hazards. Many organizations would rather remove a hazard at the source versus after the employee comes into contact with the source.<sup>6</sup>
- Administrative controls are changing the way employees perform particular processes. This type of control is typically used alongside other existing processes.<sup>6</sup>
- Personal protective equipment (PPE) is used while the employee is performing their work. This is typically used alongside other preexisting processes and can be ineffective if not used properly.<sup>6</sup>

**Research Question:** *As an employee in the industry, what workplace hazards should you be aware of and how can you mitigate the risks associated with those hazards?*

- In the field of masonry there is a risk for developing various types of cancer and lung diseases from the breathing in of hazardous chemicals. Some of these chemicals include cement lime, chemical grouts, and additives. <sup>4</sup>
- To decrease workplace hazards in the field of masonry, use the proper PPE. <sup>7</sup>
- Employers should provide N95 half face respiratory protection, monitor exposure time, and provide screenings. <sup>5</sup>

**Research Question:** *Looking at the broader picture, how does increasing occupational health impact overall wellness?*

- Chronic lung disease and silicosis typically occurs 10 or more years after exposure. <sup>2</sup>
- Silicosis, lung cancer, chronic obstructive pulmonary disease (COPD), and kidney disease can occur. <sup>2</sup>
- Dealing with chronic health issues related to silicosis has a large impact on overall wellness and can lead to diminished quality of life.
- Since silica exposure and silicosis are preventable, follow current guidelines and wear the appropriate PPE.
- Increasing occupational health awareness can assist in prevention of work-related injuries and illnesses.



## Industry: Food Services <sup>8</sup>

**Research Question:** As an employer in your industry, how can you increase occupational health for your employees?

- Many chefs can get diseases from handling raw meat. This can be prevented by giving workers gloves and ensuring sanitary conditions.
- Many workers have to stand up for long periods of time or are in awkward positions for a long time. This can be avoided by allowing workers to sit down or stretch when it gets less busy.
- Workers in kitchens work with sharp objects that can become a safety hazard. This can be prevented by giving proper training to employees on how to use the equipment. Also, if the equipment is well-maintained, it is more likely to work properly.
- Cooks work with high heat and fire which can cause damage if cooks are not trained properly. This damage can be prevented if there are proper safety procedures for fires. Also, if cooks are trained properly, they will know how to act during a fire emergency.

**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

The top 10 occupational injuries and illnesses associated with the nursing industry are sprains, strains, tears, slips, trips, falls, back pain, skin to skin contact with body fluids that could make you ill, violence from a patient, and sharps injuries.

- Many of the physical burdens that occur in nursing are straining your muscles. This includes back issues, or knee injuries. A mental burden that comes with nursing is being overworked. Many nurses are tired, and they are understaffed so they get scheduled more hours than they sleep.
- Many employees are exposed to harmful chemicals including cleaning products, sterilizers, and disinfectants.
- In the short term, high physical burden on nurses can lower performance levels. Long term effects can include nerve damage, back pain, and spine injuries. You can also get arthritis in your knees.

**Research Question:** As an employee in your industry, what workplace hazards should you be aware of and how can you mitigate the risks associated with those hazards?

- **Struck-by hazards** occur when a worker is struck by an object, whether it is falling, flying, slipping/sliding, or at ground level, such as heavy equipment. These hazards can be mitigated by wearing the correct personal protective equipment, storing and handling all materials properly, and making sure to have a clean and safe work zone.
- **Electrocution hazards** can occur from coming in contact with power lines, lack of ground-fault protection, and improper use of electrical equipment. These hazards can be prevented by always using caution when working near electricity, making sure power lines are a safe distance away or properly disconnected, wearing the proper protective equipment, properly using electrical equipment, and having proper grounding systems for any electrical lines in use.
- **Caught-in hazards** occur when a worker gets stuck or caught in a piece of equipment or a trench. These hazards can be prevented by making sure to never put yourself between a piece of heavy equipment and an immovable object, keeping clothes and body parts clear of moving parts of tools or machines, and putting up the proper barricades needed when operating heavy equipment or working near a trench.
- **Fall hazards** occur in all workplaces. They occur when something causes you to lose your balance and fall. Working at heights of four feet or higher results in a greater risk. These hazards can be prevented by wearing the proper fall protection equipment, keeping your workplace clear, and being cautious when working on or around elevated platforms.

**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

- The top 10 occupational injuries and illnesses associated with carpenters are falls, injuries from falling objects, hand fractures, eye injuries, lacerations, amputations, joint injuries, herniated disks, and concussions. Block O'Toole & Murphy give many examples such as these ones and ways to prevent them and stay safe.<sup>11</sup>
- Carpentry can be very physically and mentally demanding. Carpenters are frequently standing for long periods of time, bending and twisting their body, kneeling, crouching, and crawling several times a day. Carpentry is more physically demanding, but there are still mental burdens such as high levels of stress.
- For carpenters, it is common to develop some form of lung disease from breathing in asbestos. They work indoors and outdoors doing trim, cabinets, framing, and concrete pouring.
- Short-term injuries for carpenters often include lacerations and sickness from being exposed to outdoor elements. Long-term injuries would include lung cancer from breathing in asbestos and mold. It could also include herniated disks from twisting the body so frequently. Amputations from using a saw would also leave long-lasting effects.

**Research Question:** As an employer in your industry, how can you increase occupational health for your employees?

- Personal Protective Equipment (PPE) – “Prevention is better than cure.” HVAC is a job with a lot of hazards. The first step employees need to take to protect workers is to strictly enforce the wearing of PPE. Steel-toe or composite-toe boots, long pants and a long-sleeve shirt, a hard hat, safety goggles or glasses, and a face shield are must-haves to work in this industry.<sup>15</sup>
- Electrical Safety – For worker safety, employers need to enforce using Lock Out Tag Out. Some components cannot be worked on while energized. Enforcing the use of this could be the difference between someone getting electrocuted or a job getting completed.
- Chemical Safety – When working with chemicals, employers need to keep updated Material Safety Data Sheets (MSDS) on all chemicals used. Breathing masks need to be provided when working with harmful chemicals, especially in tight and confined spaces that aren’t as ventilated. Leaks checks on chemical containers need to be frequent.
- Workers’ Health – Workers need to have scheduled breaks when working. These breaks need to be enforced. Also, when working with chemicals, areas need to be ventilated. When working with loud equipment, hearing PPE such as ear plugs or earmuffs should be provided.
- Proper Certifications – Equipment needs to be frequently checked. Make sure all workers are certified and understand how to perform their tasks safely and properly. If a worker does not have EPA 608 refrigerant certification, they cannot work with refrigerant, for legal and safety reasons.<sup>16</sup>

**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

Many people who work in the dental field face the risk of being exposed to various dangerous situations and chemicals. They are more likely to be vulnerable to injuries since they are not aware of the potential risks in the work field.

- Dentistry's top ten occupational injuries and illnesses include the following: back pain, eye strain/visual problems, stress, musculoskeletal disorders (joint pain), latex allergies, repetitive strain injury, percutaneous injuries, bloodborne pathogens such as hepatitis and HIV, radiation exposure, and handling hazardous waste materials (e.g. amalgam/mercury, x-ray solutions, and extracted teeth).
- The physical burden that exists in dentistry is repetitive motions which lead to joint pain, and poor ergonomics such as posture. Mental responsibilities include stress from patient management and treatment outcomes, workload and time pressure, always having a positive attitude, and managing patient schedules with the doctor.
- Too much radiation can damage the DNA in our cells. High doses of radiation could cause acute radiation syndrome (ARS) or cutaneous radiation injuries. High doses of radiation could also lead to cancer later in life.

**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

Injuries and illnesses in firefighting can range from a simple sprain to living life with career ending cancer.

1. Sprains and strains are caused by the men and women in this occupation overexerting themselves to do their assigned tasks.
2. Exposure to chemicals, environmental elements, and radiation, are huge parts of illness in firefighting. This occupation is the most likely to deal with exposure to chemicals every time there is a fire, and they are working in the toxic smoke being produced by all the burning materials.
3. Being struck by objects is another injury that can occur on the job. In 2021, a firefighter was struck by an air conditioner unit that fell from the window of the building on fire.
4. Motor vehicle accidents (MVA) cause injury to firefighters if they are working on an MVA and become injured, or they are involved in an accident themselves causing injury.
5. Smoke inhalation is a common reason firefighters are transported to the hospital after a fire. Firefighters are working in the middle of smoke and heat of the blaze they battle, causing them to inhale smoke. Also, protective equipment malfunctions could cause smoke inhalation.
6. Cancer is a risk in firefighting studies. Cancer affects many firefighters for years after their time in duty.
7. Cardiac episodes affect firefighters severely by overworking their hearts. These episodes could cause sudden cardiac arrest or needing stents placed.
8. Mental illness can be highly present in a first responders' career. Studies focus on firefighting with things they see in a scene. Firefighters see it all, from deaths in a car accident to someone badly burned in a fire.
9. Falls, trips, and slips are common in firefighting. In this occupation you could suffer a fall from a ladder, a building collapse, or falling over tools or a firehose.
10. Hearing loss is caused by working with loud equipment like saws and power tools. Sitting in the firetrucks with the loud sirens blaring in the background while heading to calls is another cause.

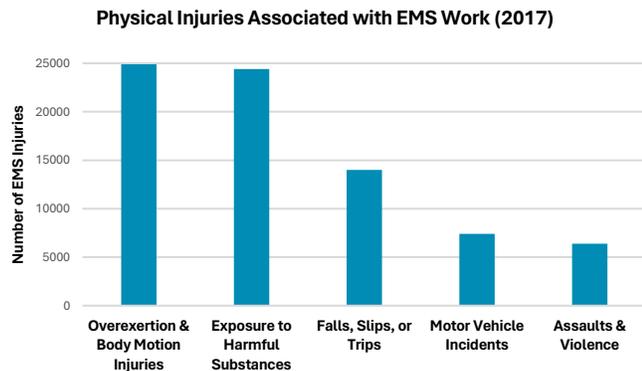
**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

Saving others, but at what cost?

Every single day, EMS workers are put into dangerous situations for the sake of others. There are hundreds of health risks that come along with these jobs. I'm going to list the top 10 occupational injuries and illnesses associated with emergency medical services.

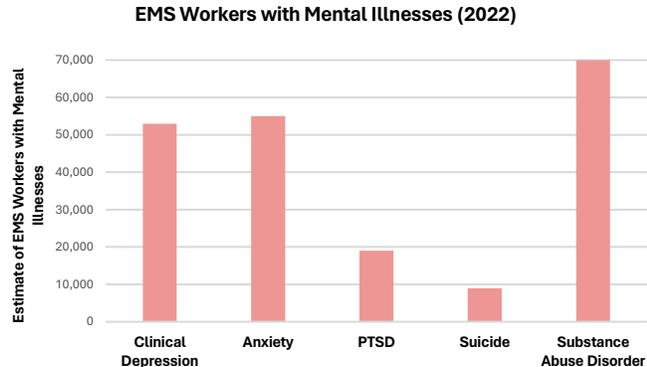
The top 5 physical injuries associated with EMS work: <sup>22</sup>

- Overexertion and body motion injuries
- Exposure to harmful substances
- Falls, slips, or trips
- Motor vehicle incidents
- Assaults and violence



The top 5 mental illnesses associated with EMS work:

- Clinical depression
- Anxiety
- Post-traumatic stress disorder (PTSD)
- Suicide
- Substance abuse disorder



EMS workers deal with a lot of hazards, and they see a lot of gruesome, horrid things too. EMS workers have to constantly lift heavy items, and some are tasked with potentially overworking themselves for someone else's needs. While on the job these workers are left to deal with hazardous substances at times and even with protective gear, they can still be exposed. The workers are also exposed to dangerous environments, including unstable structures, natural disaster zones, and other challenging terrains. These workers are also challenged with high-speed driving to get from location to the next, and it isn't always safe. When picking up patients, workers sometimes don't know what to expect; the person could be on drugs, they might be violent, or they also might refuse care. These are just the physical

injuries, not to mention the menagerie of mental illnesses that EMS workers can acquire from the toll taking job. It's not a safe job, EMS workers put their lives at risk constantly.

