Occupational Health Surveillance

Using data on work-related injuries and illnesses to support prevention efforts in worker safety and health

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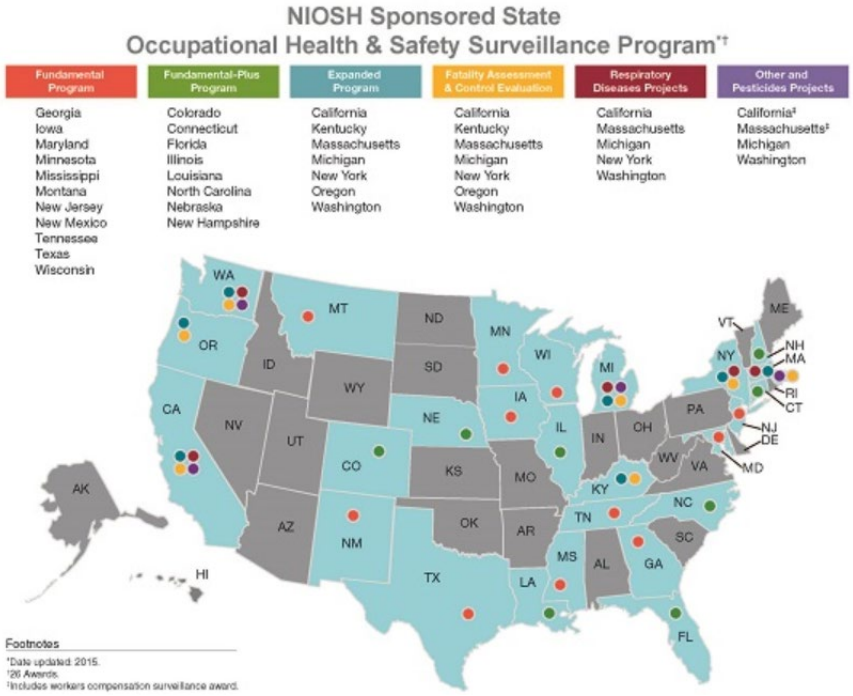
Presentation Objectives

- General Overview of Occupational Health Surveillance
- Describe the value of population-based surveillance for work-related injuries
- General stats on the magnitude of work-related injury and illness in the nation and state
- Provide links to state-based occupational health indicator statistics for different states

OH surveillance is done through collaboration

- States – 26 formally funded*
- National Institute for Occupational Safety and Health (NIOSH)
- Council of State and Territorial Epidemiologists (CSTE)



*22 states funded in new round of funding

Program Framework

- Based on CSTE and NIOSH: *Occupational Health Indicators: A Guide for Tracking Occupational Health Conditions and Their Determinants.**

*Available from:
https://cdn.ymaws.com/www.cste.org/resource/resmgr/occupationalhealth/OHI_GuidanceManual_2018_FINA.pdf

Participating States' OHI's are posted here:
https://www.cste.org/group/OHIndicators

What is Surveillance?

On-going, systematic

- **collection, analysis, and interpretation of health data which is essential to the planning, implementation and evaluation of public health practice**
- **dissemination of these data to those who need to know for the purposes of prevention**
- **"follow-up to see that action has been taken"**

Teutsch and Churchill: *Principles and Practice of Public Health Surveillance*

Types of Occupational Health Data

- Health endpoints:
  - work-related injuries
  - work-related illnesses
  - fatalities
  - biologic measures of exposure
- Hazards/Exposures
- Interventions

Types of Surveillance Systems

Case-based surveillance

- Collect information about individual cases with personal identifiers that can be used for case follow-up

Some states have laws for reporting specific occupational health conditions.

Common Reportable OH Conditions

Health Condition	Major Data Sources
Work-related asthma	Health care provider reports In-patient and ED data Workers' comp claims
Teen worker injuries (<18)	In-patient and ED data Workers' comp claims
Elevated blood lead levels	Clinical lab reports
Acute chemical poisonings	Physician and ED reports Hyperbaric chamber reports Poison Control Center
Serious burns	State Burn Registries

Types of Surveillance Systems

Population-based surveillance:

- use of large representative data sets to track trends over time and space;
- does not require access to personal identifiers.

- Caveat: Not necessarily designed to capture work-related injuries & illnesses

State Data Sources

- Hospital Data (inpatient, discharge, ED, ambulatory)
- New England Poison Control Center
- Mortality Data
- Cancer Registry Data
- Workers' Compensation (Department of Labor)
- ABLES (Adult Blood Lead Elevations)
- Behavioral Risk Factor Surveillance System Survey
- State Public Health Laboratories
- NH Labor/Economic Data
- Emergency Management System (EMS) Data

National Data Sources

- Other surveillance programs at CDC
- Bureau of Labor Statistics
- Sentinel Event Notification System for Occupational Risks (SENSOR)
- Census of Fatal Occupational Injuries (CFOI)
- Survey of Occupational Injuries and Illnesses (SOII)
- National Traumatic Occupational Fatalities (NTOF) Surveillance System
- National Center for Health Statistics (NCHS) Vital Statistics Mortality Surveillance System
- Census Current Population Survey (CPS) and other national surveys (ACS)

What is an Occupational Health Indicator?

- Provides information about a population's health status with respect to workplace injuries and illnesses or to factors that can influence health.

- Measures either health (work related disease or injury) or factors associated with health, such as workplace exposures, hazards or interventions.

Core Occupational Health Indicators

- Non-fatal work-related injuries and illnesses reported by employers
- Work-related hospitalizations
- Fatal work-related injuries
- Work related amputations with days away from work reported by employers
- State workers' compensation claims for amputations with lost work time
- Hospitalization for work related burns
- Work related musculoskeletal disorders with days away from work reported by employers.
- Carpal tunnel syndrome cases filed with the state workers' compensation system
- Hospitalization from or with pneumoconiosis
- Mortality from or with pneumoconiosis
- Work related asthma

Indicators (continued)

- Acute work-related pesticide associated illness and injury reported to poison control centers
- Incidence of malignant mesothelioma
- Elevated blood levels among adults
- Occupational heat-related emergency department visits
- Influenza vaccination coverage among healthcare personnel
- Percentage of workers employed in industries at high risk for occupational mortality
- Percentage of workers employed in occupations at high risk for occupational morbidity
- Percentage of workers employed in industries and occupations at high risk for occupational mortality
- OSHA Enforcement Activities
- Workers' compensation awards

Why do people need data about work related injury and illness?

- Early event detection (disease outbreaks)
- Safety and health program development
- Intervention assessment
- Resource allocation
- Grant applications
- Business and community planning
- Research – focused on prevention
- Citizen inquiries about their work environments

NH OHSP Goals

- Assess the extent and severity of workplace injuries, illnesses, disability, deaths, hazards and/or exposures;
- Identify workers and occupations at greatest risk through data collection of industry, occupation, and work status;
- Develop research and prevention (program) policies through partnerships with public health and non-public health organizations; and
- Expand outreach and dissemination.

Some Stats from NH…..

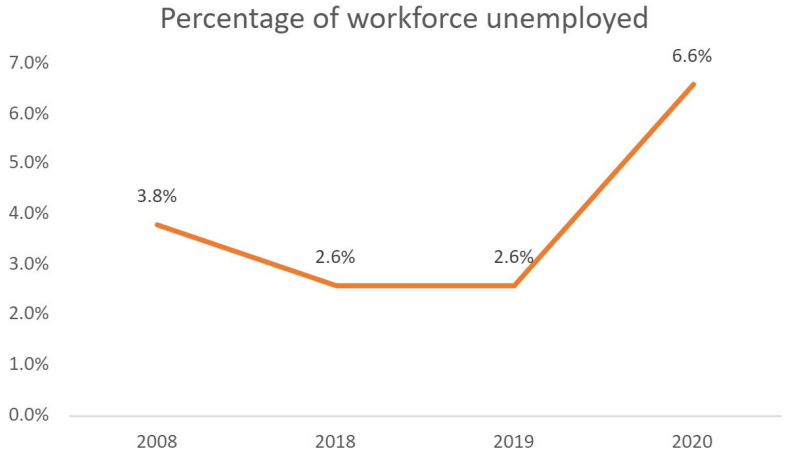
https://iod.unh.edu/sites/default/files/media/NHOHSP/Pubs/occupational_injury_and_illness_in_new_hampshired_final.pdf

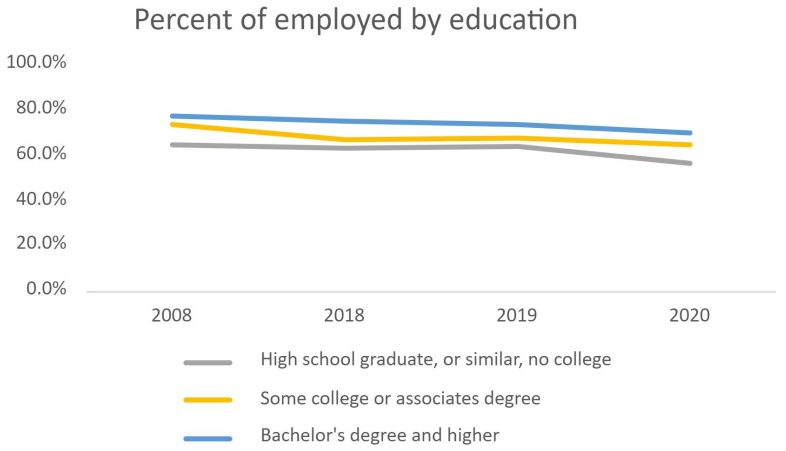
New Hampshire Employment Demographics

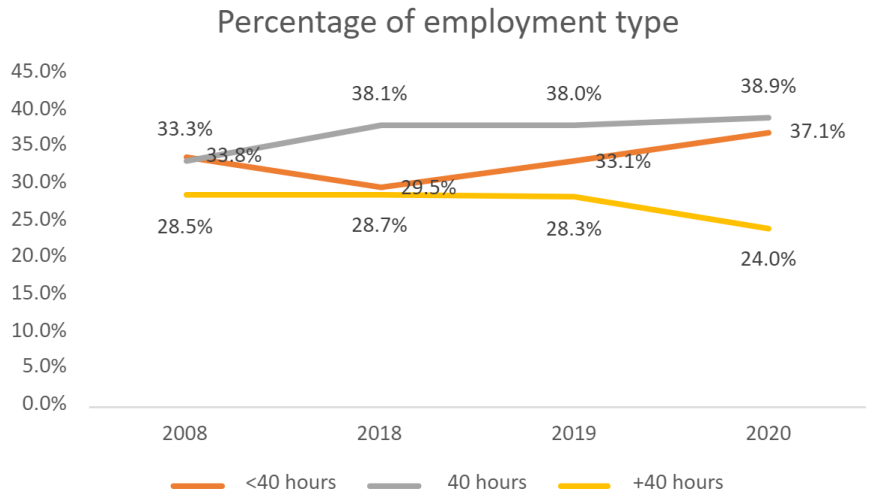
Employed Persons 16 Years or Older 2008-2020

