Prevalence Characteristics and Risk Factors of Chronic Disease in NH Workers, 2019-2021

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Introduction

According to the World Health Organization, work is a social determinant of health (WHO 2021). When assessing the impacts of health and coincidence with health behaviors, often worker industry and occupation are not included in the analysis due to lack of information, data quality issues, and complexity (e.g. assessing many demographics, in many industries, in many occupations, in many geographic locations, can become computationally limiting, depending on resources and time available). (Steege et al., 2023).

The New Hampshire Occupational Health Surveillance Program has produced this report to show how work, along with personal characteristics, affects the prevalence of arthritis, cancer, diabetes, and hypertension in the working population. The information presented represents the New Hampshire working population using the NH Behavioral Risk Factor Surveillance System (BRFSS) 2019 to 2021 surveys and was designed to show how chronic disease was impacted by not just personal characteristics, but also by health behaviors and work environments (within occupation and industry). This work follows a previous report, Prevalence, Characteristics, and Risk Factors of Chronic Disease by Industry and Occupation in New Hampshire: 2013-2018, in investigating chronic disease and health behavior risk factors to inform workplace practices and policy.

The BRFSS is a population-representative survey (based on a sample of the population) administered by the U.S. Centers for Disease Prevention and Control. In addition to the questions in the core survey, states may choose other modules, one of which includes industry and occupation questions. NH has been including these questions on the state BRFSS since 2013.

Methods

Study Design and Setting

This study used the New Hampshire Behavioral Risk Factor Surveillance System (BRFSS) 2019 - 2021 surveys administered by the Centers for Disease Control and Prevention (CDC) in collaboration with New Hampshire Department of Health and Human Services (NH DHHS). This telephone survey (cell and landline) is designed to collect demographic and health data including risk behaviors, chronic conditions, and preventive service usage (CDC, 2014)

Study Population and Descriptive Variables

Utilizing 2019- 2021 NH BRFSS, we identified the population of non-institutionalized adults 18 years or older in New Hampshire and computed chronic disease prevalence, prevalence of health behaviors, and the overlap of disease and behavior. The health behaviors reviewed are: smoking habit (and history), reported physical activity, heavy alcohol consumption, obesity, and a measure provided by the survey to indicate overall health (or poor health). The following data aggregations were used to facilitate interpretability.

- Age groups are defined to be “Age 18 to 44”, “Age 45 to 64”, and “Age 65 or older”.
- Disability status was 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?”.
- Employment status was defined by reporting “Employed for wages” or “Self-employed”.
- Industry and occupation information were collected through “Industry and Occupation” state module and coded based on NAICS[1] 2-digit, and SOC[2] major codes aligned with 2012 Census codes.

BRFSS pre-calculated variables were used for overall poor health indication, race and ethnicity, smoking status and history, alcohol consumption, reported physical activity, obesity, and employment. Variables with skip patterns, and missing, unknown, or refusal responses were omitted from analysis.

The dataset includes a total of 18,824 respondents in New Hampshire, with 8,969 respondents in the working population.

Outcome Measures

The outcome measures analyzed were the presence (prevalence) of chronic disease by a current or past diagnosis of arthritis, cancer (inclusive of skin and all other cancers), diabetes, and hypertension. Analysis of arthritis, cancer, diabetes, and hypertension were described using secondary measure health behaviors like smoking (being a current smoker every day or most days), heavy alcohol consumption (men having 14 drinks per week and women having 7 drinks per week), obesity, and physical activity (physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise). 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).

[1] North American Industry Classification System (https://www.census.gov/naics/)

[2] US Bureau of Labor Statistics Standard Occupational Classification (https://www.bls.gov/soc/)

Statistical Analysis

R Version 4.1.2 was used as the primary statistical software (2021). The following libraries were used tidyverse, readxl, rvest, R.utils, survey, plyr, and writexl.

Results

Prevalence of Chronic Disease

Arthritis

The overall prevalence of arthritis in New Hampshire was 26.4% (Table 1). The prevalence of arthritis was higher in older residents. An estimated 8.6% of residents aged 18 to 44 had arthritis, 31.3% of residents aged 45 to 64 had arthritis, and 49.5% of residents aged 65 and older had arthritis. The prevalence of arthritis was significantly higher among female residents (29.5%) than male residents (23.1%), with a relative risk (RR) of 1.28 as compared to their male counterparts (95%CI: 1.20-1.37). The highest estimated prevalence of arthritis within race/ethnicity was 31.1% for Native Americans (due to small sample size this may be an overestimate). Arthritis was 2.34 times (95%CI: 2.08-2.62)more prevalent among people with disabilities (47.2%) than people without disabilities (20.2%). Breaking down by disability type, people with a mobility disability had even higher relative risk of arthritis as compared to people with no mobility disability (RR: 3.09, 95%CI: 2.69-3.55).

