

# COVID Risk Experienced By NH Workers – 2021

## Contributors:

Doug Marino, NH Occupational Health Surveillance Program,  
Institute on Disability, University of New Hampshire

Nate Thomas, MSBA, NH Occupational Health Surveillance  
Program, Institute on Disability, University of New Hampshire

Karla Armenti, MS, Sc.D., NH Occupational Health Surveillance  
Program, Institute on Disability, University of New Hampshire

## Table of Contents

Contributors: .....	1
Executive Summary.....	2
Introduction.....	3
Methods .....	3
Study Design and Setting.....	3
Study Population and Descriptive Variables.....	4
Outcome Measures .....	5
Statistical Analysis .....	5
Results .....	5
COVID-19 Risk by Industry and Occupation .....	6
COVID-19 risk by other measures .....	6
Table 1: Distribution of COVID-19 Risk Experienced by New Hampshire Workers by Employer Size, Safety Training Frequency, Occupation, Age, Gender, Race/Ethnicity, and Health Risk Behaviors, 2021 .....	8
Discussion.....	13
Limitations .....	13
References .....	14

## Executive Summary

This report was developed by the New Hampshire Occupational Health Surveillance Program at the University of New Hampshire Institute on Disability, based on the New Hampshire Behavioral Risk Factor Surveillance System (BRFSS) 2021 survey. The goal of the program is to identify health trends in the workplace and inform future public policy changes to improve public health.

Respondents from several different industries and occupations reported the level of risk they experienced of contracting COVID-19 in the workplace. Respondents had the opportunity to choose whether they were at a high risk of contracting COVID-19 in the workplace, moderate, risk, low risk, and no risk. The survey measures occupations within the healthcare industry, the manufacturing

industry, transportation, computer sciences, education, maintenance, as well as other occupations. The data was collected in 2021, so respondents had roughly a year of living through the COVID-19 pandemic to inform their responses.

The data collected indicates that those who work in the food service industry faced an extremely high risk of contracting COVID-19 at work. Restaurants were among the first businesses to reopen during the pandemic, and many service employees felt that they had to go back to work for financial reasons.

The risk of contracting COVID-19 was also high among healthcare workers, and other social service workers. Many of these workers were on the frontline of the pandemic and were adversely impacted by the shortages of personal protective equipment (PPE). Non-white respondents also reported a disproportionate risk of contracting COVID-19.

## **Introduction**

The COVID-19 pandemic has fundamentally changed the landscape of the American workplace. Many workers experienced significant risks in their workplace. Other studies have shown that 48.8% of employees in protective service occupations, such as firefighters and police officers, were exposed to COVID-19 at work. Among non-healthcare workers, one in five workers reported being exposed to COVID-19 in the workplace (Free, et al, 2022).

It is important to note that not every occupation is conducive to working from home, and many workers had to make a choice between making ends meet and staying safe from the virus.

Awareness of the prevalence of disease outcomes by industry and occupation can assist in identifying disease clusters or outbreaks, determining the magnitude of a problem within worker groups, and prioritizing industries and occupations for the development of prevention measures.

## **Methods**

### **Study Design and Setting**

This study uses the New Hampshire Behavioral Risk Factor Surveillance System (BRFSS) 2021 survey from the Centers for Disease Control and Prevention (CDC) administered by the New Hampshire Department of Health and Human Services (NH DHHS). This is a national telephone survey (cell and land-line) designed to collect demographic and health data information such as risk behaviors, chronic conditions, and preventive service usage for all 50 states (CDC, 2014)

## Study Population and Descriptive Variables

This analysis utilizes the 2021 NH BRFSS, to evaluate the population of non-institutionalized working adults 18 years or older in New Hampshire for their perception of the COVID-19 risk they experienced through the workplace. This analysis extends into reviewing experience of COVID-19 risk by employer size, general workplace safety training as an impact for reducing COVID-19 risk, as well as industry and occupation-specific occupational risk profiles. Safety trainings investigated were not necessarily related explicitly to COVID-19, but are used as an indicator for safety prioritization by the employer. The following post-processing data transformations were performed to facilitate interpretability.