Demographic Indicators	2008	2018	2019	2020
Total Number of employed persons 16 years or older[1]	712000	745000	756000	754000
Percentage of workforce unemployed[1]	3.8%	2.6%	2.6%	6.6%
Percentage of employment self-employed[1]	7.6%	7.1%	6.6%	6.4%
Percentage of employment in part-time jobs[1]	19.9%	18.3%	18.9%	17.3%
Percentage of employment by number of hours worked per week[1]				
<40 hours	33.8%	29.5%	33.1%	37.1%
40 hours	33.3%	38.1%	38.0%	38.9%
+40 hours	28.5%	28.7%	28.3%	24.0%
Percentage of employment by sex[1]				
Males	N/A	N/A	53.0%	52.7%
Females	N/A	N/A	46.8%	47.3%
Percentage of employment by age group[1]				
16 to 17	2.1%	1.9%	1.7%	1.7%
18 to 64	93.9%	90.4%	91.3%	90.5%
65+	3.9%	7.7%	7.0%	7.7%
Percentage of employment by race[1]				
White	95.9%	1.2%	94.1%	94.0%
Black	1.1%	1.2%	1.7%	2.0%
Other	2.9%	5.0%	4.2%	3.9%
Percentage of employment by Hispanic origin[1]	1.8%	3.8%	3.2%	3.5%
Percentage of employment by education, Ages 25+[1]				
Less than a high school diploma	39.3%	N/A	N/A	42.1%
High school graduate, or similar, no college	64.7%	63.0%	63.9%	56.4%
Some college or associates degree	73.7%	67.0%	67.6%	64.4%
Bachelor's degree and higher	76.9%	74.9%	73.8%	69.9%

Employed Persons 16 Years or Older 2008-2020 (Charts – to highlight trends)





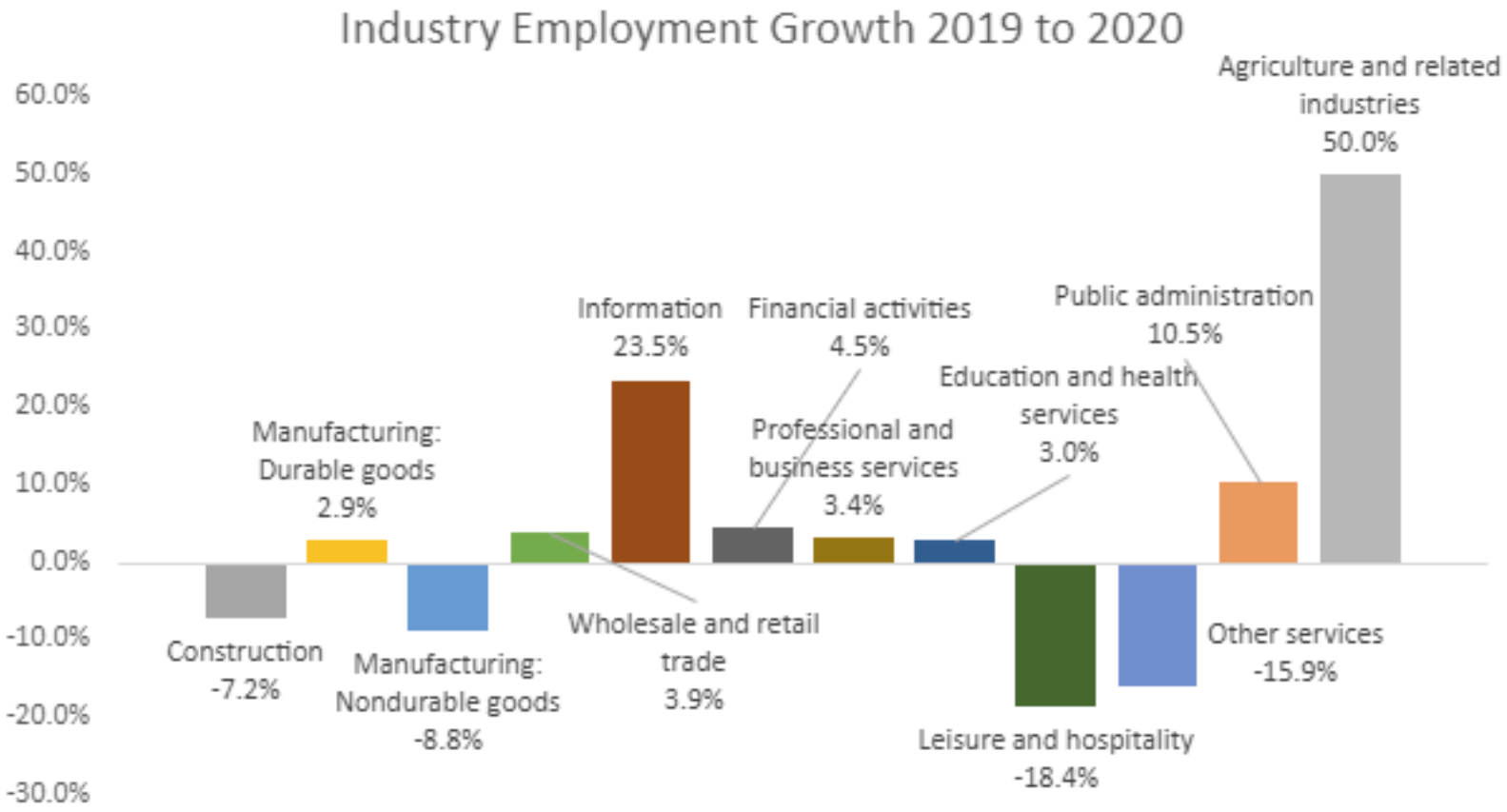


Percentage of employment by industry

Percent of employment by Industry[1]	2008	2018	2019	2020
Mining and Logging	0.1%	0.0%	0.1%	0.0%
Construction	7.4%	8.2%	8.3%	7.7%
Manufacturing: Durable goods	10.6%	10.4%	10.5%	10.8%
Manufacturing: Nondurable goods	3.2%	3.1%	3.4%	3.1%
Wholesale and retail trade	15.3%	13.5%	12.9%	13.4%
Transportation and utilities	3.9%	3.8%	3.9%	3.9%
Information	2.7%	2.0%	1.7%	2.1%
Financial activities	6.7%	6.1%	6.6%	6.9%
Professional and business services	10.6%	12.3%	11.8%	12.2%
Education and health services	21.9%	23.5%	23.4%	24.1%
Leisure and hospitality	8.0%	8.4%	8.7%	7.1%
Other services	4.3%	4.2%	4.4%	3.7%
Public administration	4.6%	3.9%	3.8%	4.2%
Agriculture and related industries	0.8%	0.6%	0.6%	0.9%

Data Source: 1. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm)

Percent change of industry employment percentage

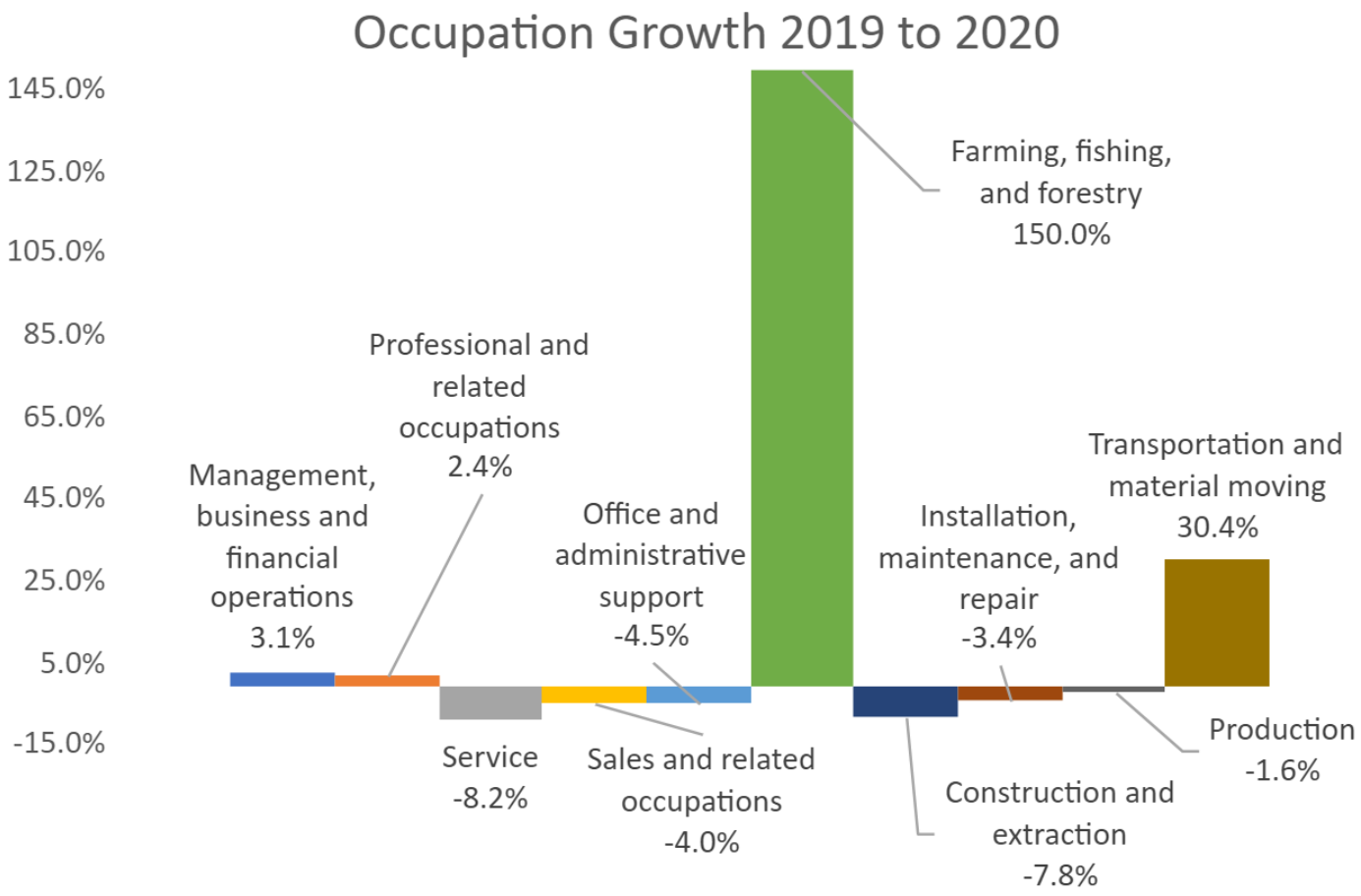


Percentage of employment by occupation

Percent of employment by Occupation[1]	2008	2018	2019	2020
Management, business and financial operations	16.8%	18.2%	19.1%	19.7%
Professional and related occupations	23.4%	25.2%	24.5%	25.1%
Service	14.6%	16.0%	15.9%	14.6%
Sales and related occupations	10.9%	10.2%	10.1%	9.7%
Office and administrative support	13.6%	10.2%	11.2%	10.7%
Farming, fishing, and forestry	0.4%	0.2%	0.2%	0.5%
Construction and extraction	5.6%	5.7%	5.1%	4.7%
Installation, maintenance, and repair	3.6%	2.8%	2.9%	2.8%
Production	6.6%	7.0%	6.4%	6.3%
Transportation and material moving	4.6%	4.6%	4.6%	6%