Cancer

13.7% of all residents reported having had cancer. Cancer was more common among older adults. 31.7% of people 65 or older reported having cancer, with a RR of 2.3 compared to people aged 45-64 (95%CI: 1.97-2.67). 3.2% of adults aged 18 to 44 reported having had cancer, far lower than residents aged 45 to 64 (RR: 0.23, 95%CI: 0.22-0.24). Females had a higher prevalence of cancer (15.6%) than males (11.9%) (RR: 1.31, 95%CI: 1.20-1.44). Cancer among Native Americans (18.0%) was estimated to be higher than white residents (14.5%). The estimated cancer prevalence among Asian residents was 1.5%, 4.4% among Black residents and 4.6% among Hispanic residents. The cancer prevalence among races not previously listed (categorized as other races) was 10.1%. Cancer was more common among people with disabilities (20.4%) than people without disabilities (11.7%) (RR: 1.75, 95%CI: 1.54-1.98). Similar to arthritis, people with a mobility disability had the highest prevalence compared to people without a mobility disability (RR: 2.14, 95%CI: 1.80-2.54) .

Diabetes

The overall prevalence of diabetes among residents was 8.9%. The prevalence among residents aged 18 to 44 was 2.9%, 10.5% among residents aged 45 to 64, and 16.9% among residents aged 65 or older. Different than arthritis and cancer where female residents had a significantly higher prevalence rate, for diabetes female residents reported lower prevalence of diabetes than male residents (8.0% vs. 9.9%; RR: 0.81, 95%CI: 0.75-0.88). The prevalence of diabetes was

disproportionately high among Black residents (15.7%), although the difference was not statistically significant compared to white residents (9.0%). The prevalence of diabetes among people with disabilities (16.3%) was significantly higher than the prevalence of diabetes among people without disabilities (6.7%) (RR: 2.44, 95%CI: 1.95-3.06). Breaking down by disability type, people with a mobility disability had even higher relative risk of arthritis as compared to people with no mobility disability (RR: 3.47, 95%CI: 2.51-4.80).

Hypertension

The prevalence of hypertension among all residents was 30.4%. The prevalence of hypertension was observed to be the highest among older residents. 13.3% of residents aged 18 to 44 had hypertension. 33.7% of residents aged 45 to 64 reported experiencing hypertension. More than half (54.6%) of residents who are 65 or older had hypertension. Male residents reported a higher prevalence of hypertension (33.6%) than female residents (27.3%). Hypertension among white residents was significantly higher (31.5%) than Asian residents (14.8%), Black residents (15.3%), and Hispanic residents (17.3%), and other races (27.7%). The prevalence rate among Native American residents (23.6%) was not statistically significant compared to white residents. Residents with disabilities had a higher prevalence of hypertension (42.1%) than residents without disabilities (26.6%) (RR: 1.58, 95%CI: 1.44-1.74). Again, people with a mobility disability had the highest relative risk of having hypertension as compared to people with no mobility disability (RR: 2.04, 95%CI: 1.81-2.31).

Table 1: Disease Prevalence (%) by Age, Gender, and Race/Ethnicity for the General Population 2019-2021

CHARACTERISTIC: Disability Status	ARTHRITIS	CANCER	DIABETES	HYPERTENSION*
Disability	47.0±2.0	20.4±1.5	16.3±-1.3	42.1±2.3
No Disability	20.1±0.8	11.7±0.6	6.7±-0.5	26.6±1.2
Deaf or Serious Difficulty Hearing	51.2±3.3	27.4±2.8	18.0±-2.4	51.5±4.2
No Hearing Disability	24.7±0.8	12.8±0.6	8.3±-0.5	28.9±1.1
Blind or Serious Difficulty Seeing	45.7±5.4	17.2±3.8	17.4±-3.8	46.4±6.4
No Seeing Disability	25.7±0.8	13.6±0.6	8.6±-0.5	29.8±1.1
No Cognitive Disability	24.9±0.8	13.6±0.6	8.4±-0.5	30.1±1.1
Serious Difficulty Concentrating, Remembering, or Making Decisions	39.9±3.2	15.1±2.2	13.9±-2.0	32.4±3.6
No Mobility Disability	21.8±0.7	12.3±0.6	7.1±-0.5	27.4±1.1
Serious Difficulty Walking or Climbing Stairs	67.2±2.5	26.4±2.2	24.7±-2.2	55.9±3.2
Difficulty Dressing or Bathing	61.0±5.3	20.3±4.4	22.6±-4.2	50.7±6.2
No Self Care Disability	25.3±0.8	13.6±0.5	8.5±-0.5	29.7±1.1
Difficulty Doing Errands Alone	47.0±4.0	16.9±2.7	16.9±-2.6	38.9±4.5
No Independent Living Disability	25.0±0.8	13.5±0.6	8.4±-0.5	29.8±1.1

NOTE: Values are reported with 95% confidence interval.