- Age groups are defined to be “Age 18 to 44”, “Age 45 to 64”, and “Age 65 or older”
- Disability status is defined by having answered “Yes” to any of the following questions: “Are you deaf or do you have serious difficulty hearing?”, “Are you blind or do you have serious difficulty seeing, even when wearing glasses?”, “Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?”, “Do you have serious difficulty walking or climbing stairs?”, “Do you have difficulty dressing or bathing?”, “Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor’s office or shopping?”
- Industry and occupation coding is based on NAICS<sup>1</sup> 2-digit, and SOC<sup>2</sup> major codes aligned with 2012 Census codes.
- The following question was included in the 2021 NH state specific BRFSS, and used to determine risk perceived by workers of “Rate the level of risk of being infected with the Corona Virus with the type of work you do (read the response options to respondent)”, the following available selections are included in subsequent analysis “High risk”, “Moderate risk”, “Low risk”, “Not at all”, with the following responses excluded “Not sure/don’t know”, and “Refused”.

BRFSS pre-calculated variables were used to define employment. Variables with skip patterns, and missing, unknown, or refusal responses are omitted from analysis.

---

<sup>1</sup> North American Industry Classification System (<https://www.census.gov/naics/>)

<sup>2</sup> US Bureau of Labor Statistics Standard Occupational Classification (<https://www.bls.gov/soc/>)

## Outcome Measures

The outcome measure was “perceived COVID-19 risk experienced by NH workers.” This experienced risk was analyzed by industry, occupation, and demographic characteristics. Suppression of data follows guidance provided by the CDC (Parker et al., 2017). Data stratification and weighting process to provide statewide representative populations of the New Hampshire community follow guidance by the CDC (CDC, 2021).

## Statistical Analysis

R Version 4.2 was used as the primary statistical software (2021). The following libraries were used tidyverse, readxl, rvest, R.utils, survey, plyr, and writexl.

## Results

Among workers, 16.9% of the working population reported being at high COVID-19 risk. 22% of workers reported moderate COVID-19 risk. 33.9% of workers reported a low COVID-19 risk, and 14.3% of them reported no COVID-19 risk.

Among workers with 1-10 employees, 15.6% of them reported being at high COVID-19 risk. 18.4% of those workers reported a moderate COVID-19 risk, 37.4% reported a low COVID-19 risk, and 22.2% reported no COVID-19 risk. The rates were higher among workers with 11-49 employees. 23% of those workers reported being at a high risk for COVID-19, 27.1% reported moderate risk, 38.2% reported low risk, and just 8.3% of workers reported no COVID-19 risk. Among employers with 50-249 employees, the rate of high COVID-19 risk was 20.2%. 28% of those workers reported moderate COVID-19 risk, 37% reported low COVID-19 risk, and 9.5% reported having no COVID-19 risk. The rate of workers with high COVID-19 risk was 15.5% among employers with 250 to 999 employees. 26.5% of them reported a moderate risk, 11% higher than those who reported being at high risk. 36% of those workers reported low COVID-19 risk, and 15.2% reported no risk. 19.9% of employers with 1000 or more employees reported being at high risk, 21.1% reported a high risk, 37.1% reported a low risk, and 19.7% of them reported being at low risk.

The results seem to indicate that general safety trainings (not specific to COVID-19) did not make a difference in combating employees' risk of contracting COVID-19. 27.9% of workers who attended 5 or more safety trainings in the past year reported being at high risk for COVID-19, 28% reported moderate risk, 31% reported low COVID-19 risk, and just 9.8 reported no COVID-19 risk. By comparison, only 10% of workers who attended zero safety training reported being at high risk. 20.9% of those workers reported a moderate risk, 39.5% of them reported low risk, and 22.5%

reported no COVID-19 risk. Among workers who attended 1 to 4 safety trainings, 18% of them reported high COVID-19 risk. 24% of them reported moderate risk, 38.9% of them reported low risk, and 13.3% of them reported no risk. It is possible that employers who held a higher number of trainings did so because the occupation had an inherently higher risk of COVID-19 transmission in the workplace.