## Industry: Veterinary Services

**Research Question:** What are the top 10 occupational injuries and illnesses associated with your industry?

- Animal Handling/Restraint
  - Within this field, it is likely to get bitten. I was bitten by a dog within my first month of working in a veterinary clinic. Neither I nor the technician I was assisting were expecting it, and the dog just suddenly bit my hand that was in the dog's face. Dog bites can be prevented by learning how to read a dog's behavior, by telling if they are stressed, anxious, frightened, or threatened.<sup>27</sup> Dogs will also bite if they are in pain, or not feeling well.
- Musculoskeletal Strain and Muscle Fatigue
  - At a veterinary clinic you are bending down, lifting patients, looking and leaning over a computer, and straining your back.<sup>28</sup>
- Ionizing Radiation
  - The risk of being exposed to radiation in this field is high. With handling animals to get x-rays and having to restrain them, radiation exposure is possible.
  - Reasons of why people in the veterinary industry are exposed to radiation:
    - Use of older equipment
    - Poorly maintained equipment
    - Inadequate use of protective garments <sup>28</sup>
- Hearing Loss
  - Hearing loss can be common in a veterinary facility due to barking dogs in kennel areas. It is recommended that those who are working in areas with barking dogs use ear protection, such as ear plugs or earmuffs, to help prevent hearing loss.<sup>29</sup>
- Stress/Suicide
  - The veterinary field is challenging even though many people think that all veterinarians do is play with puppies and kittens all day. But that is the opposite – they work with clients who are grieving the loss of a pet, and then have to go into an appointment of a client with a new pet. Veterinarians have one of the highest suicide rates out of other professions. One out of six vets have considered suicide and women who are vets are 2.5 times more likely to die by suicide than the general population.<sup>30</sup> Men who are vets are 1.6 times more likely.<sup>30</sup>
  - If you or someone you care about are having any suicidal thoughts/actions, please call the Suicide and Crisis Lifeline at 988.

## Looking Ahead

PennOSHS will implement a second round of the high school student research project in the 2023–2024 school year. The project will be updated based upon teacher feedback, which was collected during the follow-up evaluation at project completion. Specifically, an additional BLS data component to enhance literature review findings will be added. This update will allow students to explore current and past occupational health data, consider additional research questions based on findings, and use creative skills in data visualization for inclusion in one-page summaries.

PennOSHS is dedicated to continuing to improve the occupational health of populations entering the workforce. Bringing occupational health awareness to students in the classroom would not have been possible without both teacher commitment and student participation. We thank all teachers and students that made the first year of the PennOSHS student research project a success.

Additional resources are available to support a larger cohort of teachers, and materials will be updated to reflect feedback from the 2022–2023 teacher cohort. If you are interested in participating in upcoming student occupational health projects, please reach out to us at [dehe@pa.gov](mailto:dehe@pa.gov).

Funding for this work came from the NIOSH state-based occupational health and safety surveillance program (U60OH012280-02-00). For more information regarding PennOSHS, please visit PennOSHS ([pa.gov](http://pa.gov)), email [dehe@pa.gov](mailto:dehe@pa.gov), or call 717-787-3350.

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# Project Materials

Below is a list of five primary research questions for your students to explore. At a minimum, students should explore 1 primary research question (indicated in bold). The sub-bullets are guides that can be used to answer the primary research questions. Please note, sub-bullets do not need to be answered in full for the research question to be considered complete. Additionally, sub-bullets are not exhaustive, and we encourage students to come up with their own ideas for answering the primary research questions.

*Primary Research Questions:*

*Note: All questions are specific to a group's chosen industry.*

- 1. What are the top 10 occupational injuries and illnesses associated with your industry?**
  - What physical and mental burdens exist?
  - Are employees exposed to chemicals, environmental elements, or biological agents?
  - What are the short-term vs. long-term effects of exposure or repeated physical burdens?
- 2. What are the OSHA guidelines and regulations associated with your industry?**
  - Summarize guidelines and regulations
  - What do the guidelines and regulations mean for employee safety?
  - What are the consequences when OSHA guidelines and regulations are not met (e.g., health and safety consequences, economic implications, etc.)?
  - What is missing from OSHA guidelines and regulations?
- 3. As an employer in your industry, how can you increase occupational health for your employees?**
  - As an employer in a specific industry, how do you ensure employee safety while maintaining company success?
  - Identify a hazard and follow the hierarchy of controls to create a safe workplace environment
  - If you provide a safe workplace for your employees, how will this benefit your company in the short and long term?
- 4. As an employee in your industry, what workplace hazards should you be aware of and how can you mitigate the risks associated with those hazards?**
  - What types of hazards should you be able to recognize (i.e., physical, chemical, biological)? How might these hazards change depending on the work environment (i.e., highway construction in the winter vs summer)
  - How do you respond to hazards to keep both you and your coworkers safe?
  - If you neglect to follow safety procedures, how might this put you and your coworkers at risk?
  - What types of personal protective equipment do you need to use for a job(s) in this industry?
- 5. Looking at the broader picture, how does increasing occupational health impact overall wellness?**
  - How does protecting yourself and others from occupational hazards influence your family's or community's wellbeing?
  - If you were to neglect occupational health, what consequences might that have on other areas beyond your own wellbeing?
  - Has your industry garnered significant attention around occupational or environmental health issues? Why or why not? Are there actions that can be taken to raise awareness?

*Optional Reflection:* How has this project influenced your current Co-op or impression of past work experiences in terms of occupational safety and health? How can you take what you have learned from this project to prepare yourself for potential occupational health risks in the future?

***The following page is a guide for the 1-page summaries (please include all research questions explored).***

At the top of the page please include

- School name
- Course
- Teacher
- Industry (industry explored for the project)

For each research question explored, please type out the research question first. Follow the below instructions for summarizing the answer to the research question:

- Use 3-5 bullet points on major findings
  - More than 5 bullet points can be used, but please remain within the 1-page limit
- Stick to the 5 primary research questions; do not include the optional reflection question within the 1-page summary
- Findings do not have to be in complete sentences, but must be comprehensive
- Do not use specific names of companies or employers
- Along with bullet points, we encourage students to try and summarize their findings in an infographic or visual representation, but this is not mandatory. Infographics can be submitted on a separate page or included within the 1-page limit.
- Include in text citations as numbered superscripts, e.g., <sup>1</sup>
- Please include a bibliography in APA style on a separate and final page

Appendix:

Table 1: A list of industries and trustworthy sources for students to explore when conducting literature reviews, students should choose an industry sector that is bulleted. Sources include links to scientific articles, news articles, documents and fact sheets from government agencies, and relevant webinars are also included.

Using the search function on [National Institute for Occupational Safety & Health \(NIOSH\)](#) and [Occupational Safety and Health Administration \(OSHA\)](#) sites are also recommended.

Industry	Sources (break up into source type)
<p>Agriculture, Forestry, and Fishing</p> <ul style="list-style-type: none"> <li>• Crop production</li> <li>• Animal production</li>   <li>• Fishing</li>   <li>• Logging</li> </ul>	<p><a href="#">Agricultural Operations</a> (website)  <a href="#">Agricultural Safety</a> (website)  <a href="#">Agricultural Health</a> (website)  <a href="#">Epidemiology of Health and Safety Risks in Agriculture and Related Industries</a> (scientific article)  <a href="#">Youth in Agriculture</a> (web-based training tool)  <a href="#">Supporting Agricultural Worker Health</a> (video)  <a href="#">Farm Worker Health and Hygiene Basic Rules</a> (video)  <a href="#">Agricultural Worker Fact Sheets &amp; Reports</a> (fact sheets &amp; reports)</p> <p><a href="#">Commercial Fishing Safety</a> (resource webpage)  <a href="#">Commercial Fishing Fall Protection Safety</a> (fact sheet)  <a href="#">Health in Fishing Communities</a> (scientific article)  <a href="#">Fishing Safety Occupational Hazards</a> (website)  <a href="#">Space Safety on Commercial Fishing Vessels</a> (fact sheet)  <a href="#">Health Risks in Commercial Fishermen</a> (scientific article)  <a href="#">Fishing and Hunting Workers</a> (resource webpage)</p> <p><a href="#">Logging Overview</a> (website)  <a href="#">Preventing Injuries and Deaths of Loggers</a> (website)  <a href="#">Logging Safety</a> (website)  <a href="#">Occupational Safety and Health Concerns in Logging</a> (scientific article)  <a href="#">Logging Equipment Operation</a> (website)  <a href="#">Logging Workers</a> (resource webpage)  <a href="#">Health and Disease Factors among Logging Workers</a> (scientific article)</p>
<p>Construction</p> <ul style="list-style-type: none"> <li>• Highway, street, and bridge construction</li> </ul>	<p><a href="#">Construction Resources</a> (resource webpage)  <a href="#">Construction Industry</a> (website)  <a href="#">Occupational Health and Safety Issues in Construction</a> (scientific article)  <a href="#">Fall Protection</a> (video)  <a href="#">Highway Work Zones and Signs</a> (website)  <a href="#">Construction Safety and Health (annotated bibliographies)</a>  <a href="#">Construction Safety Hazards</a> (study summaries)</p>