* Blood pressure survey question was omitted from the 2020 version of BRFSS. All values reported include only responses from 2019 and 2021.

Distribution of Chronic Disease by Risk Behaviors

Arthritis

The prevalence of arthritis was 1.52 times higher among overweight or obese residents (30.2%) than non-overweight residents (19.9%) (95%CI: 1.38-1.67). There was also a far higher prevalence of arthritis among current and former smokers (29.2% and 36.7% respectively) than residents who had never smoked (21.1%) (RR: 1.39 & 1.75, 95%CI: 1.24-1.56 & 1.59-1.92, respectively). Additionally, the prevalence of arthritis was higher among people who had not exercised during the past 30 days (36.7%) than those who had (23.8%). The arthritis prevalence of heavy drinkers (28.1%) and non-heavy drinkers (26.9%) were not significantly different.

Cancer

The cancer prevalence of heavy drinkers (13.4%) and non-heavy drinkers (14.2%) were not significantly different. There were also slight non-significant differences in cancer prevalence between people who are overweight and those who are not (14.1% and 14.5% respectively). The prevalence of cancer among people who had and had not exercised over the past 30 days are also similar (13.5% and 15.5%). The cancer prevalence among former smokers (19.8%) was notably higher than current smokers (11.5%) and people who had never smoked (11.9%).

Diabetes

The prevalence of diabetes was also higher among people who had not exercised over the past 30 days (16.2%) than those who had (7.0%). There was no statistically significant difference in diabetes prevalence among current smokers (7.9%) compared to those who had never smoked (7.4%). However, former smokers had 1.75 times higher prevalence (12.9%) compared to those who had never smoked (95%CI: 1.48-2.07). The prevalence of diabetes was statistically higher among people who are not heavy drinkers (9.4%) than those who are heavy drinkers (4.5%). Residents who are overweight had more than 3.6 times higher prevalence of diabetes (11.9%) than those who are not overweight (3.3%) (95%CI: 2.06-6.20).

Hypertension

Prevalence of hypertension was higher among people who had not exercised over the past 30 days (38.6%) than people who had (28.3%). Former and current smokers had a statistically higher prevalence of hypertension (31.1% and 40.8%) than people who had never smoked (25.9%) (RR: 1.54 & 1.20, 95%CI: 1.43-1.74 & 1.07-1.35. respectively). Overweight residents had nearly twice (RR: 1.95, 95%CI: 1.67-2.27) the prevalence of hypertension (37.0%) than people who are not overweight (19.0%).

Table 2: Disease Prevalence (%) by Risk Factors for the General Population 2019-2021

CHARACTERISTIC: Risk Factors	ARTHRITIS	CANCER	DIABETES	HYPERTENSION*
All	26.4±0.8	13.7±0.6	8.9±-0.5	30.4±1.0
Exercise past 30 days	23.8±0.9	13.5±0.6	7.0±-0.6	28.3±1.2
No exercise past 30 days	36.7±2.0	15.5±1.4	16.2±-1.4	38.6±2.5
Never smoked	21.1±0.9	11.9±0.7	7.4±-0.6	25.9±1.5
Current smoker	29.2±2.6	11.5±1.8	7.9±-1.5	31.1±3.3
Former smoker	36.7±1.7	19.8±1.2	12.9±-1.1	40.8±2.1
Normal weight or underweight	19.9±1.3	14.5±1.1	3.3±-0.6	19.0±1.6
Overweight or obese	30.2±1.1	14.1±0.7	11.9±-0.8	37.0±1.5
Not heavy Drinker	26.9±0.9	14.2±0.7	9.4±-0.6	31.0±1.2
Heavy Drinker	28.1±3.2	13.4±2.1	4.5±-1.4	33.7±4.4

NOTE: Values are reported with 95% confidence interval

* Blood pressure survey question was omitted from the 2020 version of BRFSS. All values reported include only responses from 2019 and 2021.

Prevalence of Chronic Disease by Industry and Occupation

Arthritis

Among the working population, the prevalence of arthritis was 18.1%, lower than the prevalence among all residents. The industry with the highest estimated prevalence of arthritis was the agriculture, forestry, fishing, and hunting industry (21.7%). The lowest prevalence of arthritis was from workers in the wholesale trade industry (13.8%). Following closely behind was the information industry (16.0%) and finance and insurance industry (16.2%).