## COVID-19 Risk by Industry and Occupation

The industry with the highest prevalence of workers who reported high risk is the accommodation and food services industry (43.9%). This is significantly higher than the next highest industry, real estate (31.6%). The lowest prevalence of high risk was reported by people in the scientific and technical services industry (3.4%). This was notably lower than the second lowest rate, which was reported by workers in the manufacturing industry (3.4%). The industry with the highest prevalence of moderate COVID-19 risk is the retail trade industry (37.6%). The lowest prevalence of moderate risk was reported by people in the scientific and technical services industry (10%). 54.5% of workers in that industry reported low COVID-19 risk, the highest among any industry. Only 14.9% of food service workers reported being at low risk, this is by far the lowest rate of any industry. 33.7% of workers in the finance industry reported no COVID-19 risk, by far the highest rate of any industry. Just 0.6% of food service workers reported no COVID-19 risk. These results make sense. Due to the in-person nature of food service work, the risk for contracting COVID-19 is higher than industries where remote work is possible. Restaurants were also among the first businesses to reopen during the height of the COVID-19 pandemic.

The occupation with the highest prevalence of workers who reported being at high risk for contracting COVID-19 was protective services at a staggering 88.4%. This is nearly twice as high as the next highest occupation, the healthcare industry (46%). People who work in production reported the lowest prevalence of high risk (2.7%). 34% of education workers reported a moderate risk, which was the highest prevalence. Just 2.6% of workers in protective service reported a moderate risk. 58.9% of architecture workers reported low COVID-19 risk. Just 7.6% of protective service workers reported being at low risk. Protective service workers also reported the lowest rate of no COVID-19 risk (1.3%). The highest rate of workers who reported no COVID-19 risk came from workers in the business and financial operations industry (42.2%), followed closely behind by the computer and mathematics industry (40.8%).

## COVID-19 risk by other measures

There was not a significant difference among different age groups, nor was there a considerable difference on the basis of sex. Hispanic workers reported the highest prevalence of high COVID-19 risk

(26.4%). 19.1% of Asian workers reported high risk, and 16.4% of white workers reported the same. Only 10.3% of Hispanic workers reported no COVID-19 risk, as opposed to 22.8% of Asian workers and 14.3% of white workers.

Unsurprisingly, only 3.8% of workers who worked from home reported a high COVID-19 risk. 44.2% of them reported low risk and 44.2% reported no risk. 26.4% of people who worked in person reported a high COVID-19 risk, only 7.2% reported no risk. 16.7% of workers who worked in a hybrid model reported being at high risk, 8.8% of them reported no risk.

COVID-19 risk was particularly high among workers whose employers required them to use PPE. This is likely because many of these workers are in the healthcare industry. 25.8% of them reported being at high risk, and 25.3% of workers whose employers actually provided PPE reported being at high risk. Just 5.6% of them reported no risk. The rate among workers whose employers provided PPE is 6.4%. Among workers who had no such requirement, 9.4% of them were at high risk, 15.8% reported moderate risk, 47.3% reported low risk, and 27.4% reported no risk.

The rate of high COVID-19 risk was particularly high among employees who were not offered paid sick time. For those who had to take unpaid leave, 29.6% reported being at high risk; for those having to use vacation days, 18.4% reported high risk. For workers who had access to paid sick leave 20% reported of being at high risk for contracting COVID-19.