<ul style="list-style-type: none"> <li>Roofing</li> <li>Plumbing, heating, and air conditioning</li> </ul>	<p><a href="#">Protecting Roofing Workers (guide)</a>  <a href="#">Asphalt Fumes: Roofing Operations (website)</a>  <a href="#">Occupational Health Risks: Roofers (toolkit)</a>  <a href="#">Roofers (resource webpage)</a>  <a href="#">Commercial Roof Safety Guide (video)</a>  <a href="#">Commercial vs. Residential Roofing (video)</a></p> <p><a href="#">Plumbing Health and Safety (website)</a>  <a href="#">Plumber Health and Safety Issues (website)</a>  <a href="#">Plumbers (resource webpage)</a>  <a href="#">HVAC Safety 101 (blog)</a>  <a href="#">HVAC Safety Hazards (website)</a></p>
<p>Health Services</p> <ul style="list-style-type: none"> <li>Ambulatory</li> <li>Hospital or health care facility</li> <li>Nursing and long term care facilities</li> </ul>	<p><a href="#">COVID-19 - Control and Prevention - Emergency Response Workers and Employers (website)</a>  <a href="#">Reducing EMS Workforce Injuries and Illness (video)</a>  <a href="#">Safety for Ambulance Workers &amp; EMS Responders (website)</a>  <a href="#">Paramedics Health and Safety Issues (website)</a>  <a href="#">Paramedic Occupational Violence Mitigation (scientific article)</a>  <a href="#">Occupational Injury Risk Among Ambulance Officers and Paramedics (scientific journal)</a></p> <p><a href="#">Occupational Hazards in the Health Sector (e-tool)</a>  <a href="#">Healthcare Overview (website)</a>  <a href="#">Worker Safety in Hospitals (website)</a>  <a href="#">Hospitals Food Services (e-tool)</a>  <a href="#">Nurse Health and Safety (website)</a>  <a href="#">The Effect of Shift Work on Body Composition (scientific article)</a>  <a href="#">Occupational Dermatitis in Healthcare Workers (scientific article)</a></p> <p><a href="#">Nursing Homes and Personal Care Facilities Overview (website)</a>  <a href="#">Safe Patient Handling (PowerPoint)</a>  <a href="#">Long-Term Care Workers' Psychological Health and Safety (scientific article)</a>  <a href="#">Stress Social Support and Burnout (scientific article)</a>  <a href="#">Noise-Induced Stress Among Primary Care Workers in Long Term Care Facilities (scientific article)</a>  <a href="#">Safe Lifting Programs at Long-Term Care Facilities (scientific article)</a></p>
<p>Education</p> <ul style="list-style-type: none"> <li>Elementary and secondary schools</li> </ul>	<p><a href="#">Safety Checklist Program for Schools (website)</a>  <a href="#">Guidance for School Administrators to Help Reduce the Spread of Seasonal Influenza (website)</a>  <a href="#">Teacher Health and Safety Issues (website)</a>  <a href="#">Safety and Health Innovation in Preschools (scientific article)</a>  <a href="#">Stress Amongst Teachers (scientific article)</a></p>

<p>Manufacturing</p> <ul style="list-style-type: none"> <li>• Automobile manufacturing</li> <li>• Food manufacturing</li> <li>• Battery manufacturing</li> </ul>	<p><a href="#"><u>Manufacturing Program</u></a> (website)  <a href="#"><u>Manufacturing</u></a> (website)  <a href="#"><u>Resolve to Protect the Safety and Health of Workers</u></a>  <a href="#"><u>Manufacturing Fitness Equipment</u></a> (blog)  <a href="#"><u>Carpal Tunnel in Manufacturing Workers</u></a> (scientific article)  <a href="#"><u>Morbidity in Automobile Manufacturing</u></a> (scientific article)  <a href="#"><u>Physical and Psychosocial Ergonomic Risk Factors in Automobile Manufacturing Workers</u></a> (scientific article)  <a href="#"><u>Hearing Conservation Program Effectiveness</u></a> (scientific article)</p> <p><a href="#"><u>Burden of Respiratory Abnormalities in Microwave Popcorn and Flavouring Manufacturing Workers</u></a> (scientific article)  <a href="#"><u>Thermal Comfort of Employees Working in Food Preparation</u></a> (website)</p> <p><a href="#"><u>Industry-Specific Prevalence of Elevated Blood Lead Levels Among Pennsylvania Workers</u></a> (scientific article)</p>
<p>Transportation and Warehouses</p> <ul style="list-style-type: none"> <li>• Truck transportation</li> <li>• Warehousing and storage</li> <li>• Couriers and messengers (e.g., United States Postal Service)</li> </ul>	<p><a href="#"><u>Highway Driving</u></a> (website)  <a href="#"><u>Health of Long-Haul Truck Drivers</u></a> (website)  <a href="#"><u>Truck Driver Occupational Safety and Health</u></a> (report)  <a href="#"><u>Truck Driver Health</u></a> (video)  <a href="#"><u>Occupational Health Disparities Among Truck Drivers</u></a> (scientific article)  <a href="#"><u>Heavy and Tractor-Trailer Truck Drivers</u></a> (website)</p> <p><a href="#"><u>Warehousing Hazards and Solutions</u></a> (website)  <a href="#"><u>Warehouse Safety</u></a> (website)  <a href="#"><u>Warehouse Risk Assessment</u></a> (summary document)  <a href="#"><u>Warehouse Safety Tips</u></a> (video)  <a href="#"><u>Worker Safety Law Targets Warehouse Practices</u></a> (news article)</p> <p><a href="#"><u>Safety, Health, and Environment</u></a> (website)  <a href="#"><u>Slip, Trip, and Fall Prevention</u></a> (website)  <a href="#"><u>Health Hazard Evaluation Report</u></a> (report)  <a href="#"><u>Postal Service Workers</u></a> (website)  <a href="#"><u>Dog Bite Awareness</u></a> (video)  <a href="#"><u>Mail Carrier Delivers To Burned-Out Homes</u></a> (news article)  <a href="#"><u>Postal Service’s Unprecedented Overload</u></a> (news article)</p>
<p>Leisure and Hospitality</p> <ul style="list-style-type: none"> <li>• Food services and drinking places</li> </ul>	<p><a href="#"><u>Young Worker Safety in Restaurants</u></a> (e-tool)  <a href="#"><u>Cook Health and Safety</u></a> (website)  <a href="#"><u>Server Health and Safety</u></a> (website)  <a href="#"><u>Safe Food Preparation Workers and Managers</u></a> (website)  <a href="#"><u>Low Pay Leading Workers to Quit Restaurant Jobs</u></a> (news article)</p>

<ul style="list-style-type: none"> <li>Hotels, dormitories, rooming and boarding houses</li> </ul>	<p><a href="#">Kitchen Hazards (video)</a>  <a href="#">Hazards of Working in Hospitality (video)</a></p> <p><a href="#">Occupational Health in Hospitality (scientific article)</a>  <a href="#">Hotel Hospitality Health and Safety (website)</a>  <a href="#">Housekeeper Occupational Health and Safety (report)</a>  <a href="#">Health and Safety Among Hotel Cleaners (fact sheet)</a>  <a href="#">Hotel Cleaners (scientific article)</a>  <a href="#">Stronger Measures To Protect Hotel Workers (news article)</a>  <a href="#">Work-Related Injury and Illness among Hotel Housekeepers (website)</a></p>
<p>Wholesale and Retail Trade</p> <ul style="list-style-type: none"> <li>Food and beverage stores</li> <li>General merchandise stores</li> </ul>	<p><a href="#">Wholesale and Retail Trade Program (website)</a>  <a href="#">Food and Beverage Servers Health and Safety Issues (website)</a>  <a href="#">Injuries to Young Workers in the Retail Trades (scientific article)</a></p> <p><a href="#">Retail Sales Health and Safety (website)</a>  <a href="#">Health and Safety Guide for New Retail Workers (guide)</a>  <a href="#">Safety in Store (news article)</a>  <a href="#">Retail Health and Safety (resources webpage)</a>  <a href="#">Young Retail Workers (website)</a>  <a href="#">Reducing Fatigue and Stress in the Retail Industry (blog)</a>  <a href="#">Ergonomic Solutions for Retailers (guide)</a></p>
<p>Personal Services</p> <ul style="list-style-type: none"> <li>Hair salons</li> <li>Nail salons</li> <li>Dry cleaning and laundry services</li> </ul>	<p><a href="#">Health &amp; Safety Issues for Hairdressers (website)</a>  <a href="#">Hair Salons: Formaldehyde in Hair Products (website)</a>  <a href="#">Birth Defects Among Pregnant Hair and Nail Salon Workers (blog)</a>  <a href="#">Occupational Health and Safety in a Hair Salon (video)</a></p> <p><a href="#">Nail Technicians' Health &amp; Workplace Exposure Control (website)</a>  <a href="#">Health Hazards in Nail Salons (website)</a>  <a href="#">Nail Salons In California Use Less Toxic Chemicals (news article)</a>  <a href="#">Nail Salons Health and Safety (website)</a>  <a href="#">Birth Defects Among Pregnant Nail and Hair Salon Workers (blog)</a>  <a href="#">Nail Salon Workers Exposed to Hazardous Chemicals (news article)</a>  <a href="#">Air Quality in Nail Salons (news article)</a>  <a href="#">Health and Safe While Giving Manicures and Pedicures (guide)</a></p> <p><a href="#">Dry Cleaning Overview (website)</a>  <a href="#">Drycleaning (website)</a>  <a href="#">Dry Cleaner Safety (website)</a>  <a href="#">Health and Safety in Dry Cleaning (video)</a>  <a href="#">Long-Term Exposure to Dry Cleaning Agents (scientific article)</a></p>
<p>Mining</p>	

<ul style="list-style-type: none"> <li>• Oil and gas extraction</li>   <li>• Coal mines</li> </ul>	<p><a href="#"><u>Oil and Gas Extraction Program (website)</u></a>  <a href="#"><u>Oil and Gas Extraction Overview (website)</u></a>  <a href="#"><u>Protecting Oil and Gas Workers from Gases and Vapors (video)</u></a>  <a href="#"><u>Fatalities in Oil &amp; Gas Extraction (website)</u></a>  <a href="#"><u>Hearing Loss Among Noise-Exposed Mining, and Oil and Gas Extraction Workers (website)</u></a></p> <p><a href="#"><u>Coal Workers' Health Surveillance Program (website)</u></a>  <a href="#"><u>Coal Workers Pneumoconiosis (website)</u></a>  <a href="#"><u>Mine and Mine Worker Charts (e-tool)</u></a>  <a href="#"><u>Mine Safety and Health Administration (website)</u></a>  <a href="#"><u>Mining Program: Occupational Safety and Health Risks (website)</u></a>  <a href="#"><u>Identifying Coal Mine Safety Production Risk Factors (scientific article)</u></a>  <a href="#"><u>Black Lung Disease Among Coal Miners Linked to Silica (news article)</u></a></p>
<p>Arts, Entertainment, and Recreation</p> <ul style="list-style-type: none"> <li>• Performing arts</li>   <li>• Sports</li>   <li>• Casinos</li> </ul>	<p><a href="#"><u>Safety and Health in the Theater (blog)</u></a>  <a href="#"><u>Safety and Health of Entertainment Industry Workers (news release)</u></a>  <a href="#"><u>Introduction to Performing Arts Safety (website – video unavailable)</u></a>  <a href="#"><u>General Theatre Safety 2021 – Part 1 (video)</u></a>  <a href="#"><u>General Theatre Safety 2021 – Part 2 (video)</u></a>  <a href="#"><u>Performing Arts Safety Manual (guide)</u></a>  <a href="#"><u>Concussion in Theater (scientific article)</u></a></p> <p><a href="#"><u>Olympic Work (blog)</u></a>  <a href="#"><u>Suicide Among Former NFL Players (blog)</u></a>  <a href="#"><u>Heat and Athletes (website)</u></a>  <a href="#"><u>Preventing Sports Injuries (website)</u></a>  <a href="#"><u>Athlete Health and Safety Packet (guide)</u></a>  <a href="#"><u>Athletes Who Specialize Too Young Risk More Injuries (news article)</u></a>  <a href="#"><u>Young Athletes Risk Back Injury By Playing Too Much (news article)</u></a>  <a href="#"><u>Consequences of Sports Injuries and Illnesses (scientific article)</u></a></p> <p><a href="#"><u>Secondhand Smoke and Casino Dealers (blog)</u></a>  <a href="#"><u>Occupational Exposures Among Casino Workers (scientific article)</u></a>  <a href="#"><u>Panic Buttons for Hotel, Casino Staff Working Alone (news article)</u></a>  <a href="#"><u>Exposure of Casino Employees to Tobacco Smoke (scientific article)</u></a>  <a href="#"><u>Tobacco Smoke Exposure Among Casino Dealers (report)</u></a></p>