The occupation with the highest prevalence of arthritis was the arts, design, entertainment, sports and media occupation (25.0%), which is fairly close to the prevalence among all residents. Followed closely behind was the community and social services occupation (24.2%). The lowest prevalence of arthritis was reported among workers in the life, physical and social sciences at 13.1%.

Cancer

The prevalence of cancer among all residents was 13.7%. Among the working population, the prevalence of cancer was considerably lower (8.5%). The industry with the highest prevalence of cancer was detected among workers employed in agriculture, forestry, fishing, and hunting industry (14.7%).

The lowest prevalence of cancer was reported among those who work in the transport and wholesale trade industry (2.4%), followed by workers in the accommodation and food service industry (5.7%). People who work in agriculture, forestry, fishing, and hunting industry had the highest prevalence of cancer (14.7%), followed closely behind by the real estate, rent, and lease industry at 11.3%.

The occupation in which workers reported the highest prevalence of cancer was legal occupations (14.1). This was slightly higher than people in community and social services, in which 12.6% reported having cancer. The lowest prevalence of cancer was reported by those in installation maintenance and repair occupations (4.4%).

Diabetes

The prevalence of diabetes among all residents was 8.9%. Among the working population, the prevalence was 6.0%. Those workers employed in public administration reported the highest prevalence of diabetes (8.9%). The lowest prevalence of diabetes was reported among those in the utilities industry (1.8%). Prevalence of diabetes was also low among people who work in arts, administration, and other services occupations (2.7%, 4.2%, and 4.3% respectively).

The occupation with the highest prevalence of diabetes was installment, maintenance, and repair (10.4%), followed by people in the food preparation (8.6%) and transportation occupations (8.4%). The lowest prevalence of diabetes was reported among people in personal care occupations (3.6%).

Hypertension

The overall prevalence of hypertension among residents surveyed was 30.4%. Among the working population, that prevalence was 23.3%. The highest prevalence of hypertension was reported among people who work in the education industry (40.0%). Prevalence of hypertension was also high within the administration industry (35.1%), the other services industry (32.7%). The lowest prevalence of hypertension was reported in the agriculture, forestry, fishing, and hunting industry (18.5%).

The highest prevalence of hypertension by occupation was reported among residents who work in the life, physical, and social science occupations (40.0%). The lowest prevalence of hypertension was reported among people who work in installation, maintenance, and repair occupations (13.8%).

Table 3a: Prevalence (%) of Chronic Disease for the Working Population

CHARACTERISTIC: Prevalence	ARTHRITIS	CANCER	DIABETES	HYPERTENSION*
All	26.4±0.8	13.7±0.6	8.9±-0.5	30.4±1.0
Working Population	18.1±1.0	8.5±0.7	6.0±-0.6	23.3±1.4

Table 3b: Prevalence (%) of Chronic Disease by Industry for the Working Population

CHARACTERISTIC: Industry	ARTHRITIS	CANCER	DIABETES	HYPERTENSION*
Accommodation & Food Services	18.0±5.3	5.7±2.6	5.3±-3.3	25.3±8.1
Administration, Support, Waste Management, & Remediation	20.2±7.8	7.2±4.0	4.2±-3.2	21.3±8.3
Agriculture, Forestry, Fishing, & Hunting	21.7±9.2	14.7±10.4	6.6±-8.5	35.1±15.5
Arts, Entertainment, & Recreation	19.1±7.7	8.3±5.6	2.7±-2.5	18.5±9.3
Construction	19.4±3.8	6.8±2.2	4.9±-1.9	23.8±4.8
Education	17.4±2.7	11.0±2.2	4.5±-1.5	16.3±3.4
Finance & Insurance	16.2±4.2	8.9±2.8	6.2±-3.0	28.2±6.9
Health Care and Social Assistance	19.9±2.4	10.8±1.8	6.3±-1.9	20.0±3.0
Information	16.0±6.6	9.3±5.7	6.6±-5.7	21.8±9.6
Manufacturing	18.6±2.8	6.9±1.8	6.9±-1.8	25.8±4.2
Other Services (Except Public Administration)	18.9±4.8	7.7±3.0	4.3±-2.7	24.5±7.4
Professional, Scientific, & Technical Services	18.2±3.8	9.6±2.5	6.4±-2.3	25.5±5.3
Public Administration	21.2±4.0	8.2±2.5	8.9±-3.4	29.2±5.8
Real Estate, Rent, Lease	19.6±7.3	11.3±4.9	6.7±-4.3	31.4±11.6
Retail Trade	20.4±3.5	8.4±2.2	7.7±-2.1	22.6±4.4
Transport & Warehouse	17.7±5.2	5.7±3.4	8.4±-4.4	28.1±8.4
Utilities	17.9±10.2	8.9±5.7	1.8±-3.6	24.5±11.7
Wholesale Trade	13.8±6.2	2.4±2.2	5.8±-4.0	32.7±12.7