People with disabilities reported a higher risk of contracting COVID-19. 23.4% of workers with disabilities reported being at high risk, 23.7% of them reported moderate risk, 28.4% reported low risk, and 12.2% reported no risk. Among workers without disabilities, 15.7% reporting being at high risk, 21.7% of them reported moderate risk, 34.9% reported low risk, and 14.6% reported no risk. Among people with hearing disabilities, 25% of them reported being at high risk, 21.6% reported moderate risk, 31.1% reported low risk, and just 9.4% reported no risk. By comparison, 16.5% of workers without a hearing disability reported being at high risk. 22% reported being at moderate risk, 34% reported being at low risk, and 14.4% reported being at no risk of contracting COVID-19. Among workers who have serious difficulty concentrating or making decisions, 31% of them reported being at high COVID-19 risk. 21.4% of them reported being at moderate risk, 22.2% reported low risk, and 11.7% of them reported no risk. The rate of high COVID-19 risk was particularly high among people with self-care disabilities (34.9%). 25.9% of them reported moderate risk, 20.5% reported low risk, and 19.8% reported no risk. Only 16.3% of people without self-care disabilities reported being at high risk. 21.9% of them reported moderate risk, 34.3% reported low risk, and 14.4% reported no risk.

**Table 1: Distribution of COVID-19 Risk Experienced by New Hampshire Workers by Employer Size, Safety Training Frequency, Occupation, Age, Gender, Race/Ethnicity, and Health Risk Behaviors, 2021**

<b>CHARACTERISTIC</b>	<b>HIGH COVID RISK</b>	<b>MODERATE COVID RISK</b>	<b>LOW COVID RISK</b>	<b>NO COVID RISK</b>
Working Population	16.9±1.8	22.0±2.0	33.9±2.2	14.3±1.6
<b>Employer Size</b>				
1 to 10 Employees	15.6±4.1	18.4±4.7	37.4±5.3	22.2±4.8
11 to 49 Employees	23.0±5.1	27.1±5.1	38.2±5.6	8.3±3.3
50 to 249 Employees	20.2±4.1	28.0±4.6	37.0±4.9	9.5±3.1
250 to 999 Employees	15.5±5.6	26.5±6.5	36.0±6.9	15.2±5.2
1000 or more Employees	19.9±6.8	21.1±6.4	37.1±7.6	19.7±6.6
<b>Safety Training</b>				
No safety training classes in the past year	10.1±2.5	20.9±3.4	39.5±3.9	22.5±3.6
1 to 4 safety training classes in the past year	18.0±3.5	24.0±3.6	38.9±4.1	13.3±2.9
5 or more safety training classes in the past year	27.9±4.3	28.0±4.4	31.0±4.5	9.8±2.7
<b>Industry</b>				
Accommodation & Food Services	43.9±14.2	27.9±12.1	14.9±10.8	0.6±1.1
Construction	6.4±4.3	18.9±7.6	46.5±9.1	14.1±7.0
Education	20.7±5.5	29.6±6.5	28.5±6.9	10.1±4.9
Finance & Insurance	9.3±8.6	10.4±6.7	36.5±9.4	33.7±10.4
Health Care And Social Assistance	30.7±5.4	26.7±5.3	25.5±5.7	10.3±3.9
Information	9.1±9.6	12.0±13.9	43.9±15.1	31.8±15.7
Manufacturing	7.1±4.4	23.8±6.1	50.8±6.6	14.5±4.8
Other Services (Except Public Administration)	18.3±9.2	21.9±10.8	34.0±10.7	13.8±8.9
Professional, Scientific, & Technical Services	3.4±5.0	10.0±4.9	54.5±7.4	28.6±7.2