	<a href="#">Going Smokefree Matters: Casinos (website)</a>
<p>Utilities</p> <ul style="list-style-type: none"> <li>• Utility system construction</li> <li>• Electric power generation and distribution</li> <li>• Sewage treatment and wastewater facilities</li> </ul>	<p><a href="#">Electrical Construction (website)</a>  <a href="#">Electrical Safety (website)</a>  <a href="#">Hazards to Outdoor Workers (website)</a>  <a href="#">Preventing Injuries and Deaths from Construction Falls and Telecommunication Towers Maintenance (report)</a></p> <p><a href="#">Electric Power Generation Industry (website)</a>  <a href="#">Electric Power Generation, Transmission, and Distribution (e-tool)</a>  <a href="#">Worker Safety in a Power Outage (fact sheet)</a></p> <p><a href="#">Wastewater Treatment Workers (website)</a>  <a href="#">Safe Work Practices for Wastewater Treatment Plants (website)</a>  <a href="#">Reducing Health Risks When Handling Waste or Sewage (website)</a></p>
<p>Administrative and Support Services</p> <ul style="list-style-type: none"> <li>• Waste collection (e.g., hazardous waste, recycling services)</li> <li>• Janitorial and cleaning services</li> <li>• Landscaping services</li> <li>• Remediation services (e.g., oil spill clean up, mold removal, crime scene clean up)</li> </ul>	<p><a href="#">Hazardous Waste Standards (website)</a>  <a href="#">Green Job Hazards - Recycling (website)</a>  <a href="#">Health and Safety in Waste Collection (scientific article)</a>  <a href="#">Occupational Illness in Waste and Recycling (scientific article)</a>  <a href="#">When Recycling Becomes a Health and Safety Hazard (website)</a>  <a href="#">Sustainable and Safe Recycling: Protecting Workers (report)</a>  <a href="#">Occupational Exposures at Electronic Scrap Recycling Facilities (blog)</a></p> <p><a href="#">Janitorial Safety Training Guide (guide)</a>  <a href="#">Cleaning Industry Standards (website)</a>  <a href="#">Cleaning Workers Safety and Health (literature review)</a>  <a href="#">Cleaning Up Safety (news article)</a>  <a href="#">Occupational Injury Among Janitors (scientific article)</a></p> <p><a href="#">Landscape and Horticultural Services (website)</a>  <a href="#">Landscaping Safety and Health (blog)</a>  <a href="#">Landscape Health and Safety Issues (website)</a>  <a href="#">Avoiding Hazards During Landscaping Work (website)</a>  <a href="#">Grounds Maintenance Workers (website)</a></p> <p><a href="#">Oil Spills (website)</a>  <a href="#">Mold Overview (website)</a>  <a href="#">Mold and Health (website)</a>  <a href="#">Bio Spill Cleanup Procedures (website)</a>  <a href="#">Oil Spill Response (resource webpage)</a>  <a href="#">Oil Spill Cleanup Workers Health and Safety (training tool)</a>  <a href="#">Mold: Worker and Employer Guide to Hazards and Controls (guide)</a></p>



# ▶ What is occupational health?

**Public health:** Science of protecting and improving the well-being of the population

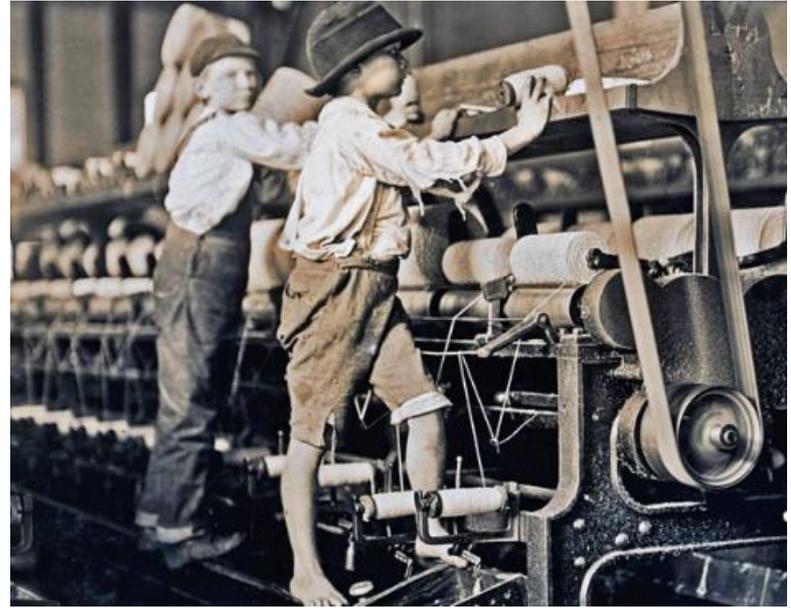
**Occupational health:** Sub-field of public health focused on workers



# ▶ Federal Laws Protecting Workers

## 1930s - The New Deal

- Abolished child labor
- Recognized workers' right to organize as a union
- Supported higher wages for workers



## 1960s - Mobilization of unions

- Mine Safety and Health Act of 1969
- Occupational Safety and Health Act of 1970

# ▶ PA Laws Protecting Workers

- The Equal Pay Law of 1959
- Pennsylvania Minimum Wage Law of 2006
- Child Labor Act of 2012



# Industry vs. Occupation

**Industry:** Type of business conducted at a person's place of work

**Occupation:** Type of activity a person performs at their place of work

Industry	Occupation
Restaurant	Waiter
School	Teacher
Automobile	Mechanic
Forestry	Park ranger
Government	Veterinarian



# ▶ Hazards: Industry or Occupation

- Same occupation: different industries → Different hazards
- Same industry: different occupation → Different hazards



Restaurant Owners



Restaurant Dishwasher

# ▶ *Example:* Differential Exposure

Exposure: Infectious Disease



Doctor



Billing Clerk

# ▶ Injury vs. Illness



**Injury:** Single work-related incident or exposure event, may result in death



**Illness:** Worsening of existing condition or emergence of condition from a prolonged work-related exposure to a factor or environmental condition

# Occupational Health Hazards

1. Safety



2. Physical

3. Biological



4. Ergonomic

5. Chemical



6. Work Organization

# 1. Safety

Unsafe work conditions, such as:

- Working from heights
- Using sharp or heavy equipment
- Loose equipment



## 2. Physical

Environmental factors or conditions, such as:



- Extreme heat
- Extreme cold
- Loud noise
- Radiation

# 3. Biological

Exposure to biological substances that may be harmful to human health, such as:

- Bacteria/Viruses
- Mold
- Poisonous plants
- Ticks



## 4. Ergonomic

Strains from working in certain positions or performing a specific action repeatedly, such as:

- Poor posture
- Heavy lifting
- Use of vibrating tools
- Repetitive movements



# 5. Chemical

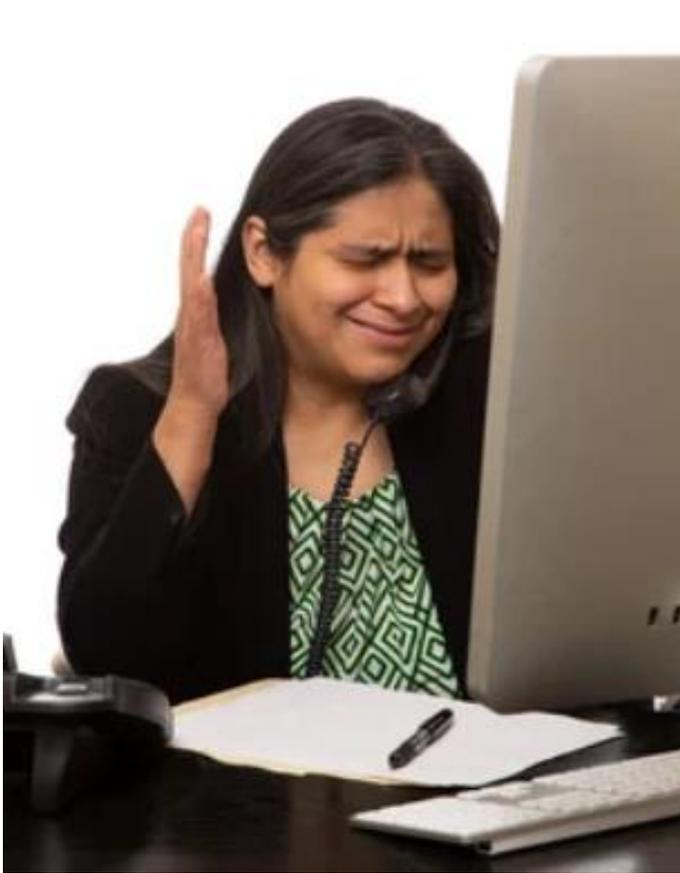
Exposure to chemicals and dust, such as:



- Solvents
- Vapors
- Pesticides
- Silica
- Asbestos
- Coal

# 6. Work Organization

Workplace social and structural issues, such as:



- Workplace demands
- Workplace violence
- Sexual harassment
- Low pay
- Job insecurity
- Racism and discrimination

# Common Occupational Injuries:

- Falls, slips, and trips – 21.7 out of 10,000
- Open wounds – 8.4 out of 10,000
- Burns and corrosions – 1.7 out of 10,000



Chemical burn on hand



Tripping over wire

# Common Occupational Illnesses:

- Respiratory illnesses — 44 out of 10,000
- Skin disease — 1.5 out of 10,000
- Hearing loss — 1.0 out of 10,000



# Factors Impacting Injury & Illness

- Occupation
- Work environment
- Work frequency
- Personal characteristics



# Example: High vs. Low Risk

Factor	High Risk	Low Risk
Occupation	Farmer	Retail assistant
Work Environment	Farm	Clothing store
Work Frequency	Long hours in summer months	Part-time (evenings and weekends)
Personal Characteristics	<ul style="list-style-type: none"><li>– Late 60s</li><li>– Smoker</li><li>– Lower back complications</li></ul>	<ul style="list-style-type: none"><li>– Early 20s</li><li>– Non-smoker</li><li>– No known health complications</li></ul>

# ▶ Young Workers: Age 15-24 years

Greater risk of work-related injuries & illnesses

- Less work experience
- Lack of proper training and supervision

In 2020, in the U.S.