Table 3c: Prevalence (%) of Chronic Disease by Occupation for the Working Population

CHARACTERISTIC: Occupation	ARTHRITIS	CANCER	DIABETES	HYPERTENSION*
Architecture & Engineering	18.7±4.7	8.2±3.0	7.1±-2.9	28.9±6.6
Arts, Design, Entertainment, Sports & Media	25.0±8.0	9.5±4.5	4.0±-4.1	16.8±8.2
Building & Grounds Cleaning & Maintenance	21.3±6.9	5.7±3.1	4.8±-4.5	29.3±9.3
Business & Financial Operations	19.2±4.4	11.6±3.5	7.1±-3.0	25.5±6.2
Community & Social Services	24.2±7.5	12.6±5.5	6.5±-4.0	26.8±9.9
Computer & Mathematical	16.5±4.3	4.9±2.6	8.1±-3.6	29.9±6.7
Construction & Extraction	20.0±4.7	6.1±2.4	4.9±-2.2	21.7±5.2
Education, Training, & Library	17.7±3.3	11.8±2.9	4.1±-1.8	15.0±4.1
Food Preparation & Serving	16.9±6.1	5.7±3.3	8.6±-5.9	22.0±9.1
Healthcare & Technical	19.3±3.7	9.5±2.4	4.5±-1.6	18.7±4.3
Healthcare Support	18.5±8.4	9.7±4.9	7.6±-8.7	22.4±11.4
Installation, Maintenance, & Repair	17.5±5.7	4.4±3.0	10.4±-5.5	36.8±10.2
Legal	17.1±6.8	14.1±7.1	4.5±-3.8	23.2±9.9
Life, Physical, & Social Science	13.1±8.2	5.3±4.6	4.3±-5.6	14.0±9.1
Management	20.5±3.4	10.8±2.3	4.8±-1.7	23.5±4.3
Office & Administration Support	20.1±3.1	9.9±2.3	7.8±-2.1	23.7±4.6
Personal Care & Service	21.1±6.3	10.4±4.6	3.6±-2.5	13.8±6.9
Production	19.5±5.0	7.1±3.1	7.0±-3.1	29.2±7.4
Protective Service	22.8±8.2	8.3±4.9	5.3±-3.8	23.5±10.1
Sales & Related	17.2±3.3	7.8±1.9	7.1±-2.1	22.8±4.2
Transportation & Material Moving	17.6±4.6	7.5±3.2	8.4±-3.4	27.5±6.9
Architecture & Engineering	18.7±4.7	8.2±3.0	7.1±-2.9	28.9±6.6

NOTE: Values are reported with 95% confidence interval.

* Blood pressure survey question was omitted from the 2020 version of BRFSS. All values reported include only responses from 2019 and 2021.

Health Risk Behaviors by Industry and Occupation

Smoking Population – prevalence of 11.4% among New Hampshire's Working Population

14.0% of the population identified as smokers. Among the working population, that prevalence was 13.4%. The highest prevalence of smoking was reported among people in the construction industry (26.7%). The prevalence of smoking was also high among people who work in the wholesale trade industry (23.1%). The lowest prevalence of smoking was reported among workers in the information industry (6.1%).

Among occupations, the highest prevalence of smoking was reported among workers in construction and extraction (29.5%). The next highest prevalence of smoking was reported by workers in food preparation (28.5%), followed by transportation and material moving (25.5%). The lowest prevalence of smoking was reported by people who work in architecture and engineering (4.5%) followed by legal occupations (5.3%).

Heavy Drinking – prevalence of 8.3% among New Hampshire's Working Population

The prevalence of heavy drinking among the population was 7.5%. Among the working population, the prevalence was slightly higher (8.3%). The industry with the highest prevalence of heavy drinking was the utilities industry (13.8%). The lowest prevalence was reported in the wholesale trade industry at 4.3%, followed by professional scientific and technical services at 5.2%.

The highest prevalence of heavy drinking was reported among workers in building and grounds cleaning and maintenance occupations (12.6%), followed by the construction and extraction occupations (11.6%). The lowest prevalence was reported in the computer and mathematical occupations (4.4%), and personal care and services occupations (5.2%).

Overweight or Obese – prevalence of 67.9% among New Hampshire's Working Population

66.5% of the population reported having a higher than average BMI. Among the working population, this prevalence was 67.9%. The largest prevalence of high BMI was reported in the utilities industry (78.0%) followed by the public administration industry (76.5%). No industries had a prevalence lower than 50%.