Data Source: 1. BLS Geographic Profiles of Employment and Unemployment (https://www.bls.gov/opub/geographic-profile/archive.htm)

Percent change of occupation employment percentage



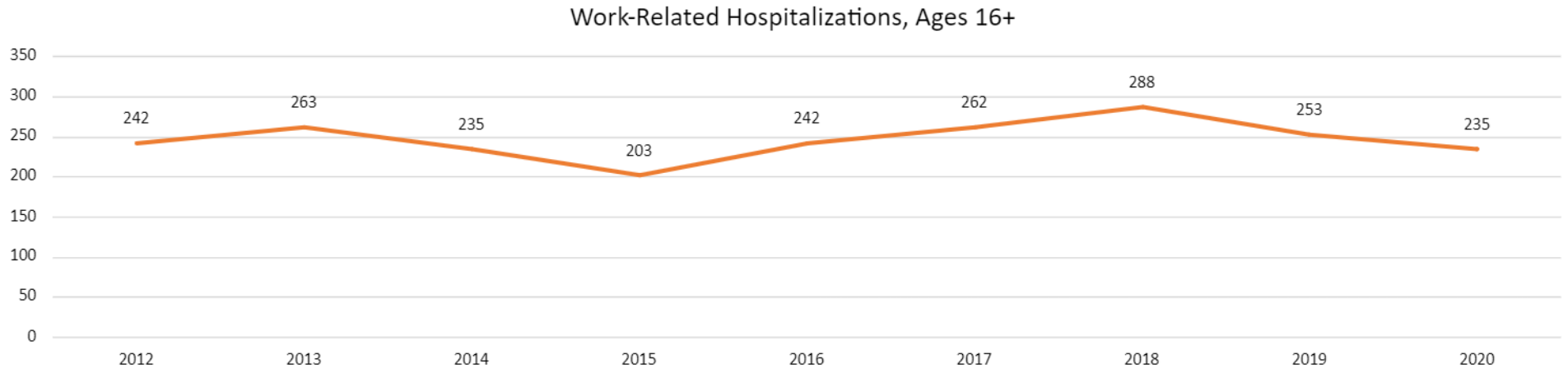
Percentage of employment by Disability Status

Percent of employment by Disability Status[2]	2009	2018	2019	2020	2021	2022
With Disability	18.9%	19.3%	19.3%	18.0%	20.7%	22.6%
Without Disability	63.4%	66.3%	66.8%	62.7%	65.0%	65.6%
Deaf or serious difficulty hearing	22.8%	24.9%	21.7%	21.4%	22.3%	23.4%
Blind or serious difficulty seeing	18.9%	21.5%	21.4%	20.4%	23.9%	21.8%
Serious difficulty concentrating, remembering, or making decisions	15.0%	16.2%	17.5%	16.9%	20.6%	21.9%
Serious difficulty walking or climbing stairs	13.0%	12.2%	12.4%	9.9%	11.8%	13.9%
Difficulty dressing or bathing	6.8%	7.0%	6.7%	5.3%	6.5%	7.1%
Difficulty doing errands alone	6.9%	7.6%	7.5%	6.4%	8.0%	8.9%

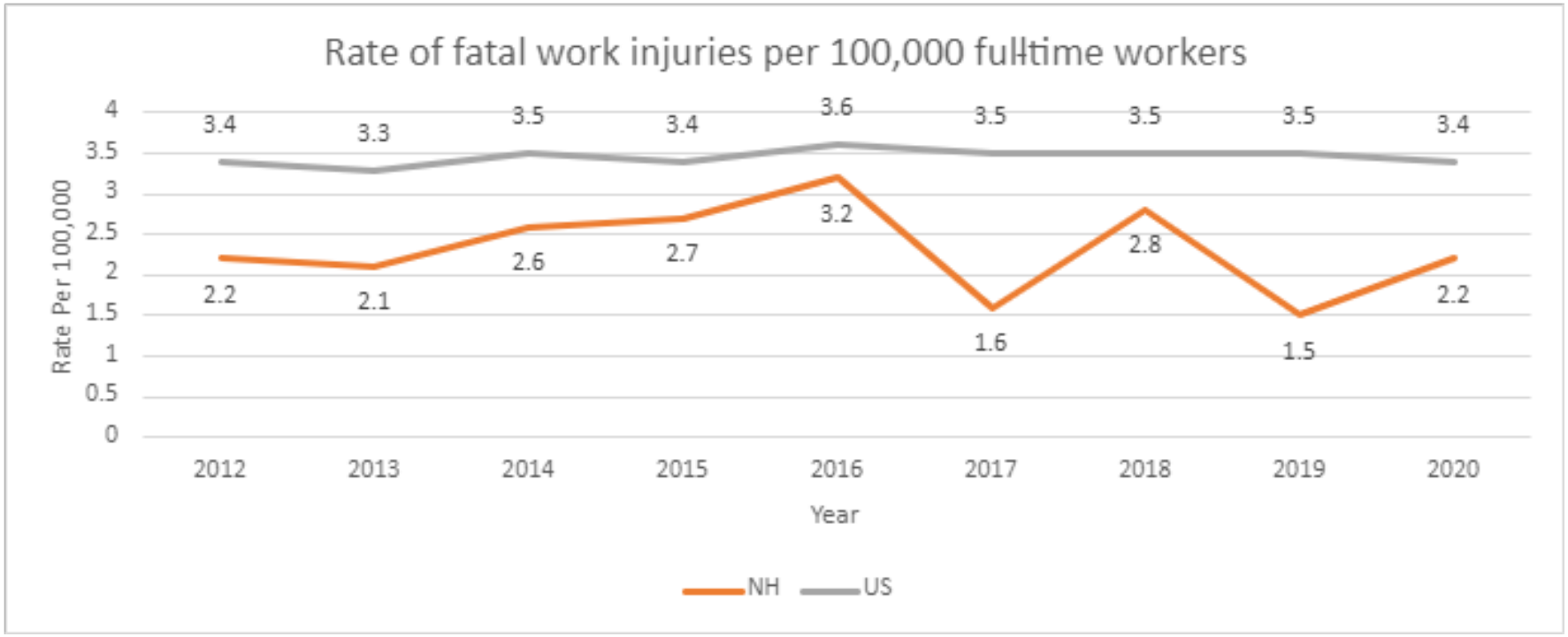
Data Source: 2. U.S. Census Bureau Current Population Survey (2008,2018,2019,2020), 1-year estimates. Summarized at Demographic Profiles: https://unhiod.shinyapps.io/DemographicProfiles/

Annual rate of Work-Related Hospitalizations 16 years and older

Year	Work-Related Hospitalizations
2012	242
2013	263
2014	235
2015	203
2016	242
2017	262
2018	288
2019	253
2020	235



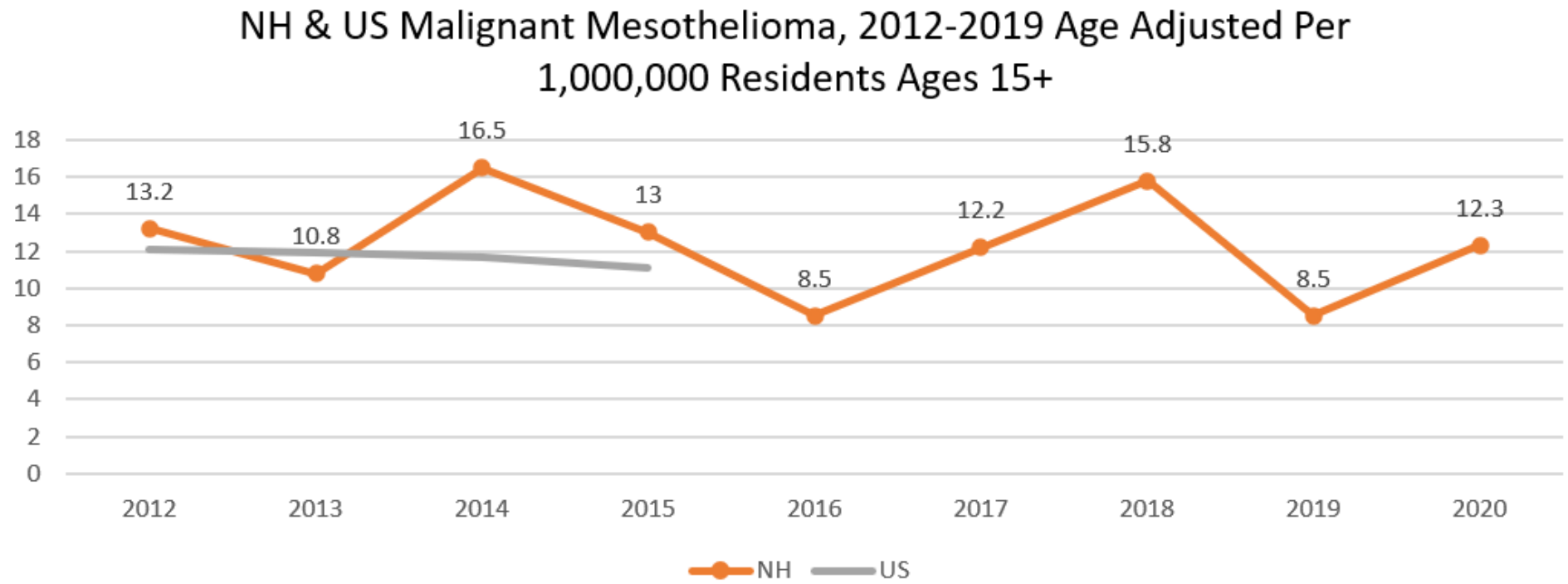
Annual rate of fatal work-related injuries in NH and U.S., 2012-2020



Hospitalization and Fatalities associated with pneumoconioses

Year	Total	Inpatient coal workers' pneumoconiosis	Inpatient asbestosis	Inpatient silicosis	Inpatient other and unspecified pneumoconiosis
2012	90	1	80	7	2
2013	82	5	73	4	0
2014	100	3	91	7	1
2015	95	4	85	4	2
2016	68	1	64	2	1
2017	63	1	59	3	0
2018	56	0	54	1	1
2019	57	3	50	3	1

Annual rate per 1,000,000 NH and U.S. residents, age 15 years and older, with malignant mesothelioma, 2012-2019



Annual number of elevated blood lead levels over time age 16 years and older, New Hampshire 2013-2020

Table 1: Blood lead levels over time, New Hampshire residents 16 years and older (2013-2020)

Blood Lead Level	2013	2014	2015	2016	2017	2018	2019	2020
<5 µg/dL	1,400	1,603	1,993	2,294	2,469	2,365	2,567	1,976
5-9 µg/dL	202	223	208	239	245	234	166	137
10-24 µg/dL	156	108	140	140	173	136	121	83
25+ µg/dL	23	14	15	38	25	31	17	7

Note - The results in this and following tables are limited to the single highest blood lead value per person per year.