**352**

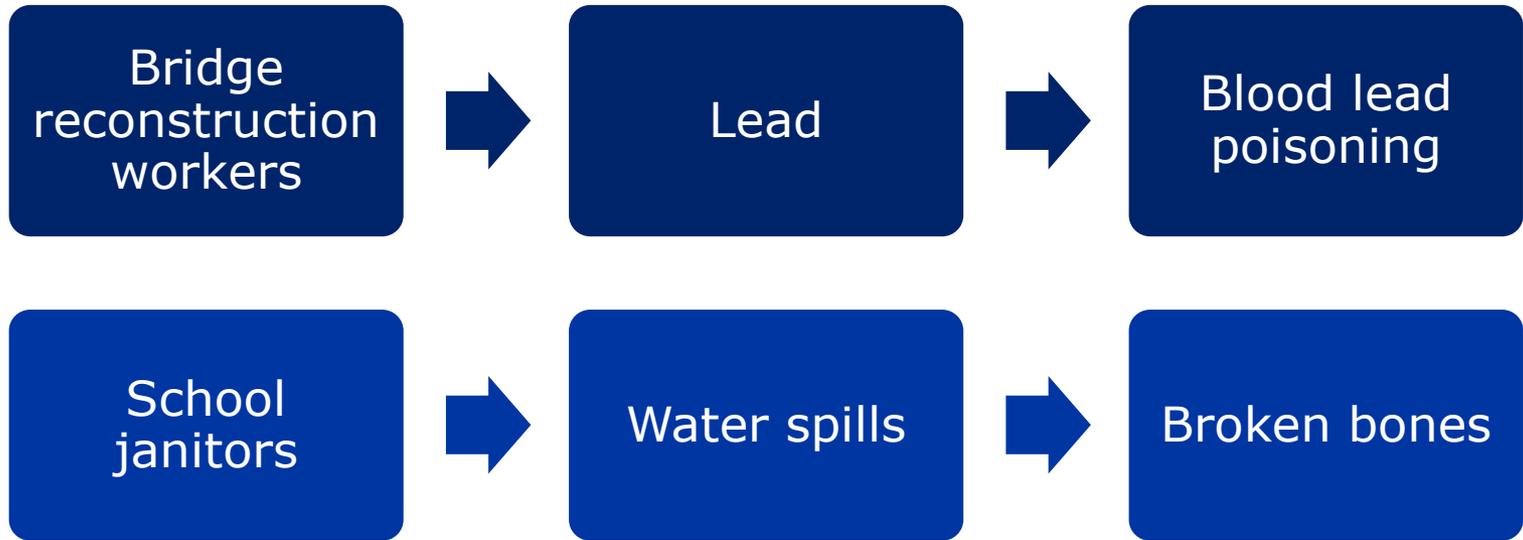


**50%**

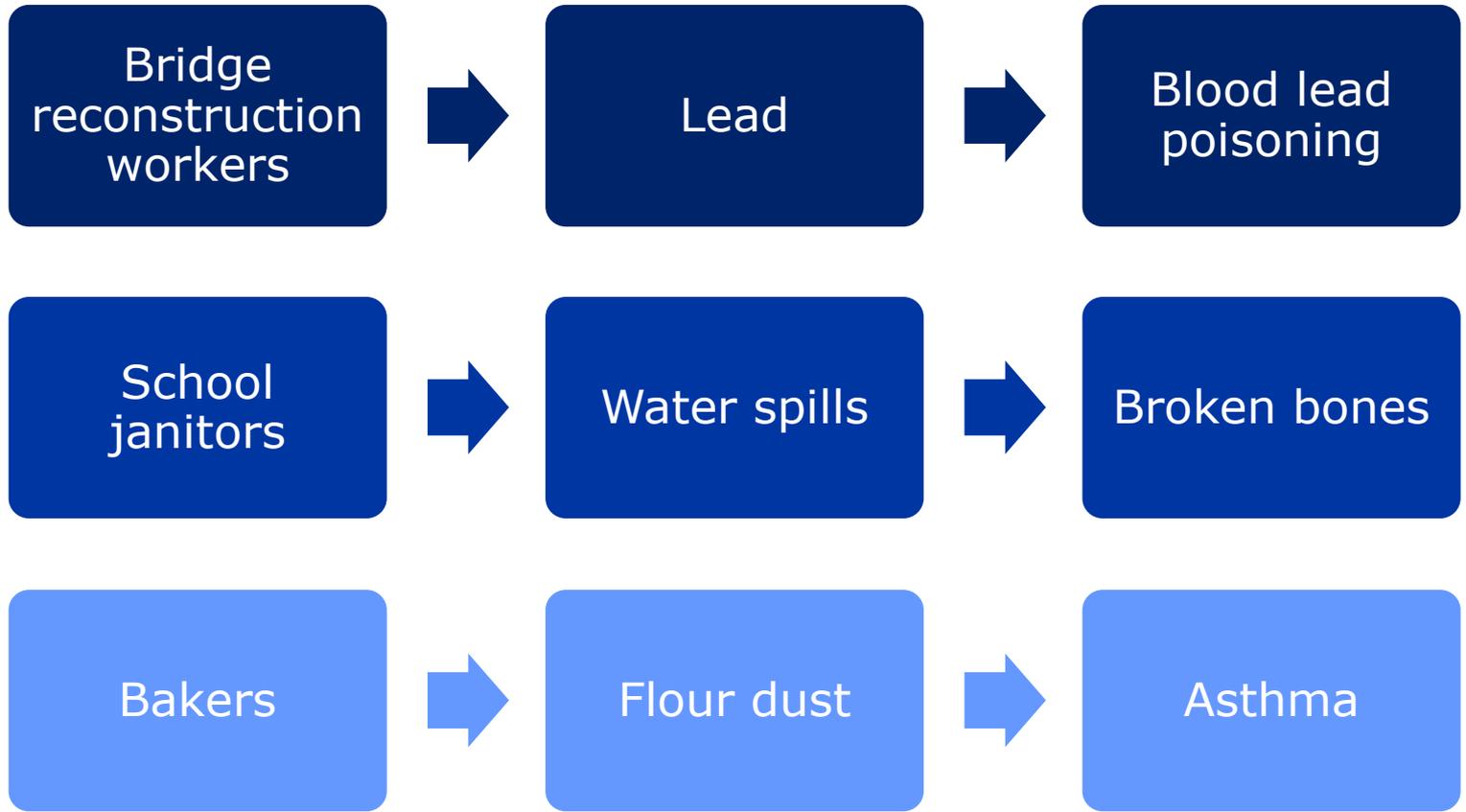
# Exposures → Injuries & Illnesses



# Exposures → Injuries & Illnesses



# Exposures → Injuries & Illnesses



# Exposures → Injuries & Illnesses

Bridge reconstruction workers

Lead



Blood lead poisoning

School janitors

Water spills



Broken bones

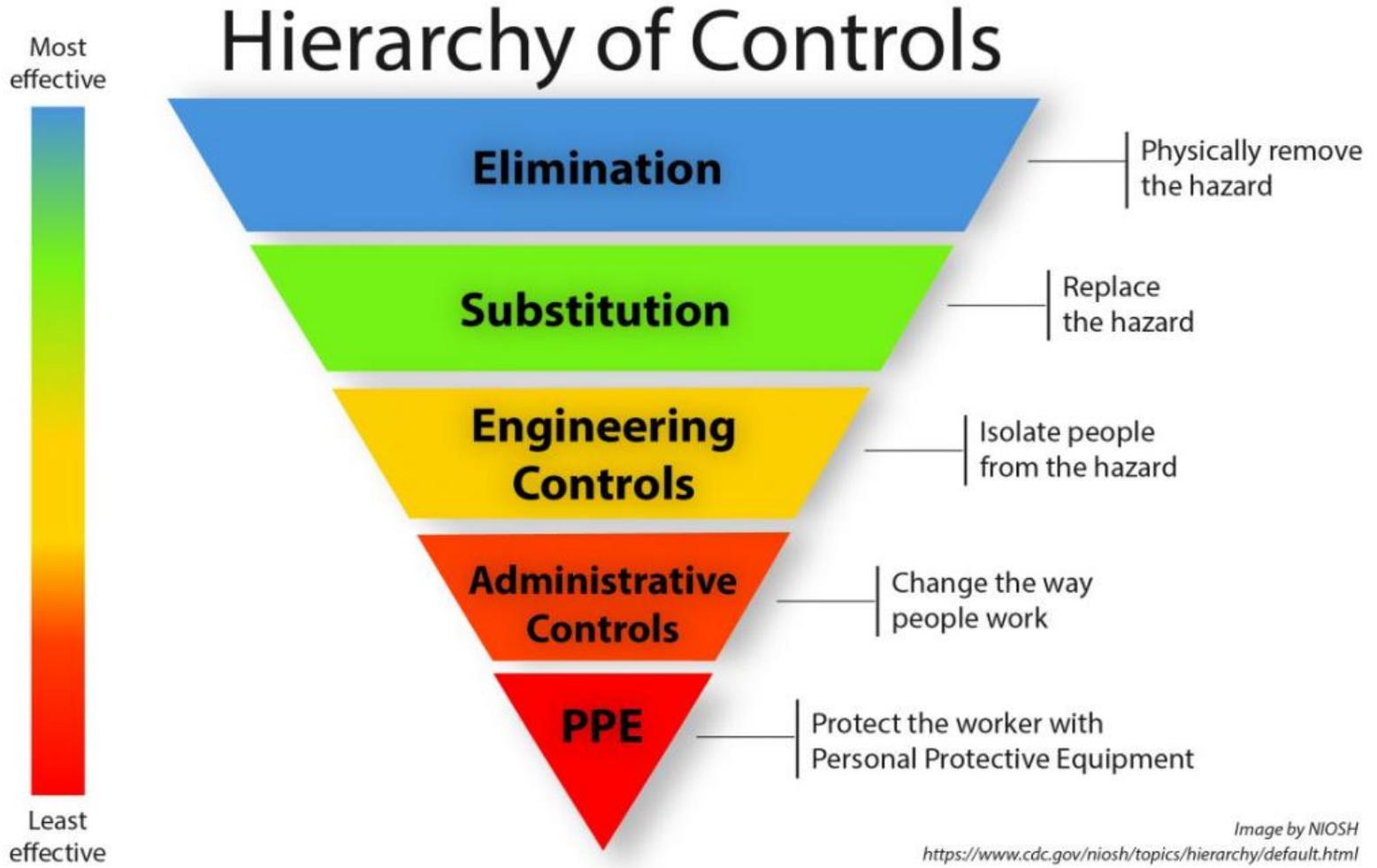
Bakers

Flour dust



Asthma

# Controlling Hazardous Exposures



# 1. Elimination

Removes hazard

Modifies work process

Preferred solution

Expensive in upfront costs

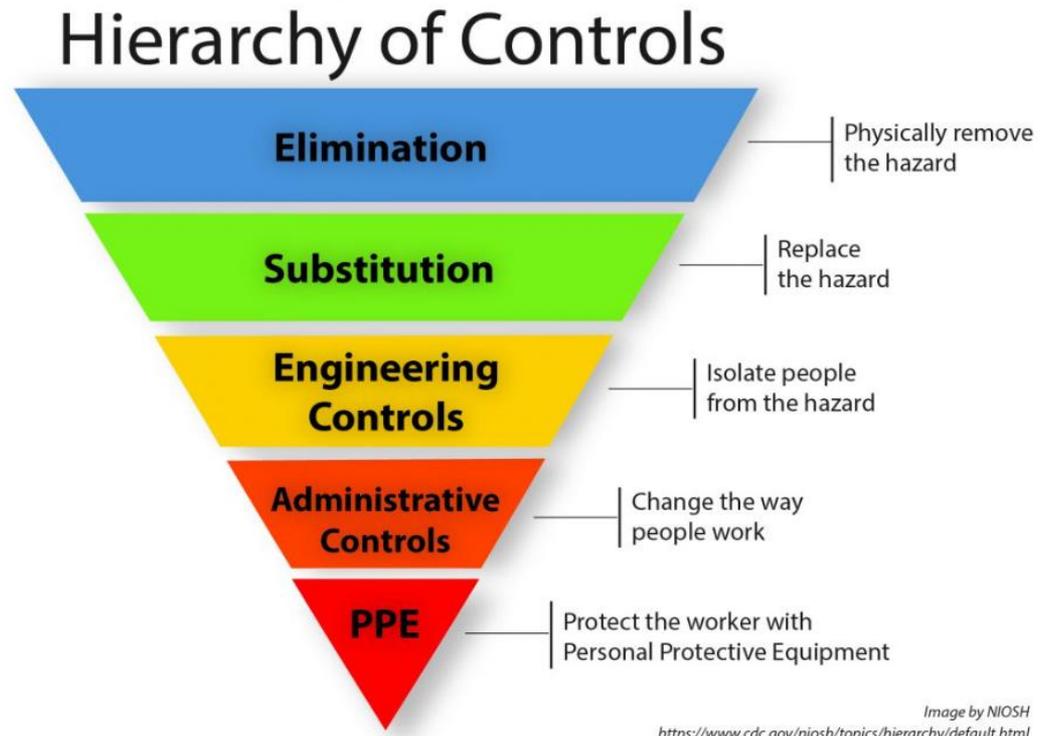
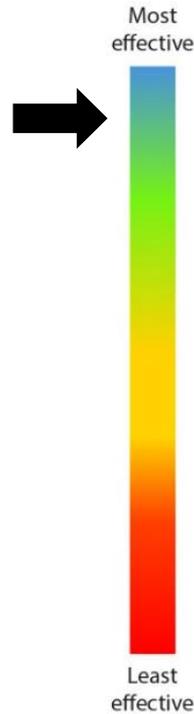