The highest prevalence reported by occupation was the protective services (89.3%). Prevalence was also particularly high among workers who work in production occupations

(80.9%). None of the occupations represented in the survey reported a prevalence lower than 50%.

Exercise in the Past 30 Days – prevalence of 83.7% among New Hampshire's Working Population

79.9% of the population in the survey indicated that they had exercised in the past 30 days. Among the working population, the prevalence was slightly higher (83.7%). The highest prevalence of people who had exercised over the past 30 days was reported by people in the information industry (90.1%). Every industry reported a prevalence above 70%, the lowest prevalence was reported among the transport and warehouse industry (72.0%).

Among specific occupations, the highest prevalence of recent exercise was reported among people in legal occupations (92.9%), followed closely behind by computer and mathematical occupations (92.7%). The occupations with the lowest prevalence were the transportation and material moving occupations (70.4%).

Table 4a: Health Behavior Prevalence (%) by Industry and Occupation

CHARACTERISTIC: Prevalence	SMOKER	HEAVY DRINKER	OVERWEIGHT / OBESE	EXERCISE
All	14.0±0.8	7.5±0.5	66.5±-1.0	79.7±0.8
Working Population	13.4±1.0	8.3±0.8	67.9±-1.3	83.6±1.0

Table 4b: Health Behavior Prevalence (%) by Industry and Occupation

CHARACTERISTIC: Industry	SMOKER	HEAVY DRINKER	OVERWEIGHT / OBESE	EXERCISE
Accommodation & Food Services	22.9±5.8	11.5±4.3	62.2±-6.9	80.2±4.5
Administration, Support, Waste Management, & Remediation	18.2±7.1	11.9±5.8	75.6±-6.6	85.8±4.5
Agriculture, Forestry, Fishing, & Hunting	11.6±10.4	6.8±6.9	59.0±-12.1	77.3±8.1
Arts, Entertainment, & Recreation	14.6±11.1	7.4±6.4	57.2±-11.3	82.7±8.8
Construction	26.7±4.8	11.5±3.7	72.0±-4.4	83.1±3.2
Education	6.4±2.4	8.5±2.5	62.8±-4.0	88.2±2.4
Finance & Insurance	6.5±3.7	7.8±3.8	69.1±-5.7	89.8±3.0
Health Care and Social Assistance	11.6±2.3	6.7±1.8	65.2±-3.4	82.7±2.6
Information	6.1±6.3	10.7±7.8	66.4±-9.0	90.1±4.6
Manufacturing	15.5±3.2	9.1±2.6	74.6±-3.7	80.3±3.3
Other Services (Except Public Administration)	16.0±5.2	8.9±4.1	61.4±-6.8	78.3±5.1
Professional, Scientific, & Technical Services	6.7±2.8	5.2±2.4	67.2±-4.9	90.0±2.4
Public Administration	12.4±4.6	6.3±2.8	76.5±-4.1	85.5±3.4
Real Estate, Rent, Lease	8.5±5.6	9.8±7.9	71.7±-7.8	88.6±4.6
Retail Trade	21.0±4.1	5.6±2.0	63.1±-4.7	76.4±3.7
Transport & Warehouse	19.6±6.8	7.5±5.0	71.5±-7.0	72.0±6.4
Utilities	9.5±9.3	13.8±11.0	78.0±-8.4	89.6±5.4
Wholesale Trade	23.1±12.2	4.3±3.6	76.2±-9.2	86.3±5.2