State of New Hampshire Adult Blood Lead Report: 2013-2020 (nh.gov)

Lead Test Results > 24 ug/dL or higher by Industry, 2013-2020

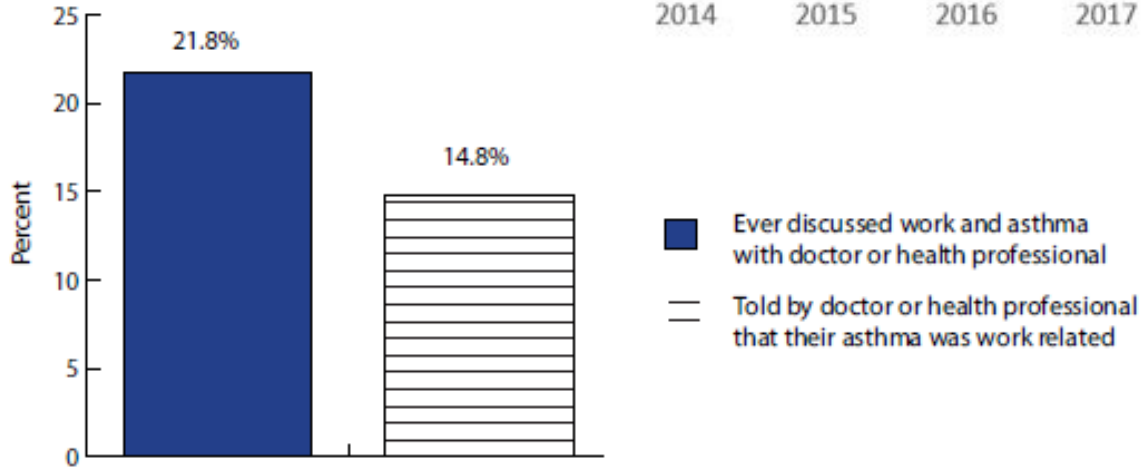
Table 4: Industry sector for cases 25 µg/dL or higher with occupational information (n=82)

Sector	Description	Count	Percent
22	Utilities	<5	<5%
23	Construction	28	34%
31-33	Manufacturing	26	32%
42	Wholesale Trade	<5	<5%
56	Administrative and Support and Waste Management and Remediation Services	13	16%
71	Arts, Entertainment, and Recreation	6	7%
81	Other Services (except Public Administration)	<5	<5%
92	Public Administration	<5	<5%

State of New Hampshire Adult Blood Lead Report: 2013-2020 (nh.gov)

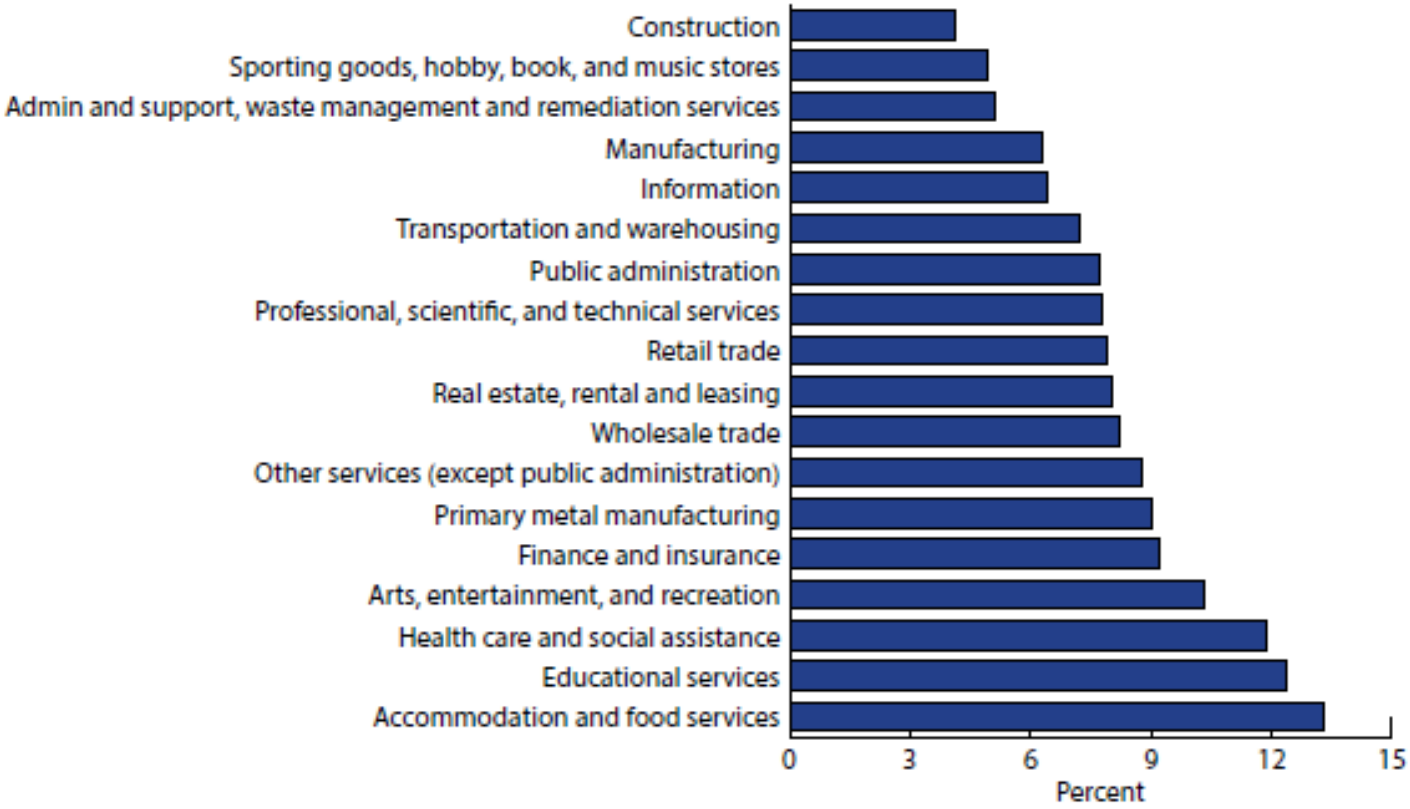
Work-Related Asthma BRFSS

Figure 10. Work-Related Asthma



Work-Related Asthma

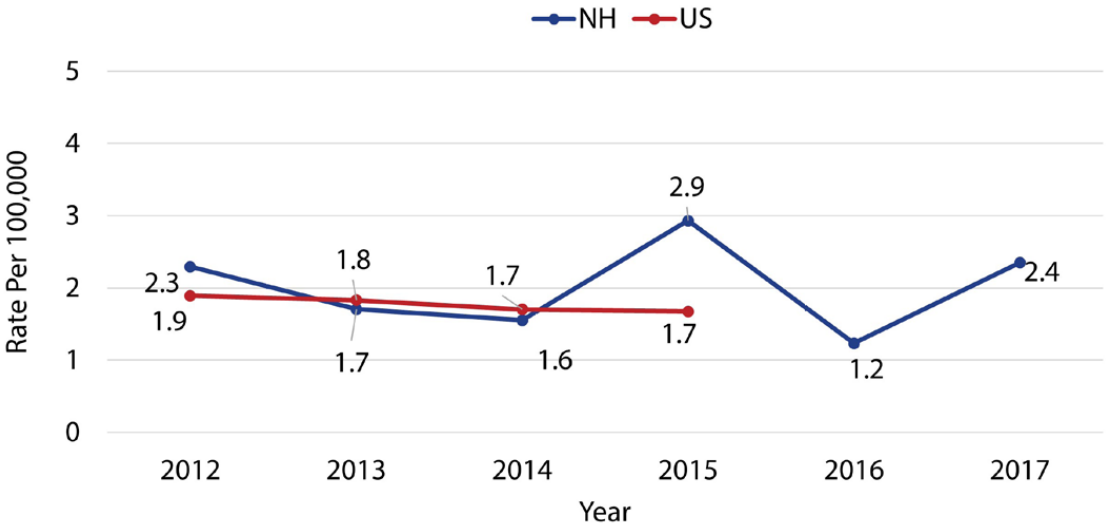
Figure 12. Percent of NH Workers Reporting Current Asthma by Industry, BRFSS-ACB, 2014-2016



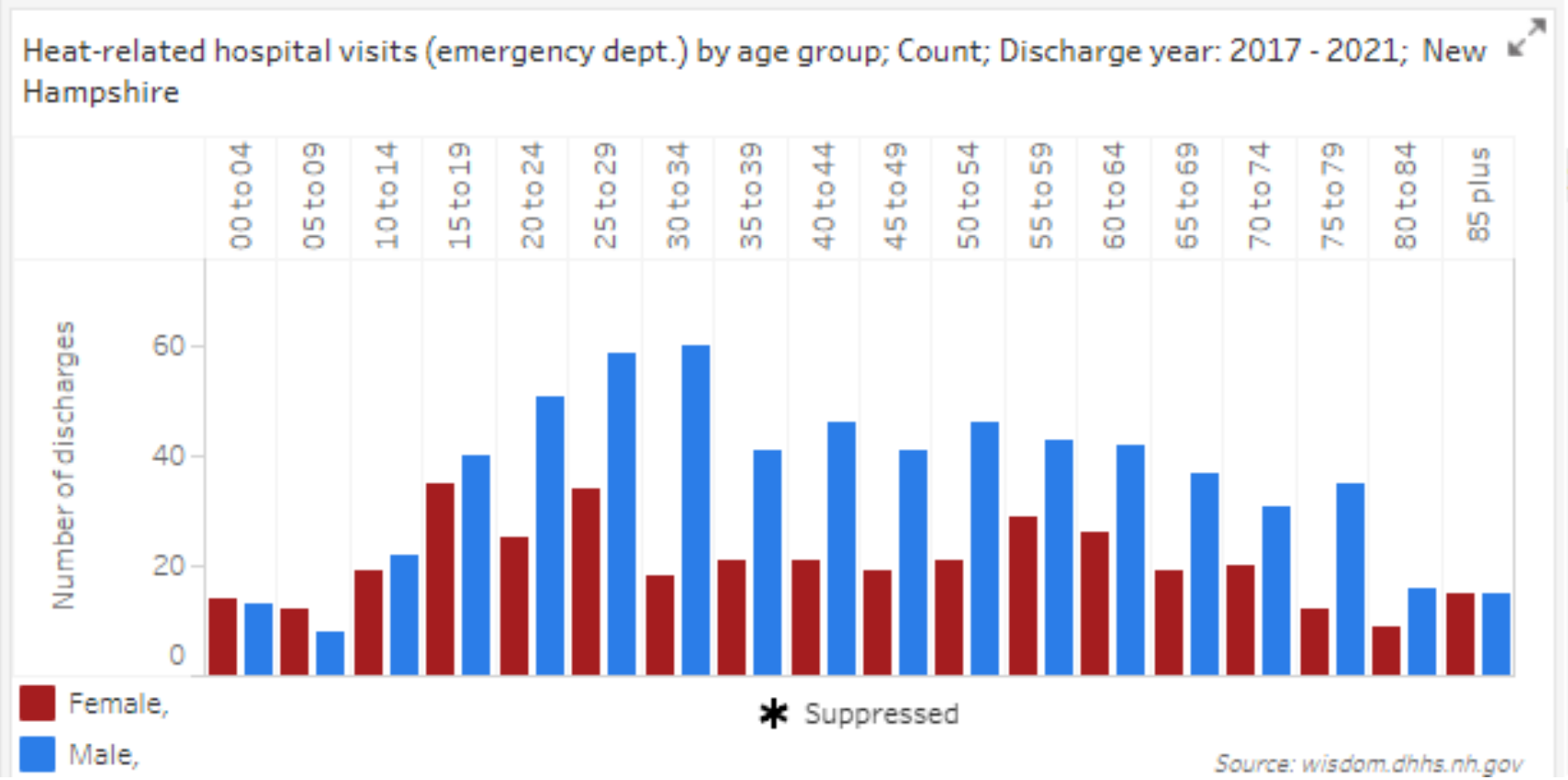
Data Source: NH Behavioral Risk Factor Surveillance System Survey (BRFSS)