<b>CHARACTERISTIC</b>	<b>HIGH COVID RISK</b>	<b>MODERATE COVID RISK</b>	<b>LOW COVID RISK</b>	<b>NO COVID RISK</b>
Public Administration	30.4±8.4	19.0±7.1	36.8±-8.2	7.7±5.3
Real Estate, Rent, Lease	31.6±15.6	15.2±10.7	43.4±-15.3	7.2±9.1
Retail Trade	27.9±7.2	37.6±7.7	19.6±-6.2	7.7±4.0
Transport & Warehouse	22.1±11.2	27.7±11.3	31.8±-13.3	5.1±5.3
<b>Occupation</b>				
Architecture & Engineering	3.0±3.5	25.1±9.0	58.9±-9.3	11.7±7.8
Business & Financial Operations	3.8±4.3	7.3±4.6	41.0±-9.4	42.2±9.8
Community & Social Services	23.0±15.2	27.6±14.3	28.7±-16.3	17.9±14.9
Computer & Mathematical	1.9±2.8	8.7±5.5	45.1±-9.6	40.8±9.6
Construction & Extraction	11.8±8.1	21.4±9.6	37.6±-10.2	11.2±7.3
Education, Training, & Library	22.5±6.9	34.8±8.2	25.1±-7.3	4.7±3.3
Healthcare & Technical	46.0±8.0	28.4±7.5	17.1±-6.7	3.9±3.0
Healthcare Support	24.4±15.2	27.5±17.0	16.9±-14.3	8.8±10.7
Installation, Maintenance, & Repair	27.9±14.2	27.5±13.7	31.2±-14.5	9.5±9.9
Management	14.0±7.2	26.0±6.5	41.4±-6.9	14.5±5.5
Office & Administration Support	8.3±4.0	19.1±6.0	45.0±-7.4	19.4±7.0
Personal Care & Service	21.4±12.3	16.7±11.9	32.0±-15.0	5.6±6.7
Production	2.7±4.7	28.0±12.6	47.8±-12.1	16.5±9.4
Protective Service	88.4±6.3	2.6±4.0	7.6±-10.4	1.3±3.5
Sales & Related	26.5±6.9	29.0±7.1	26.2±-6.7	11.4±5.0
Transportation & Material Moving	17.3±9.3	26.1±10.9	39.8±-12.2	3.7±3.9
<b>Age</b>				
Age 18 to 44	18.0±3.1	21.6±3.3	31.6±-3.7	13.8±2.8
Age 45 to 64	16.1±2.2	22.9±2.5	35.1±-2.8	14.6±2.2

<b>CHARACTERISTIC</b>	<b>HIGH COVID RISK</b>	<b>MODERATE COVID RISK</b>	<b>LOW COVID RISK</b>	<b>NO COVID RISK</b>
Age 65 or older	13.3±3.6	19.6±3.8	41.9±4.9	15.2±3.5
Gender				
Female	18.4±2.5	23.1±2.8	31.4±2.9	13.4±2.3
Male	15.5±2.6	21.0±2.8	36.1±3.2	15.0±2.4
Gender by Age				
Female Age 18 to 44	19.9±4.3	23.2±4.7	26.3±4.8	13.2±4.0
Male Age 18 to 44	16.6±4.2	20.4±4.6	35.9±5.2	14.3±4.0
Female Age 45 to 64	17.3±3.0	24.0±3.4	35.2±3.8	13.2±2.9
Male Age 45 to 64	15.0±3.3	21.9±3.7	35.1±4.0	16.0±3.1
Female Age 65 or older	15.1±5.9	17.7±5.3	42.0±7.0	16.1±5.4
Male Age 65 or older	12.0±4.4	20.9±5.5	41.8±6.6	14.5±4.6
Race and Ethnicity				
White, Non-Hispanic	16.4±1.8	23.3±2.1	34.0±2.3	14.3±1.8
Asian, Non-Hispanic	19.1±11.6	12.8±10.4	33.4±13.8	22.8±13.2
Hispanic	26.4±13.1	8.5±6.7	35.1±11.7	10.3±8.3
Other race, Non-Hispanic	21.7±13.6	14.4±9.9	19.9±11.7	22.4±13.1