Table 4c: Health Behavior Prevalence (%) by Industry and Occupation

CHARACTERISTIC: Occupation	SMOKER	HEAVY DRINKER	OVERWEIGHT / OBESE	EXERCISE
Architecture & Engineering	4.5±2.7	5.5±3.4	75.4±-5.0	89.1±3.4
Arts, Design, Entertainment, Sports & Media	5.8±4.4	7.0±6.1	58.7±-10.6	86.2±7.5
Building & Grounds Cleaning & Maintenance	21.5±7.4	12.6±6.6	66.4±-7.9	75.7±6.5
Business & Financial Operations	10.8±4.3	9.7±3.6	67.4±-5.6	87.1±3.7
Community & Social Services	16.0±8.0	9.5±6.4	67.8±-8.2	87.4±5.1
Computer & Mathematical	8.4±3.6	4.4±3.0	67.7±-5.7	92.7±2.4
Construction & Extraction	29.5±5.7	11.6±4.4	72.5±-4.9	82.9±3.6
Education, Training, & Library	6.3±3.0	8.2±2.9	56.9±-5.0	91.9±2.3
Food Preparation & Serving	28.5±8.7	10.0±5.9	60.3±-8.9	77.5±6.0
Healthcare & Technical	7.2±2.9	7.2±2.7	63.5±-5.0	85.2±3.6
Healthcare Support	13.5±6.8	6.0±4.6	69.6±-7.9	73.7±7.4
Installation, Maintenance, & Repair	22.6±7.3	8.9±4.9	77.2±-6.5	75.0±6.4
Legal	5.3±5.9	10.2±6.7	61.5±-9.4	92.9±3.5
Life, Physical, & Social Science	9.1±9.6	8.0±6.8	50.9±-12.4	87.3±6.6
Management	8.5±2.9	9.6±2.9	71.0±-4.3	85.7±3.1
Office & Administration Support	15.5±3.5	7.2±2.1	65.4±-4.5	82.3±3.0
Personal Care & Service	16.4±6.7	5.2±4.3	56.5±-8.4	80.6±5.6
Production	18.6±5.5	8.8±4.4	80.9±-5.0	73.8±5.6
Protective Service	7.2±5.5	7.8±6.8	89.3±-4.7	88.2±4.5
Sales & Related	16.7±3.8	7.5±2.5	63.8±-4.8	82.5±3.1
Transportation & Material Moving	25.5±6.8	7.0±4.3	74.9±-5.9	70.4±5.9

NOTE: Values are reported with 95% confidence interval
*Insufficient sample size to provide an estimate.

Overall Health Status by Industry and Occupation

Overall Health Status– prevalence of 12.7% poor health among New Hampshire's Working Population

12.7% of the population reported a health status of "fair" or "poor." Among the working population, prevalence of fair to poor health was 6.6%. The industry with the highest prevalence of "fair" or "poor" health status was the arts entertainment and recreation industry (15.1%), more than double the average prevalence of the working population surveyed. The next highest reported prevalence came from the retail trade industry (11.7%). The lowest prevalence of "fair" or "poor" health status was reported by workers in the utilities industry (2.4%), followed closely behind by the education industry (4.2%).

The prevalence of "fair" or "poor" health outcomes was 6.1% among workers aged 18 to 44. The prevalence was higher among older workers, with a 7.0% prevalence reported by workers aged 45 to 64, and a 6.9% prevalence reported by workers aged 65 and older.

There was no statistical significance in the prevalence of "fair" or "poor" health outcomes among male workers (6.8%) and female workers (6.3%). The prevalence of these outcomes increased among both male and female workers as their age increased. For male workers, the prevalence increased from 6.1% among 18 to 44 year olds, to 7.3% among 45 to 64 year olds, although continued to slightly increase among workers aged 65 and over (8.7%). Among female workers 18 to 44 years old, the prevalence of "fair" or "poor" health outcomes was 6.2%, the prevalence increased to 6.7% among female workers aged 45 to 64, and 4.7% among workers aged 65 and older.

Table 5a: Health Status by Prevalence of the Working Population

CHARACTERISTIC: Prevalence	**FAIR/POOR HEALTH STATUS (%)**
All	12.7±0.7
Working Population	6.6±0.7

Table 5b: Health Status by Industry of the Working Population

CHARACTERISTIC: Industry	**FAIR/POOR HEALTH STATUS (%)**
Accommodation & Food Services	9.2±4.6
Administration, Support, Waste Management, & Remediation	7.7±4.5
Agriculture, Forestry, Fishing, & Hunting	6.6±8.4
Arts, Entertainment, & Recreation	15.1±13.6
Construction	5.5±2.0
Education	4.2±2.1
Finance & Insurance	5.2±2.2
Health Care and Social Assistance	6.7±1.7
Information	11.3±8.8
Manufacturing	8.5±2.6
Other Services (Except Public Administration)	6.7±3.0
Professional, Scientific, & Technical Services	5.9±2.3
Public Administration	6.2±2.4
Real Estate, Rent, Lease	5.6±4.9
Retail Trade	11.7±3.3
Transport & Warehouse	8.6±5.1
Utilities	2.4±3.2
Wholesale Trade	5.3±4.5

Table 5c: Health Status by Occupation of the Working Population

CHARACTERISTIC: Occupation	**FAIR/POOR HEALTH STATUS**
Architecture & Engineering	5.3±3.1
Arts, Design, Entertainment, Sports & Media	17.2±12.2
Building & Grounds Cleaning & Maintenance	7.1±3.7
Business & Financial Operations	5.4±2.8
Community & Social Services	5.4±3.8
Computer & Mathematical	3.6±2.2
Construction & Extraction	5.9±2.4
Education, Training, & Library	4.0±1.8
Food Preparation & Serving	13.8±7.9
Healthcare & Technical	3.6±2.0
Healthcare Support	10.0±6.0
Installation, Maintenance, & Repair	6.4±3.6
Legal	8.0±5.7
Life, Physical, & Social Science	5.1±7.3
Management	7.5±3.2
Office & Administration Support	8.4±2.4
Personal Care & Service	7.7±4.3
Production	9.2±4.6
Protective Service	8.0±5.5
Sales & Related	8.7±2.6
Transportation & Material Moving	12.9±5.4