Occupational Poisonings
NH and US Pesticide Associated Illness/Injury 2012-2017
Rate per 100,000 Employed Ages 16+

Year	Total
2000	12
2001	9
2002	18
2003	7
2004	14
2005	3
2006	7
2007	8
2008	7
2009	5
2010	13
2011	12
2012	16
2013	12
2014	11
2015	21
2016	9
2017	17

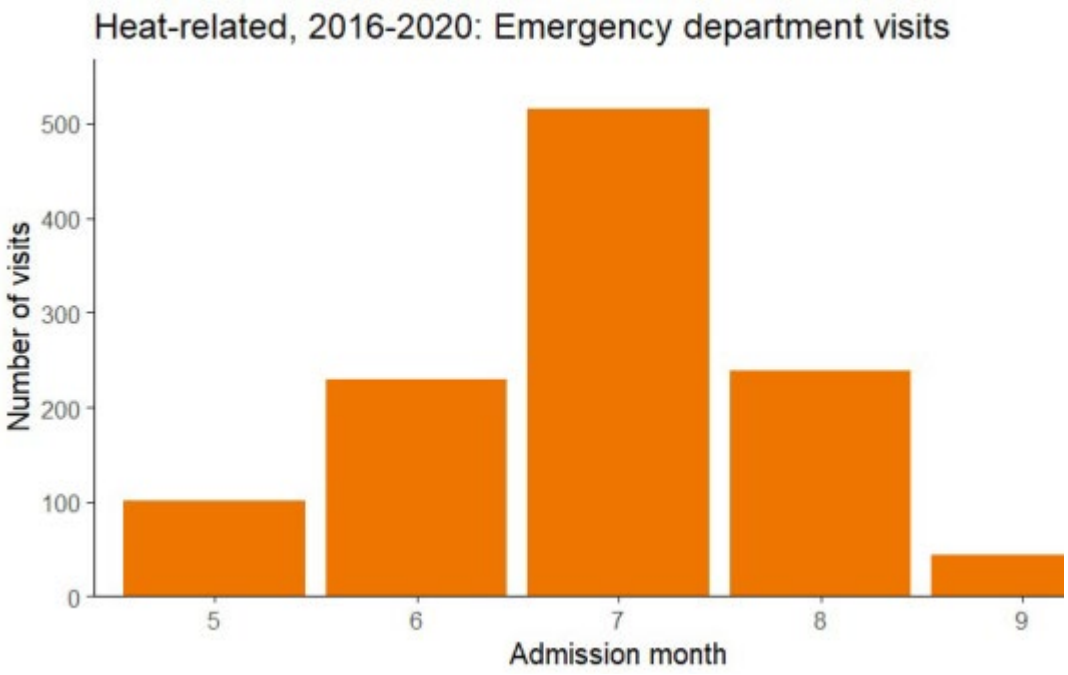


Heat Related Illness



NH DHHS Data Portal, Environmental Public Health Tracking Portal
https://wisdom.dhhs.nh.gov/wisdom/topics.html?topic=climate-and-weather

Heat Related Illness



11%* of all heat emergency department (ED) visits

This is about
5x
the rate of work-relatedness for all ED visits

NH DHHS Environmental Public Health Tracking Program
https://www.dhhs.nh.gov/programs-services/environmental-health-and-you/environmental-public-health-tracking

Morbidity and Mortality by Industry and Occupation

Indicator	2017	2018	2019	2020	2020
Percent Employed in Industries at High Risk for Morbidity	5.3%	5.0%	4.1%	4.1%	4.3%
Percent Employed in Industires at High Risk for Mortality	13.8%	14.4%%	14.5% %	14.4%	12.7%
Percent Employed in Occupations at High Risk for Morbidity	14.3%	13.9%	13.5%	14.2%	11.9%
Percent Employed in Occupations at High Risk for Mortality	10.0%	9.7%	10.4%	10.0%	8.1%

OSHA Enforcement Activities

Workers' Compensation Benefits Paid per Covered Job, NH 2010-2020

Year	Total Benefits Paid	Covered Jobs	Benefits Paid per Covered Worker	Benefits Paid per Covered Worker Adjusted by CPI-U for 2020
2010	$251,667,000	593,000	$424	$509
2011	$231,800,000	598,000	$388	$458
2012	$231,235,000	605,000	$382	$438
2013	$225,500,000	611,000	$369	$416
2014	$212,778,000	619,000	$344	$382
2015	$213,923,000	629,000	$340	$378
2016	$205,663,000	640,000	$321	$352
2017	$209,535,000	646,000	$324	$347
2018	$209,489,000	651,000	$322	$338
2019	$207,719,000	657,000	$316	$326
2020	$201,706,000	616,000	$327	$327

Indicators to Watch

- **Work-related hospitalizations (Indicator #2) has been increasing steadily since 2015 (203 to 288) and merits close review in future years to assess whether the trend continues.**

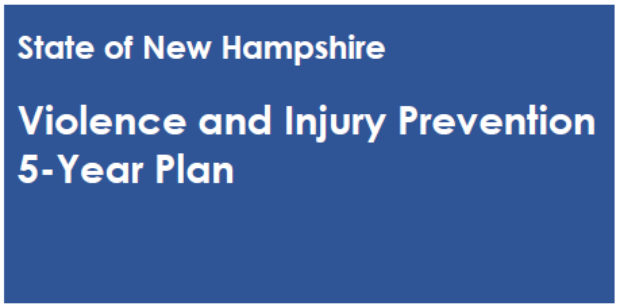
- **Work-related deaths (Indicator #3), have, outside of 2017, shown a steady increase in the rate per 100,000 since 2012, increasing from 2 per 100,000 to 2.8 in 2018.**

- **Reported adult blood lead levels (Indicator #13) of 10 µg/dL or higher have increased 19%from 2012 (100) to 2016 (124), with those above 25 µg/dL more than doubling during the same time period from 12 to 27.**

- **Workers' Compensation (Indicator #19) data shows that the average benefits per covered worker is $167 less in 2018 than 2010, a 34% drop in coverage during a time of rapidly increasing health care costs.**