Image by NIOSH  
<https://www.cdc.gov/niosh/topics/hierarchy/default.html>

# 2. Substitution

Uses a safer alternative

Does not create new risks

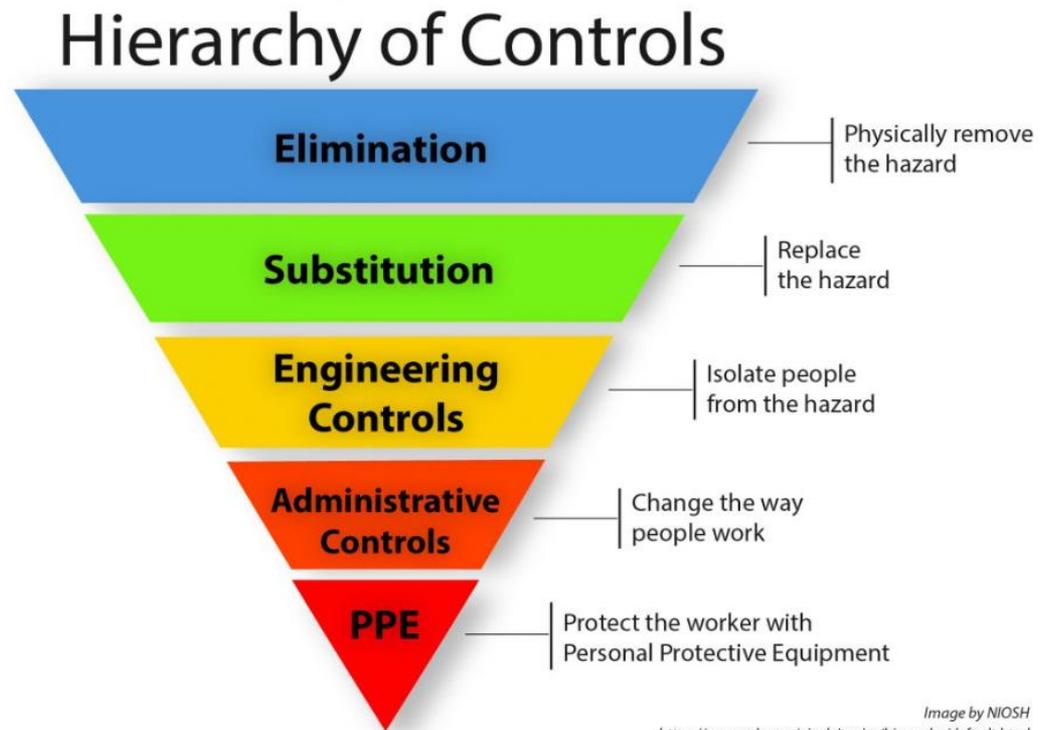
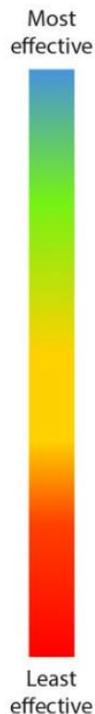


Image by NIOSH  
<https://www.cdc.gov/niosh/topics/hierarchy/default.html>

# 3. Engineering Controls

Reduces contact with hazards

Typically, physical or mechanical

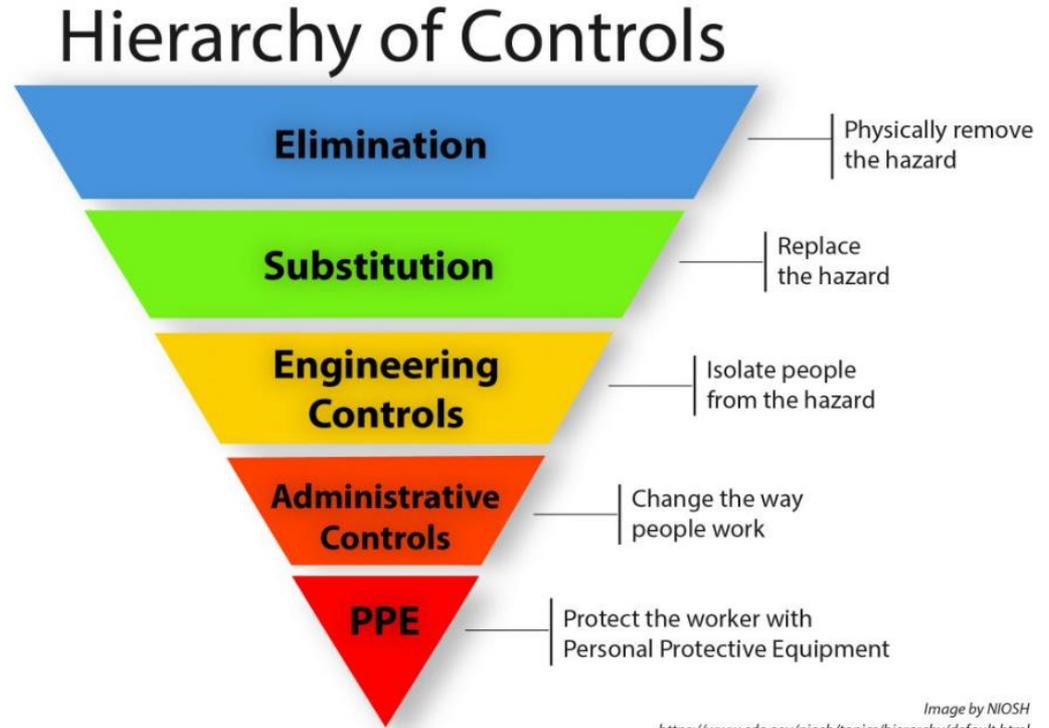
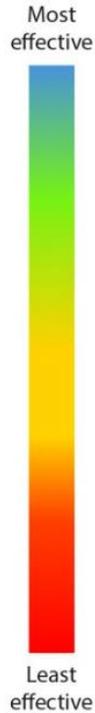
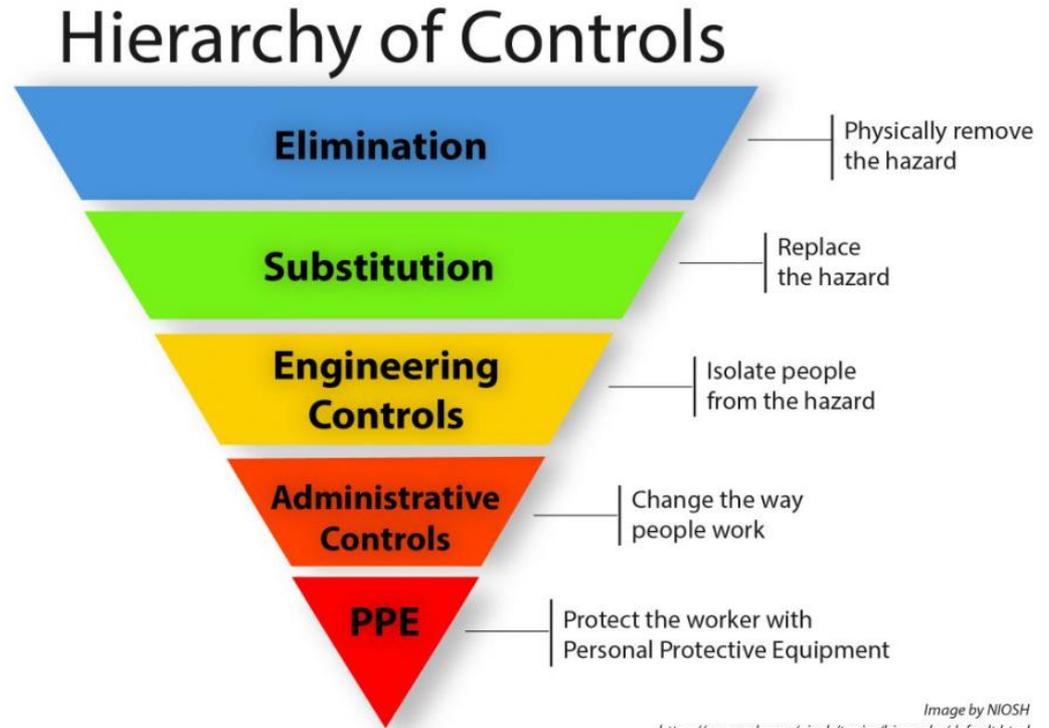
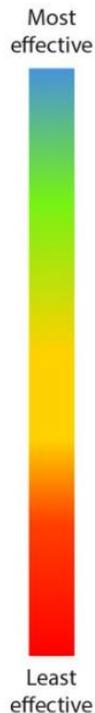