<b>CHARACTERISTIC</b>	<b>HIGH COVID RISK</b>	<b>MODERATE COVID RISK</b>	<b>LOW COVID RISK</b>	<b>NO COVID RISK</b>
Work schedule during COVID				
Work from home	3.8±2.1	7.6±2.9	44.2±4.9	44.2±5.0
Work at place of business	26.4±3.1	30.5±3.2	34.7±3.3	7.2±1.8
Work from place of business and home	16.7±4.2	30.1±4.9	43.5±5.0	8.8±3.1
Employer required COVID PPE				
No, it was not required	9.4±5.1	15.8±7.0	47.3±8.6	27.4±8.4
Yes - My employer required it	25.8±2.8	32.3±2.9	35.7±2.9	5.6±1.3
Employer provided COVID PPE				
Yes, My employer provides PPEs	25.3±2.7	31.6±2.8	36.1±3.0	6.4±1.5
No, I have to use my own PPEs	11.3±5.5	22.1±7.8	46.3±8.6	20.0±8.1
Employer offered additional paid sick time				
Yes - 2 weeks if self-quarantine	22.3±4.2	26.4±4.6	36.4±4.8	14.6±3.7
Yes - Up to 10 days for workers reporting any symptoms of illness	20.0±4.7	25.2±5.0	38.9±5.6	15.6±4.6
No, workers have to take unpaid leave	29.6±7.5	23.8±6.5	32.1±7.0	14.0±6.0
No, workers have to take vacation days	18.4±5.6	28.4±6.9	38.9±7.7	14.2±5.9

<b>CHARACTERISTIC</b>	<b>HIGH COVID RISK</b>	<b>MODERATE COVID RISK</b>	<b>LOW COVID RISK</b>	<b>NO COVID RISK</b>
Disability Status				
Disability	23.4±5.8	23.7±5.5	28.4±5.8	12.2±4.9
No Disability	15.7±1.9	21.7±2.1	34.9±2.4	14.6±1.8
Deaf or Serious Difficulty Hearing	25.5±13.4	21.6±11.0	31.1±11.0	9.4±6.7
Serious Difficulty Concentrating, Remembering, or Making Decisions	31.0±9.5	21.4±8.0	22.2±8.2	11.7±8.2
Serious Difficulty Walking or Climbing Stairs	17.5±8.1	23.6±9.0	36.7±10.8	12.6±6.7
Difficulty Doing Errands Alone	34.9±16.1	25.9±13.5	20.5±13.0	10.8±9.9

## Discussion

There are many workers who are employed in an industry or occupation where remote work is not possible. This includes various service workers, as well as social service providers. Many of these workers are also particularly vulnerable due to their financial situation. If their employer doesn't offer paid sick time, or paid time off for vaccination, employees may feel pressure to go to work even if they are ill.

In addition to healthcare workers, the data in this survey indicates that teachers, public administration workers, real estate workers, and social service workers reported a very high risk for COVID-19 exposure. Maintenance workers and protective service workers also reported a high risk of contracting COVID-19 at work. Among protective service workers, a staggering 88% of respondents reported being at high risk for contracting COVID-19.

While it is clear that the risk for COVID-19 varies by industry, it is important for employers to adopt best practices for infectious disease prevention overall, regardless of the job's risk level.

## Limitations

There are some limitations to this study, as the data was collected for only one year in 2021. Since 2021, the landscape around COVID-19 has changed considerably.

As with any survey, this data is contingent on the recall and accuracy of the information provided by the respondents. Sample sizes can be an issue with reporting statistics derived from survey responses. To ensure clarity, perceived risk percentages are reported with 95% confidence interval margins of error. Small sample sizes result in higher margins of error.

For these reasons, the data might be different if it was collected either at the beginning of the pandemic or collected today.

## References

Free, H., Luckhaupt, S. E., Billock, R. M., Groenewold, M. R., Burrer, S., Sweeney, M. H., Wong, J., Gibb, K., Rodriguez, A., Vergara, X. P., Cummings, K. J., Lavender, A., Argueta, G., Crawford, H. L., Erukunuakpor, K., Karlsson, N. D., Armenti, K., Thomas, H., Gaetz, K., Modji, K. (2022). Reported exposures among in-person workers with severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) infection in 6 states, September 2020–June 2021. *Clinical Infectious Diseases*, 75(Supplement\_2). <https://doi.org/10.1093/cid/ciac486>

*Protecting workers: Guidance on mitigating and preventing the spread of covid-19 in the Workplace.* Occupational Safety and Health Administration. (n.d.). <https://www.osha.gov/coronavirus/safework>