SEPARATE RESEARCH PROJECTS

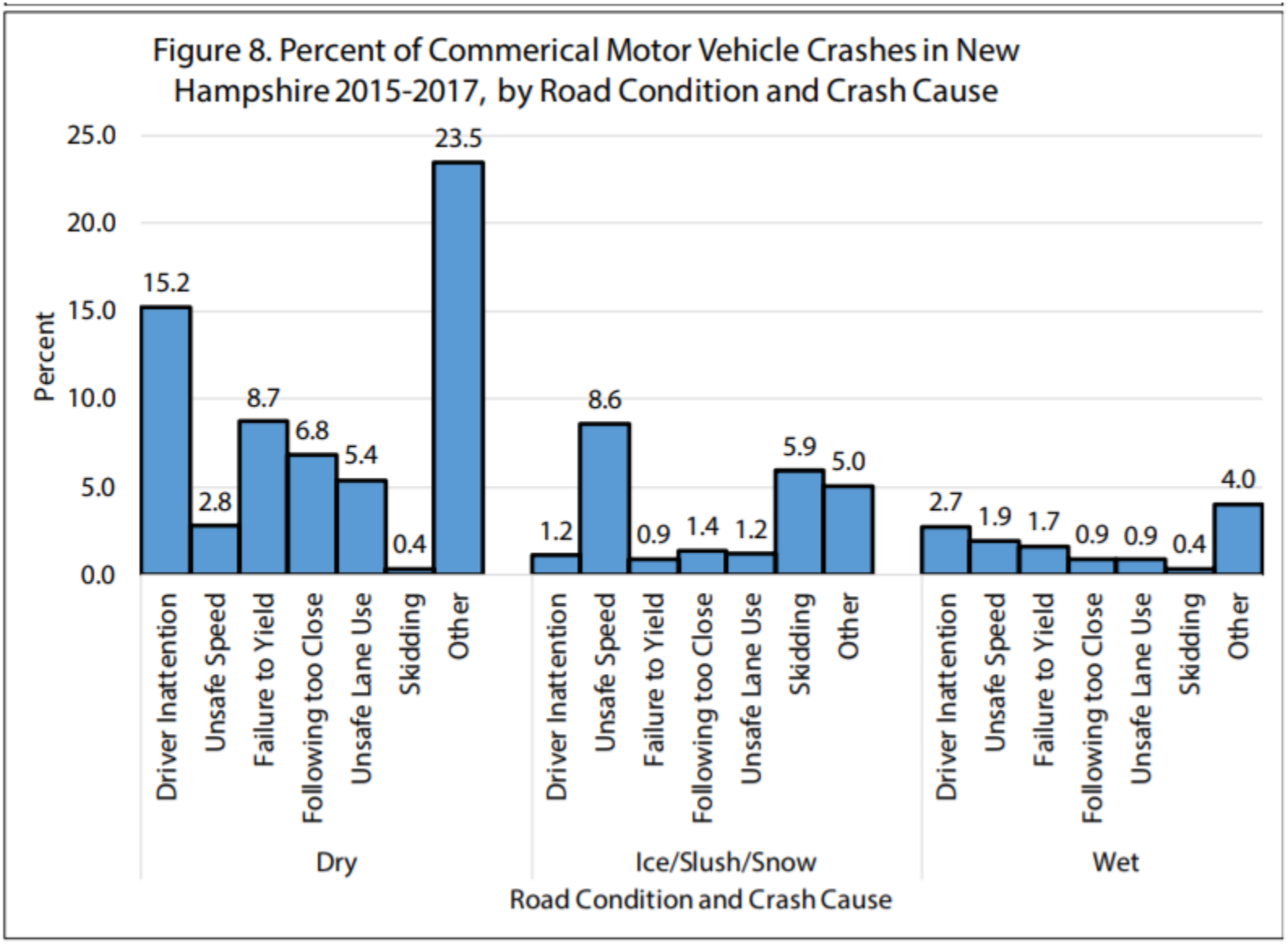
Injury Prevention



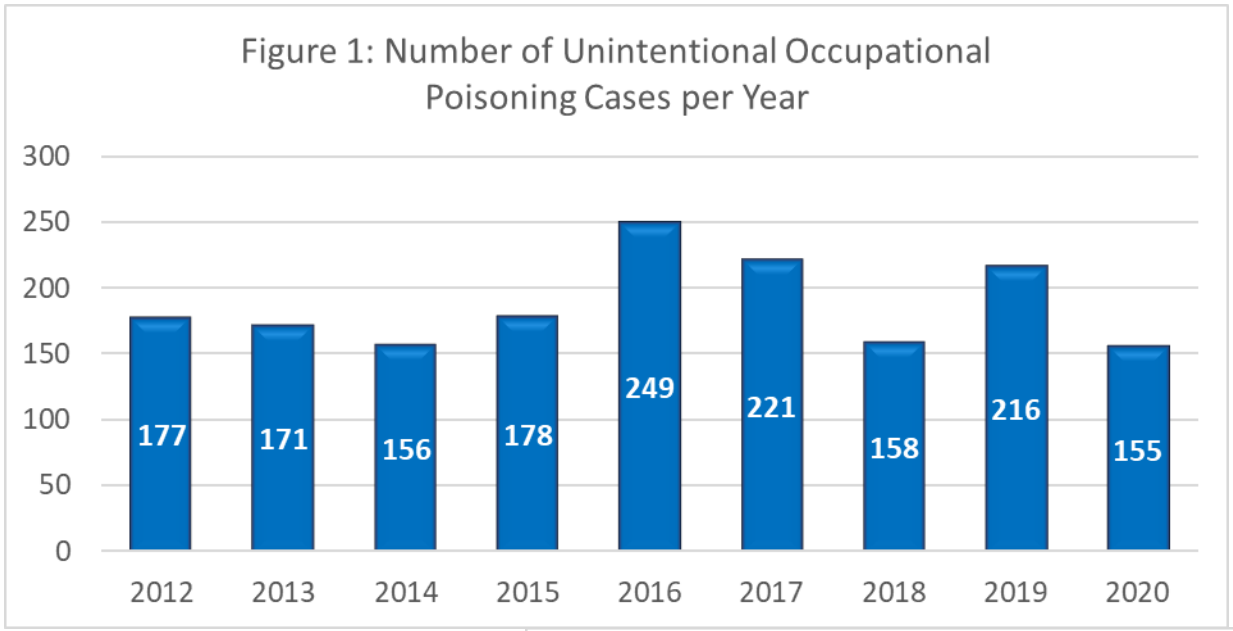
https://www.dhhs.nh.gov/dphs/bchs/mch/documents/nh-vip-plan-2020-2025.pdf

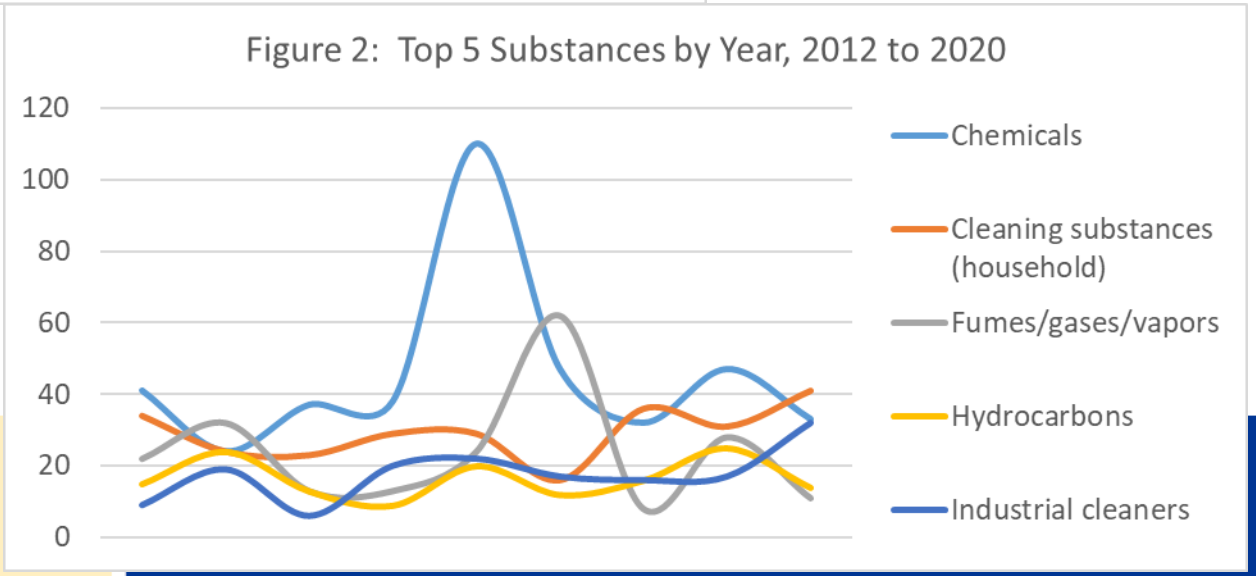
- NH's workforce has been severely impacted by the state's opioid crisis in recent years.
- In 2018, those in their prime working age of 30-49 accounted for 55% of lethal overdose deaths in workers.
- In the last five years in NH (2014-2018), those working in the construction industry have had the highest incidence of opioid overdose deaths, accounting for one-third (36%) of all overdose deaths among workers.

Commercial Motor Vehicle Crashes

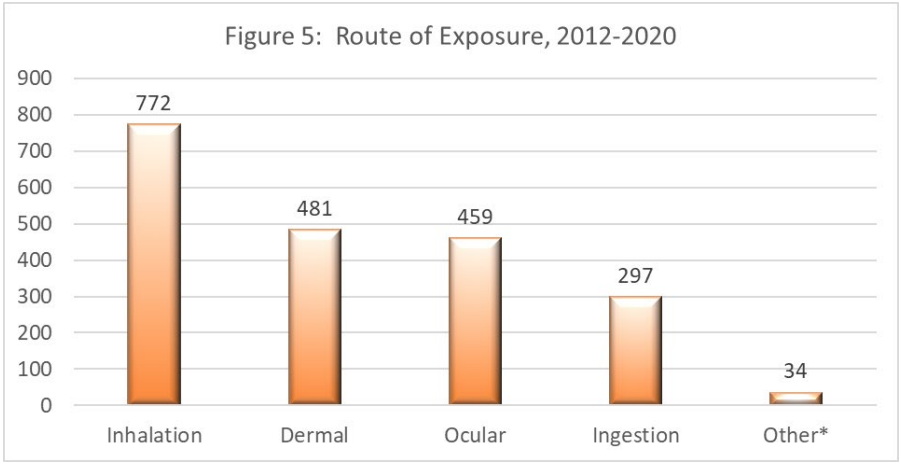


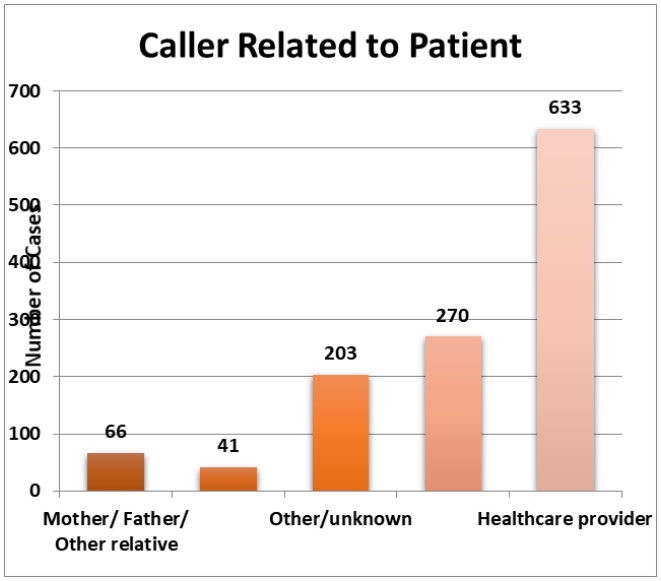
Occupational Poisoning Data – Northern New England Poison Center