Image by NIOSH  
<https://www.cdc.gov/niosh/topics/hierarchy/default.html>

# 4. Administrative Controls

Reduces duration, frequency, or intensity of exposure to hazards

Typically, related to workplace policies and culture



# 5. Personal Protective Equipment (PPE)

Equipment worn to minimize hazard exposure

Only works when used correctly and consistently

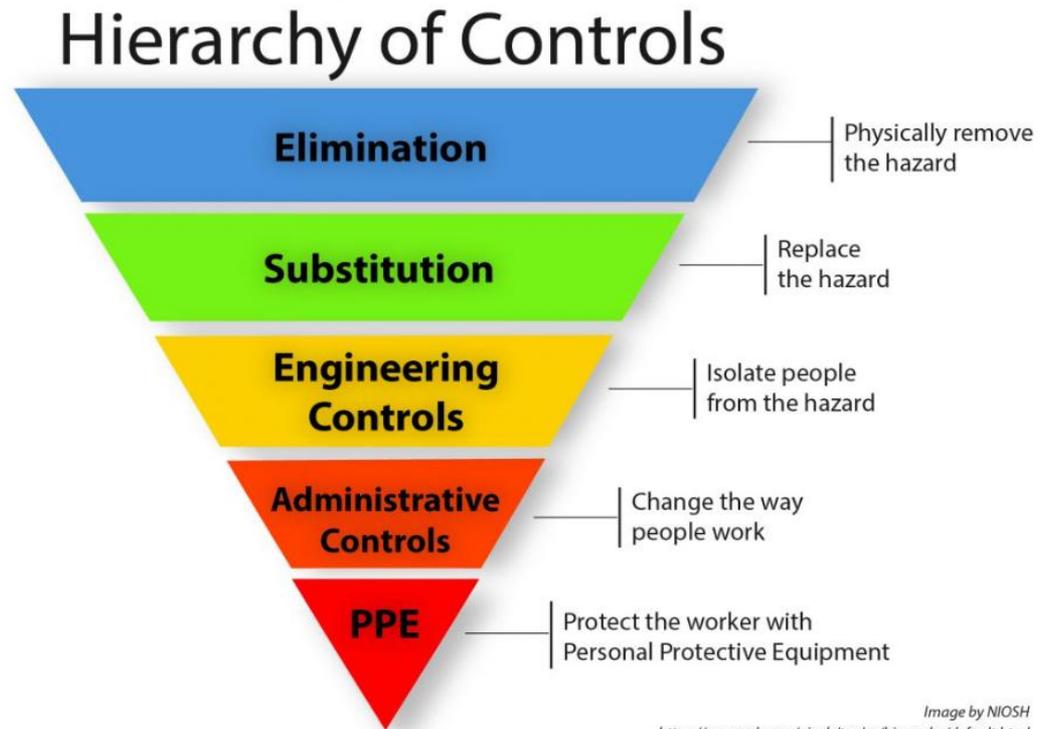
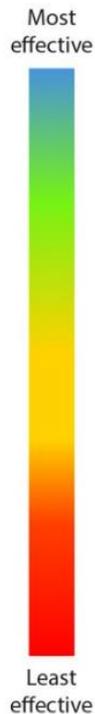


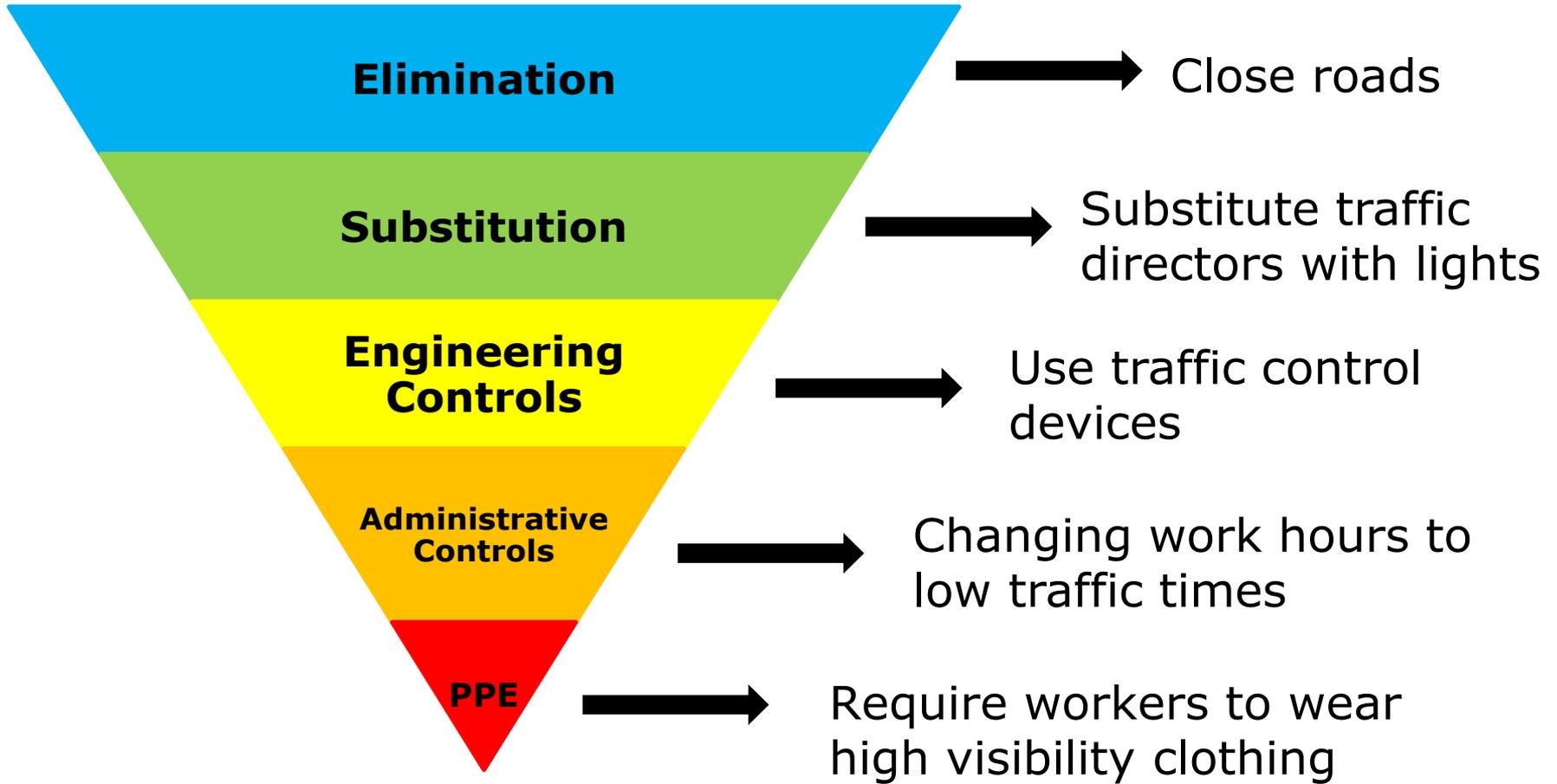
Image by NIOSH  
<https://www.cdc.gov/niosh/topics/hierarchy/default.html>

# ▶ *Example:* Road construction worker

Injuries and illnesses occur from falls, overexertion, transportation incidents, and exposure to harmful substances, such as dust, heat, or diesel emissions