Table 5d: Health Status by Demographic of the Working Population

CHARACTERISTIC: Demographics	FAIR/POOR HEALTH STATUS
Age 18 to 44	6.1±1.3
Age 45 to 64	7.0±0.9
Age 65 or older	6.9±1.6
Female	6.3±1.0
Male	6.8±1.1
Female Age 18 to 44	6.2±1.6
Male Age 18 to 44	6.1±1.8
Female Age 45 to 64	6.7±1.2
Male Age 45 to 64	7.3±1.4
Female Age 65 or older	4.7±1.7
Male Age 65 or older	8.7±2.5
White, Non-Hispanic	6.3±0.7
American Indian/Alaskan Native, Non-Hispanic	7.3±11.4
Asian, Non-Hispanic	5.4±4.4
Black, Non-Hispanic	8.9±10.1
Hispanic	11.4±6.9
Other race, Non-Hispanic	11.8±8.4

Table 5e: Health Status by Health Behaviors of the Working Population

CHARACTERISTIC: Health Behaviors	FAIR/POOR HEALTH STATUS
Exercise past 30 days	5.2±0.7
No exercise past 30 days	13.8±2.5
Never smoked	4.6±0.8
Current smoker	14.6±3.1
Former smoker	7.6±1.6
Normal weight or underweight	5.9±1.5
Overweight or obese	7.2±1.0
Not heavy Drinker	6.9±0.8
Heavy Drinker	6.9±2.7

Table 5f: Health Status by Disability Status of the Working Population

CHARACTERISTIC: Disability Status	**FAIR/POOR HEALTH STATUS**
Disability	22.0±3.3
No Disability	4.1±0.7
Deaf or Serious Difficulty Hearing	13.3±6.0
No Hearing Disability	6.3±0.7
Blind or Serious Difficulty Seeing	22.4±10.1
No Seeing Disability	6.2±0.7
No Cognitive Disability	5.2±0.7
Serious Difficulty Concentrating, Remembering, or Making Decisions	26.2±5.6
No Mobility Disability	5.4±0.7
Serious Difficulty Walking or Climbing Stairs	40.9±6.3
Difficulty Dressing or Bathing	47.8±12.3
No Self Care Disability	6.2±0.7

Limitations

There are multiple limitations which constrain the generalizability of this study. In terms of race and ethnicity—as New Hampshire has a predominantly white population base—the ability to look at differences by race and ethnicity was severely restricted for this study. Second, the ability to document significant and meaningful differences in diseases by industry and occupation is, in part, limited by the available sample sizes within BRFSS, even when summarizing data over six years. Third, the BRFSS survey data was cross-sectional. Our analysis may provide insights into the possible correlative nature of some of the variables, but it is insufficient to provide indications of a causative nature. To this end, we must rely on the extensive literature base which better documents the links between various risk behaviors and long-term health outcomes. Lastly, the use of proxy indicators in the form of various health behaviors and self-assessments to assess the risk of long-term poor health outcomes by industry and occupation may have limited value without the benefit of additional information to help guide decision making.

Conclusions

While there are constraints to the generalizability of the study, our findings concerning disparities in prevalent health behaviors and risk factors by industry and occupation are in line with continued efforts by the CDC supporting workplace health promotion. Strategies around the CDC Worksite ScoreCard effort, in particular, emphasize the value of supporting a healthy workforce, not only in the areas of smoking, alcohol use, obesity, and exercise, but also in factors shaping blood pressure, cholesterol, nutrition, heart attack, stroke, diabetes, depression, stress management, sleep, musculoskeletal disorders, occupational health, preventable disease, maternal health, and cancer. (https://www.cdc.gov/workplacehealthpromotion/initiatives/healthscorecard/worksitescorecard.html)

When combined with additional information, this work can be used as a launching point to guide further research and intervention initiatives for health promotion within certain work environments in New Hampshire. To have the greatest potential for disease burden reduction, it is important to consider the industries and occupations where the risk of chronic disease is the greatest. Additional disease and risk pattern identification is needed to promote protective changes within the New Hampshire workforce. As a part of this effort, it would be helpful for future studies to look beyond the behaviors reviewed and consider other topics included in the BRFSS, particularly a focus on nutrition, health care access, and cholesterol and hypertension awareness, as well as other chronic health conditions such as asthma, depression, heart attack, or stroke.

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