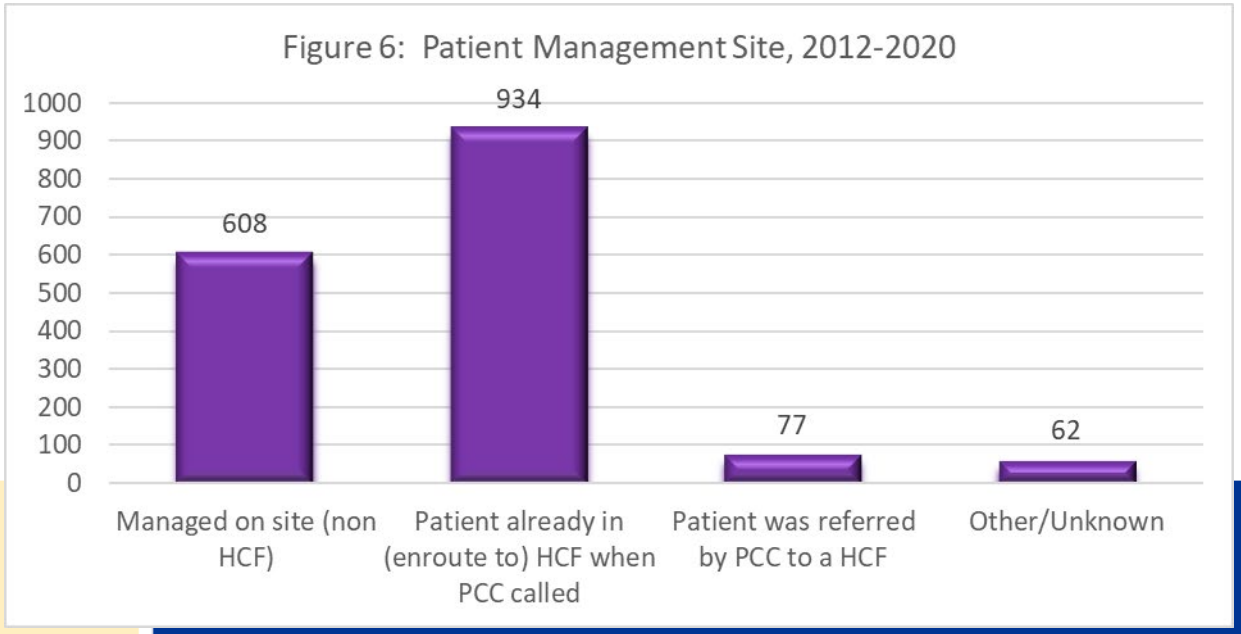




Occupational Poisoning: Poison Center Data

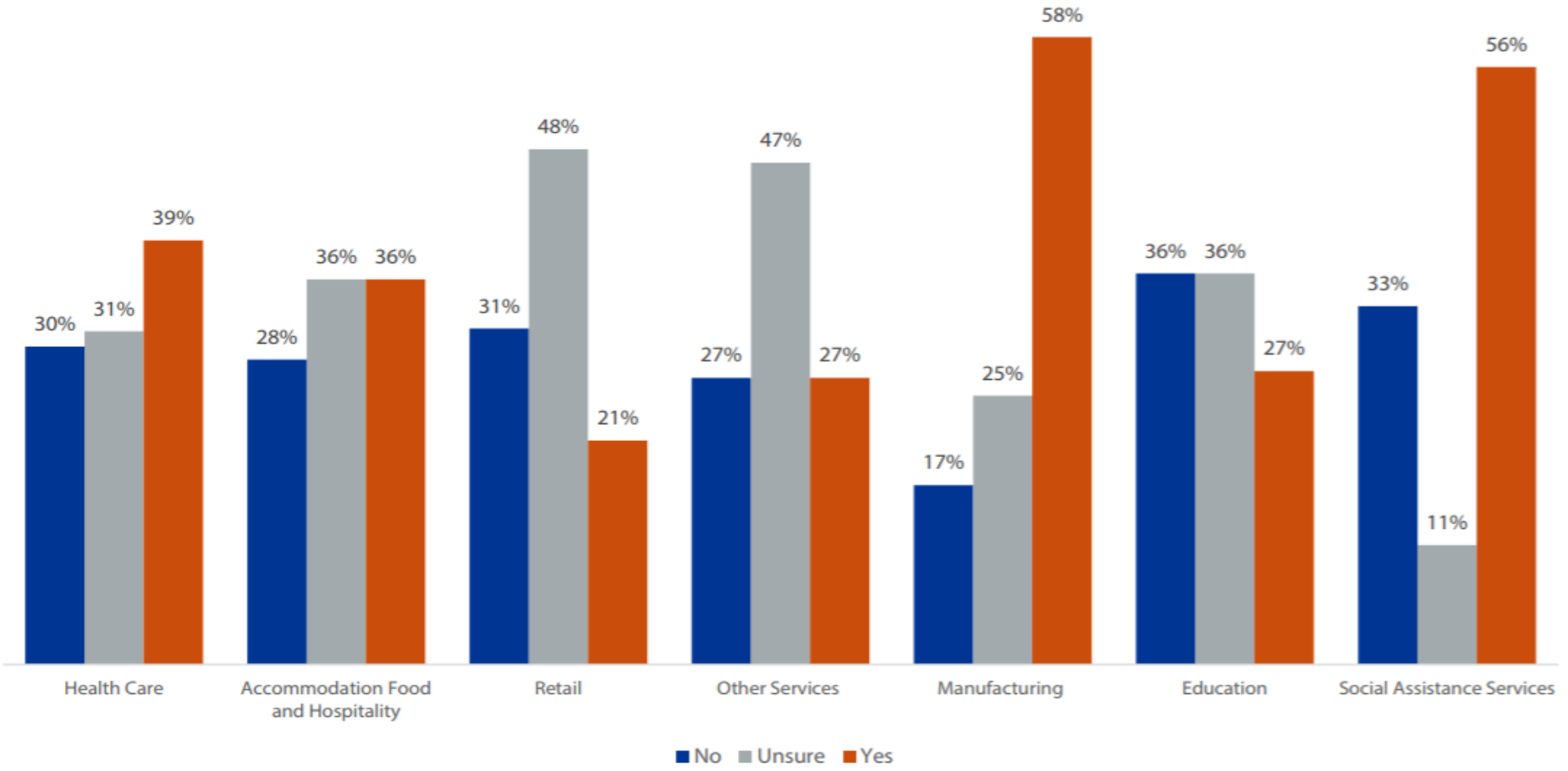






Exploration of breastfeeding barriers associated with returning to work among women enrolled in the NH WIC Program

Would you have continued breastfeeding longer if it was easier to pump at work?



Employment Opportunities Benefit NH Adults with Cognitive Disabilities

Working-age adults with cognitive disabilities in New Hampshire (NH) are less likely to live in poverty and more likely to report that they feel healthier when they work for wages or are self-employed.

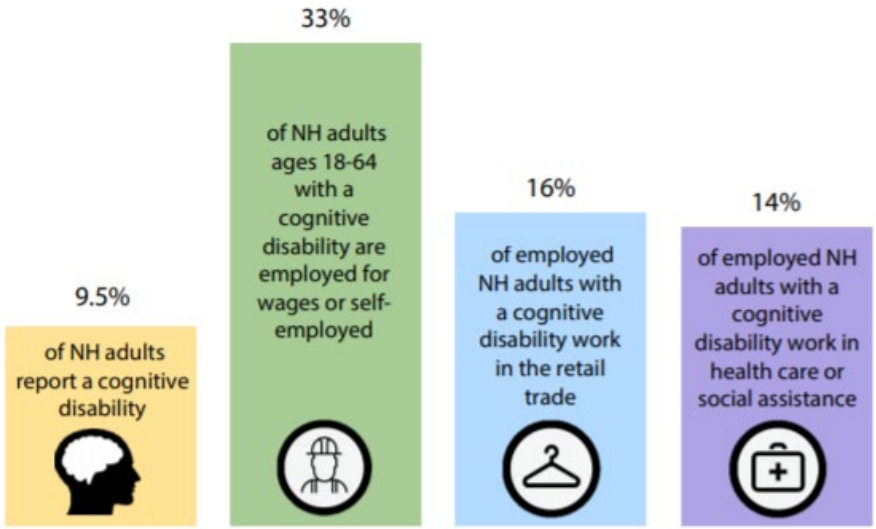
31% of employed adults ages 18 to 64 with cognitive disabilities report their health is "fair" or "poor," compared to 51% who do not have jobs[1]

12% of employed adults ages 18 to 64 with cognitive disabilities have annual household income less than $15,000, compared to 35% who do not have jobs[1]

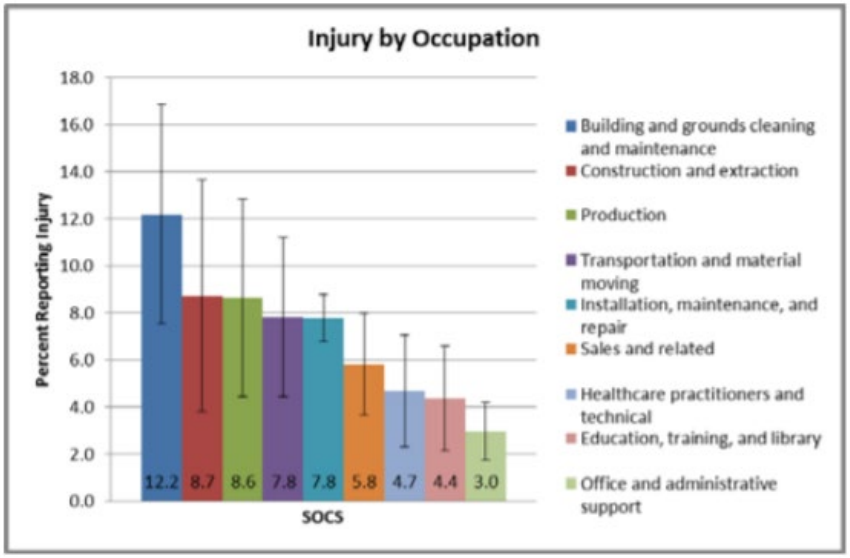
"[My job] solidifies my position in the community. It gives me a sense of purpose and an income."

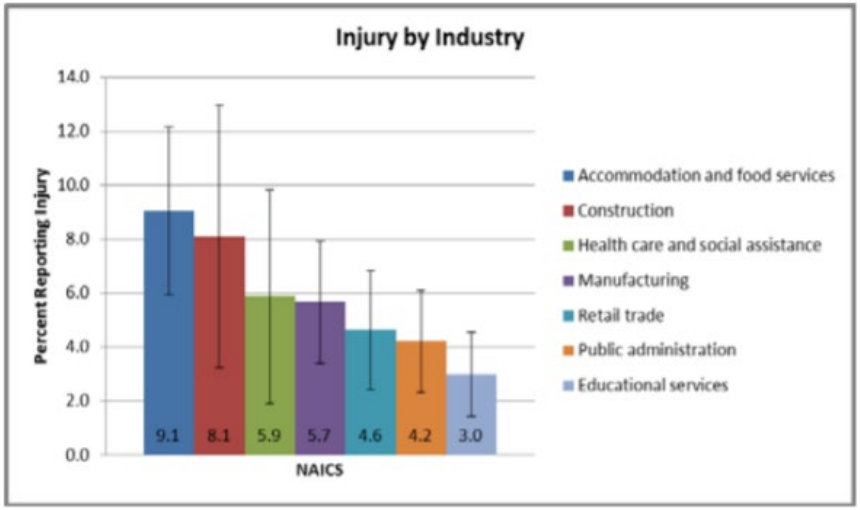
John lives in Lebanon, NH and has a brain injury and visual impairment

Employment among People with Cognitive Disabilities in NH

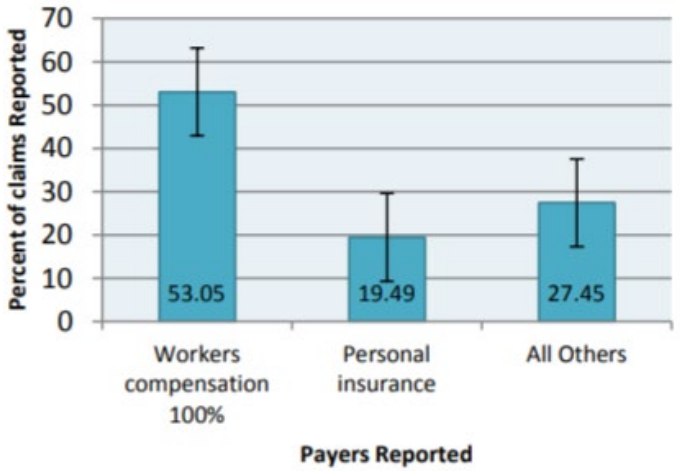


Utilization of the NH Behavioral Risk Factor Surveillance System (BRFSS) to Better Understand Under-Reporting of Work-Related Injuries