# Example: Road construction worker

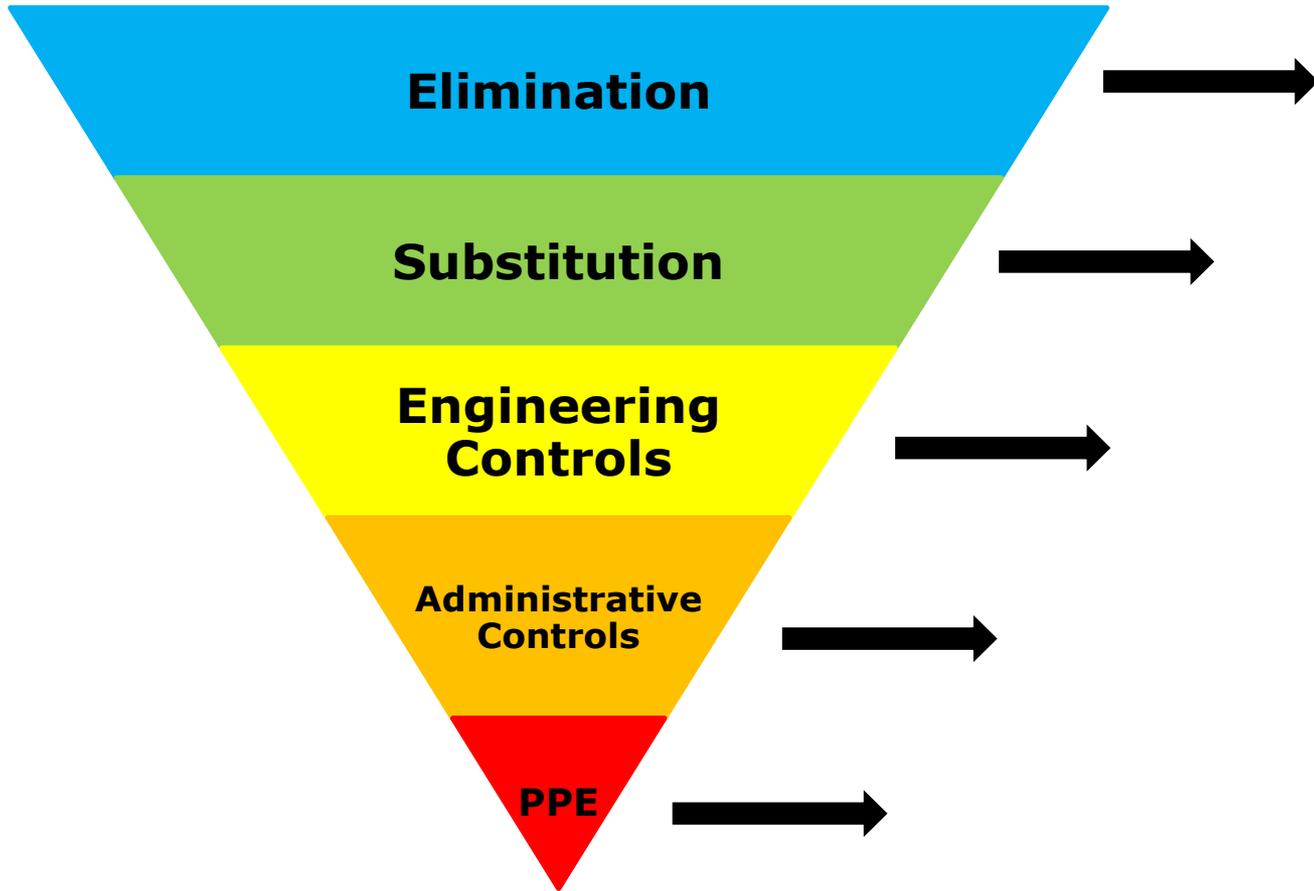


# ▶ *Example:* Nail technician

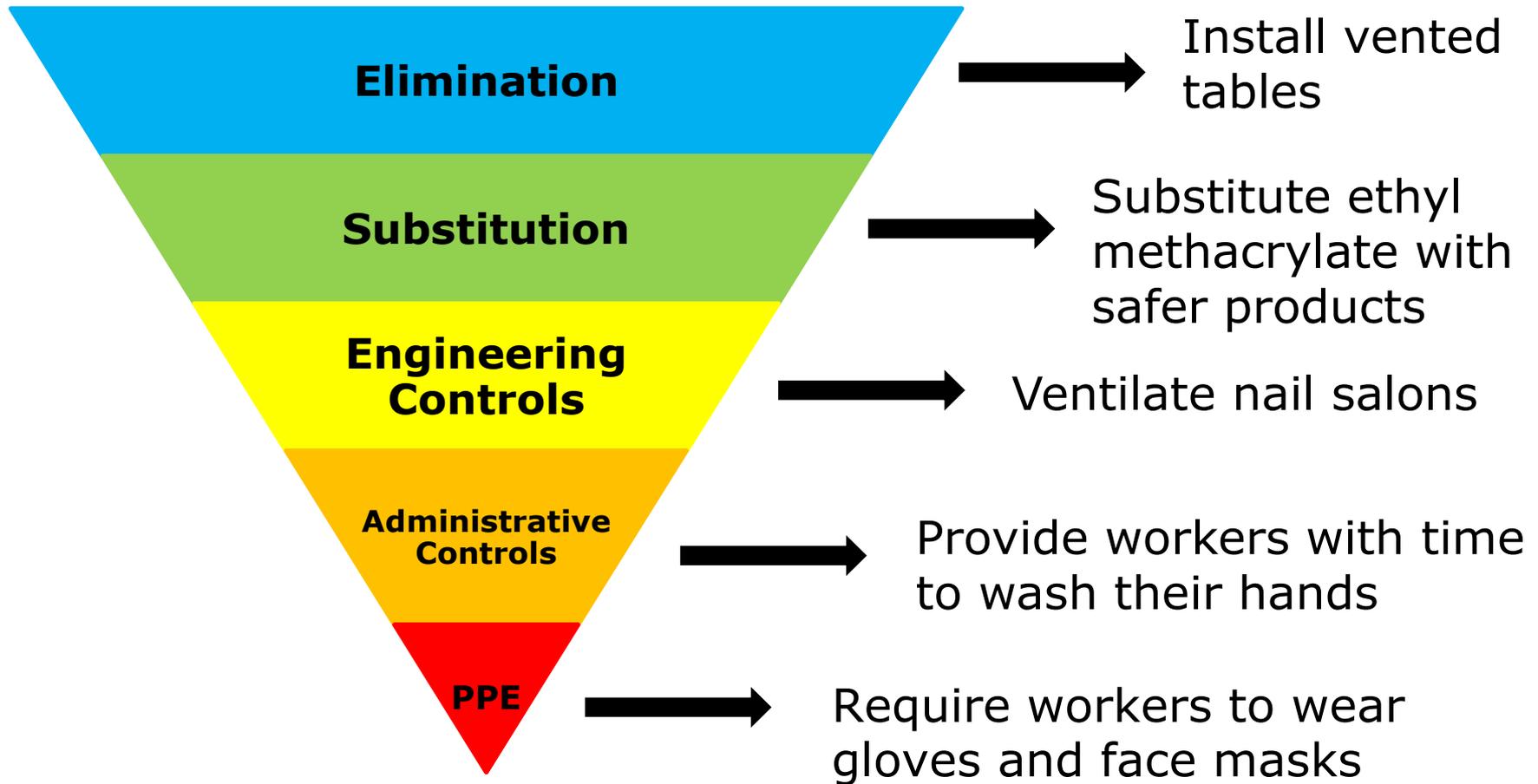
Research suggests that there are links between nail technicians' work and adverse health outcomes, such as respiratory, neurological, and musculoskeletal effects



# ▶ Example: Nail technician



# Example: Nail technician



# What happens after a work-place incident occurs?



# Workers' Compensation (WC)

- Provides medical care and income protection to injured or sick workers
- Most employers are required to purchase WC
- Most PA workers are covered under the PA WC Act
  - Examples of exemptions:
    - Federal civilian employees
    - Volunteer workers
    - Domestic workers
    - Agricultural laborers
    - Self-employed

## Occupational Safety and Health Act of 1970

- Requires employers to provide workers with an environment free of recognized hazards
- **Established Occupational Safety and Health Administration (OSHA)**
  - Sets and enforces standards
  - Provides training, outreach, and education
  - Empowers employers and workers to create and maintain a safe workplace
  - Requires reporting of workplace injuries and illness

# Benefits of Improved Occupational Health

- Worker health
- Worker productivity
- Employee satisfaction
- Health care costs
- Organizational image
- Community health



# Improved Community Health

- Reduces take-home exposure
- Allows workers to care for their family
- Work is a social determinant of health



# ▶ *Example:* Take-home lead

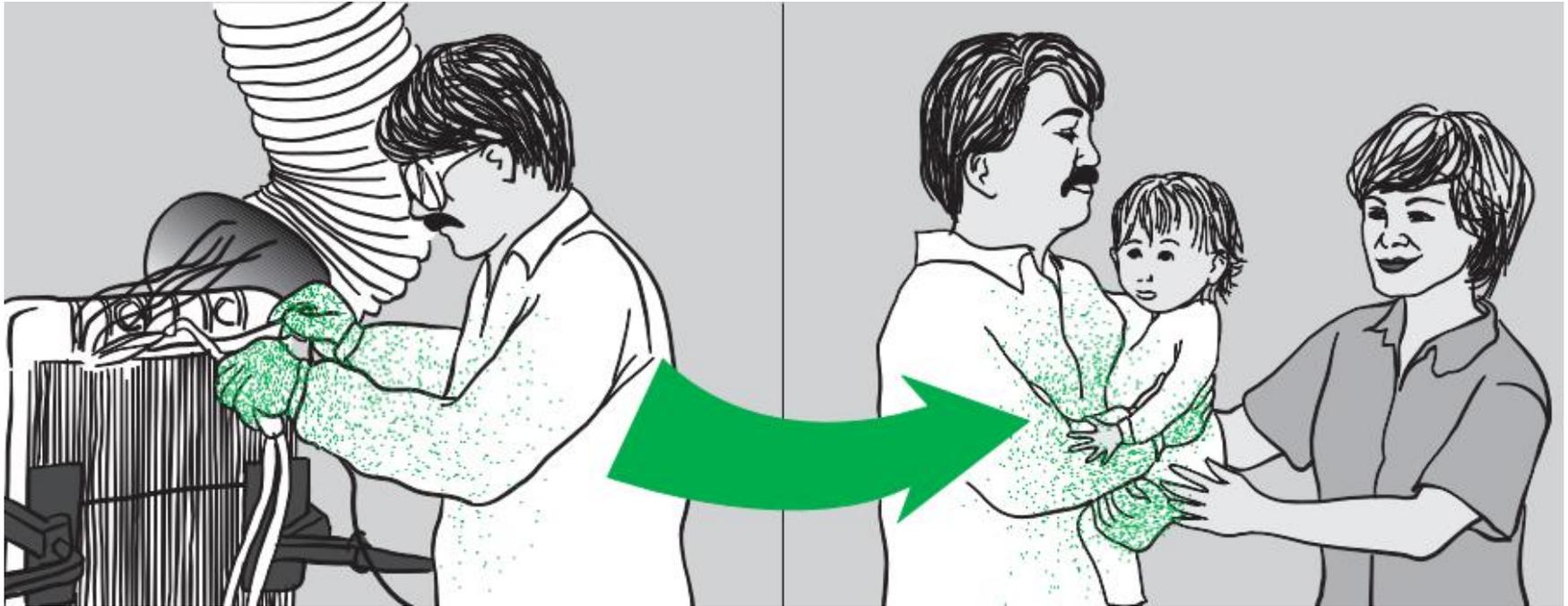


Image: California Department of Public Health

# Organizations Protecting Workers

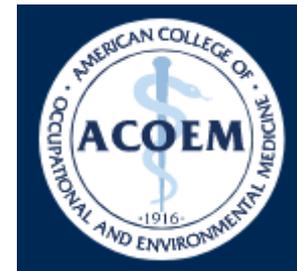
## American Industrial Hygiene Association

- Provides education and expertise on occupational health and safety



## American College of Occupational and Environmental Medicine

- Promotes worker health through preventive medicine and care, research, and education



# Organizations Protecting Workers

## **Pennsylvania Center for Workforce Information & Analysis**

- Produces data to inform policy, business, and career decisions among the public



## **Philadelphia Area Project on Occupational Safety and Health**

- Prevents workplace injury and illness through education, technical assistance, and policy



# Organizations Protecting Workers

## World Health Organization, Office of Occupational Health



- Provides educational materials for occupational health issues globally

## National Institute for Occupational Safety and Health

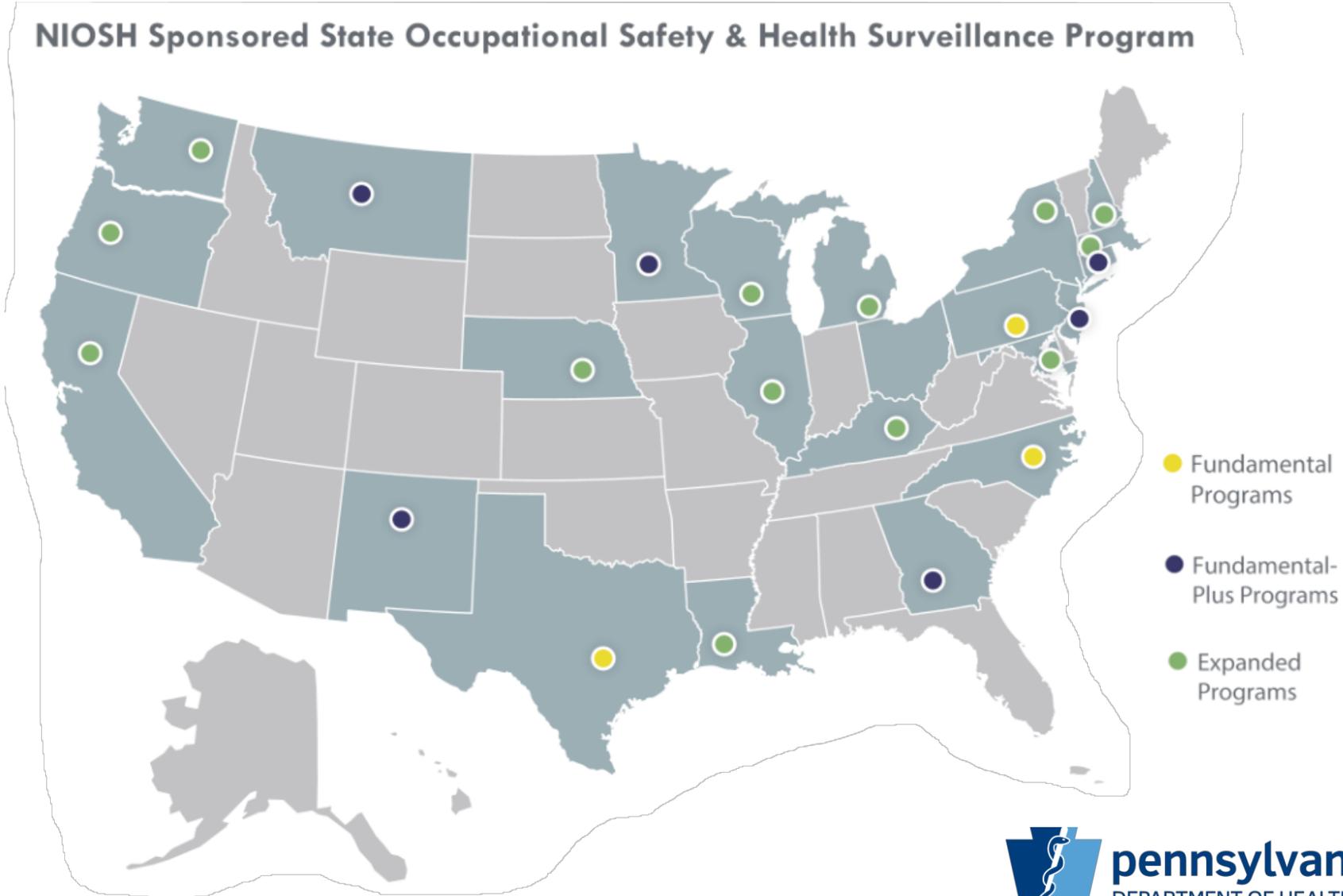


- Makes recommendations to prevent work-related injury and illness
- Approves occupational respirators



# NIOSH State Surveillance

NIOSH Sponsored State Occupational Safety & Health Surveillance Program



# ▶ PennOSHS Student Project



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