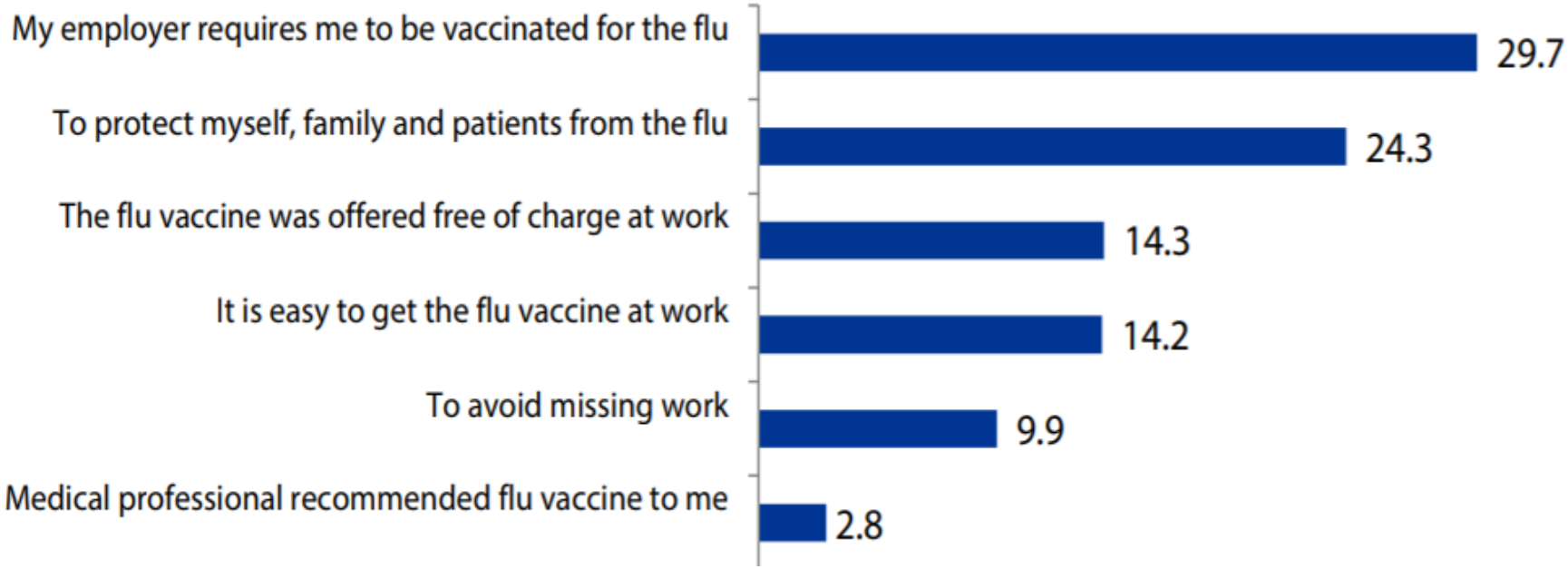


Work-Related Injury by Payer Source

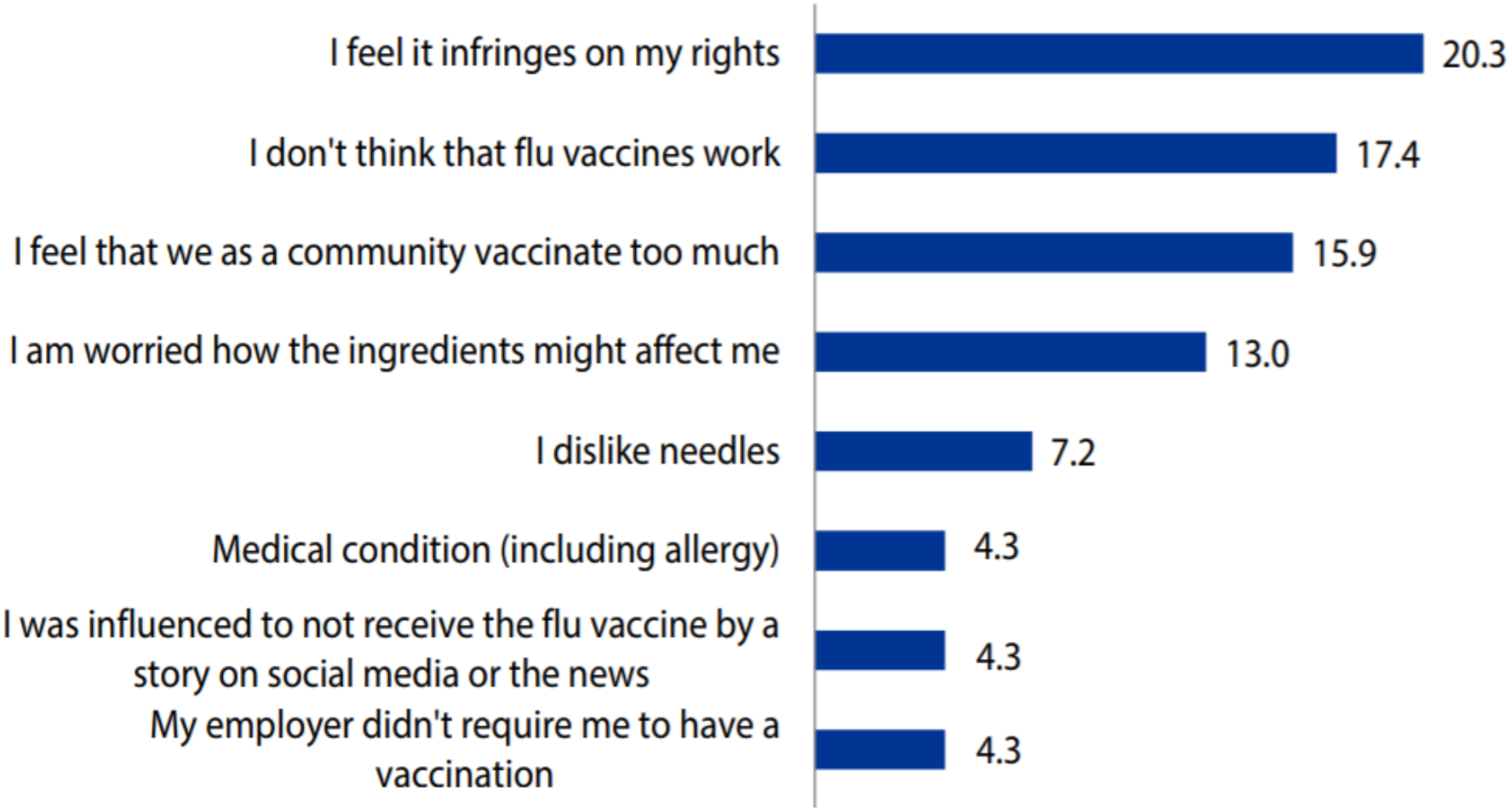


Impact of Influenza Policies among New Hampshire Healthcare Personnel

Top reasons for getting the flu vaccine



Top reasons for not getting the flu vaccine



Immigrant /Refugee Workers in Partnership with NH COSH

- 366 immigrants/refugees completed surveys, and 229 (63%) reported working in the U.S. now or at some point in their lives.
- The most common reported job/industry categories were factory, cleaning, food service, farming, service, construction and retail.
- 29 respondents, or about 10% of those who have worked in the U.S., noted they had been injured at work. Common body parts affected included hands, fingers, wrists, backs, knees, feet, elbows, and abdominal regions.

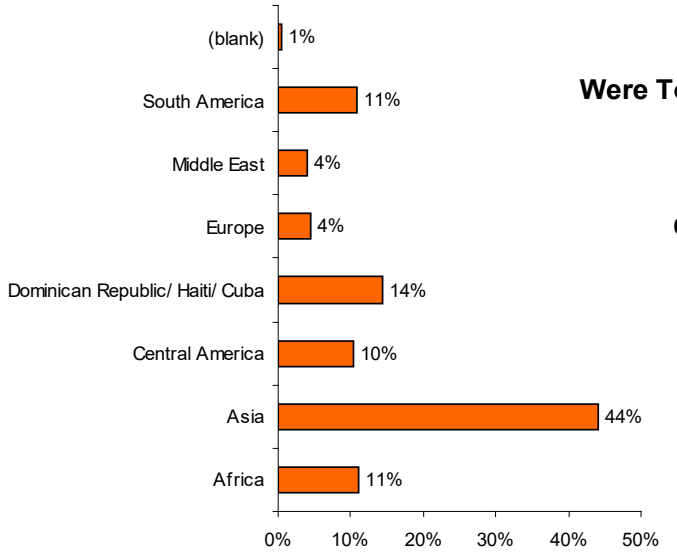
Immigrant Survey Report February 2013

Number weeks out of work	Hurt at work (Yes)
Less than 1 week	2
1 week	4
2 weeks	4
4 weeks	3
8 weeks	1
28 weeks	1
(blank)	2
Grand Total	17

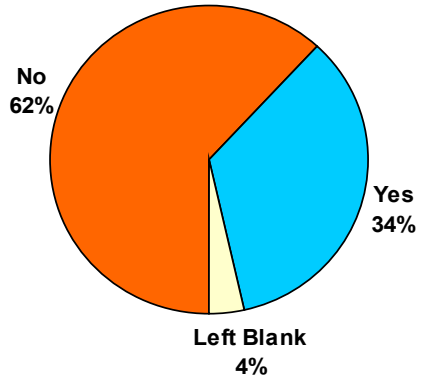
Who Paid The Bill? (could choose more than one)	Hurt at work (Yes)
Bill Paid-WC	8
Bill Paid-Your own health insurance	5
Bill Paid-Your own money	9
Bill Paid-Your employer/company	9
Bills-never paid	6
Never got a bill	6

Of the 229 respondents who reported working in the U.S., 69% reported that they always or sometimes maintain tiring or painful positions at work.

Respondents' Continents of Origin



Were Told About Worker's Compensation



Hazard Alerts

- Protect Yourself from Ticks Where You Work
- Removing Snow from Rooftops is Dangerous
- Heat Illness at Work Can Be Deadly
- Tree Work Can Be Fatal
- NH Methylene Chloride Fact Sheet
- Asthma and Cleaning Products, What Workers Need to Know, (English) (Spanish) (French) (Nepali) (Swahili)
- Healthy Body, Healthy Lungs-What Salon Workers Need to Know About Their Risk for Work-Related Asthma

https://iod.unh.edu/projects/occupational-health-surveillance-program/hazard-alerts

Trainings

- Staying Safe at Work: A Curriculum for Teaching Workers with Intellectual and Developmental Disabilities about Health and Safety on the Job

- Collecting Industry and Occupation Data: A Training Guide for Healthcare Staff (Video)

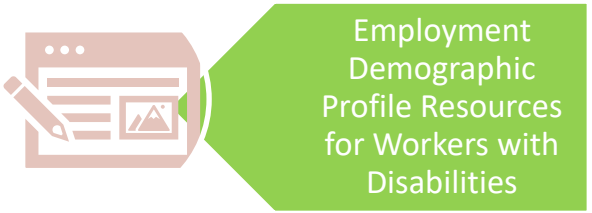
https://iod.unh.edu/projects/occupational-health-surveillance-program/trainings

New Grant Cycle 2021-2026

Fundamental Projects

- Core Occupational Health Indicators
- Enhanced Adult Lead Surveillance
- Opioid Use and Suicide (Morbidity and Mortality) by Industry and Occupation
- Enhanced COVID Surveillance
- Productive Aging and Work (CACL Collaboration)
- Chronic Disease and Disability (by Industry and Occupation (BRFSS)

Expanded Projects



COVID-19 Supplemental Funding

- Strengthening Vaccine Confidence in Workers
- Safe Return to Work Policies, and Mitigate or Prevent COVID 19 Outbreaks in Various Industrial Sectors

http://infolytics.wordpress.com/category/data-analysis/

Limitations of the Data

Data Limitations and Barriers

- Many work-related injuries and illnesses are not reported or recorded.
- BLS Annual Survey does not require every business to participate (probability survey of ~230,000 workplaces)
- 20% of workers – including public employees and those who are self-employed – are not counted by the Bureau of Labor Statistics.
- Occupational information is not considered a core demographic variable.
- Physician's reporting systems don't fully capture work related conditions.
- Medical records not always charged to workers' compensation insurance.

Data Tools

NH OHSP

NH OHSP Data Portal

- National survey analysis and communication of worker COVID-19 vaccination: https://iod.unh.edu/nhohsp/data-portal/covid-19-vaccination-vaccine-hesitancy-us-workers
- Exploring economic vulnerabilities within demographic, state, and disability status:

  https://iod.unh.edu/nhohsp/data-portal/employment-demographic-profiles

Data Tools – National and State Estimates

- CSTE Occupational Health Subcommittee
- https://www.cste.org/members/group.aspx?id=251931
- CSTE OHI https://www.cste.org/group/OHIndicators

NIOSH Tools

NIOSH Clearinghouse

- https://wwwn.cdc.gov/niosh-statedocs/

NIOSH Worker Health Charts

https://wwwn.cdc.gov/niosh-whc/

What are the priority areas you are seeing in your businesses?

Are there ways we can partner on projects (conducting surveys, hazard alerts, training)?

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Sign up for our newsletter/mailing list at:
https://iod.unh.edu/projects/occupational-health-surveillance-program/mailing-list

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