

Exploring Health Outcomes by Occupation: Using the National Health and Wellness Survey to Describe Differences in Self-Reported Occupation Profiles

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Introduction

- It has been shown that an individual's health differs by their occupation in the Netherlands, Japan, and the United States (US).
- Occupation was a significant factor in self-assessed health, disability, and longevity in the Netherlands.¹
- Research has found that occupation performance scores were correlated with self-assessed health in a healthy Japanese population.²
- In the US, occupation has been shown to have an impact on health even after a change in job or retirement.³
- Occupation profile is defined as the 22 major groups of the Standard Occupational Classification (SOC) system used by US government agencies.

Objectives

- The aim of this study was to explore potential differences in health outcomes in individuals based on their occupation profile from the 2022 National Health and Wellness Survey (NHWS).
- The objective was to determine what differences existed among different occupation profiles in patient-reported measures that describe preventative and acute health utilization, work impairment, and cost.

Methods

Data Source

- The 2022 US NHWS is a cross-sectional, internet-based survey of adults aged ≥18 years.
- A quota sampling technique is implemented to ensure that the demographic composition (i.e., age, gender, and race) of the NHWS sample is representative of the adult population in each country surveyed.
- The NHWS has been granted exemption status by Pearl IRB (Indianapolis, IN, USA).

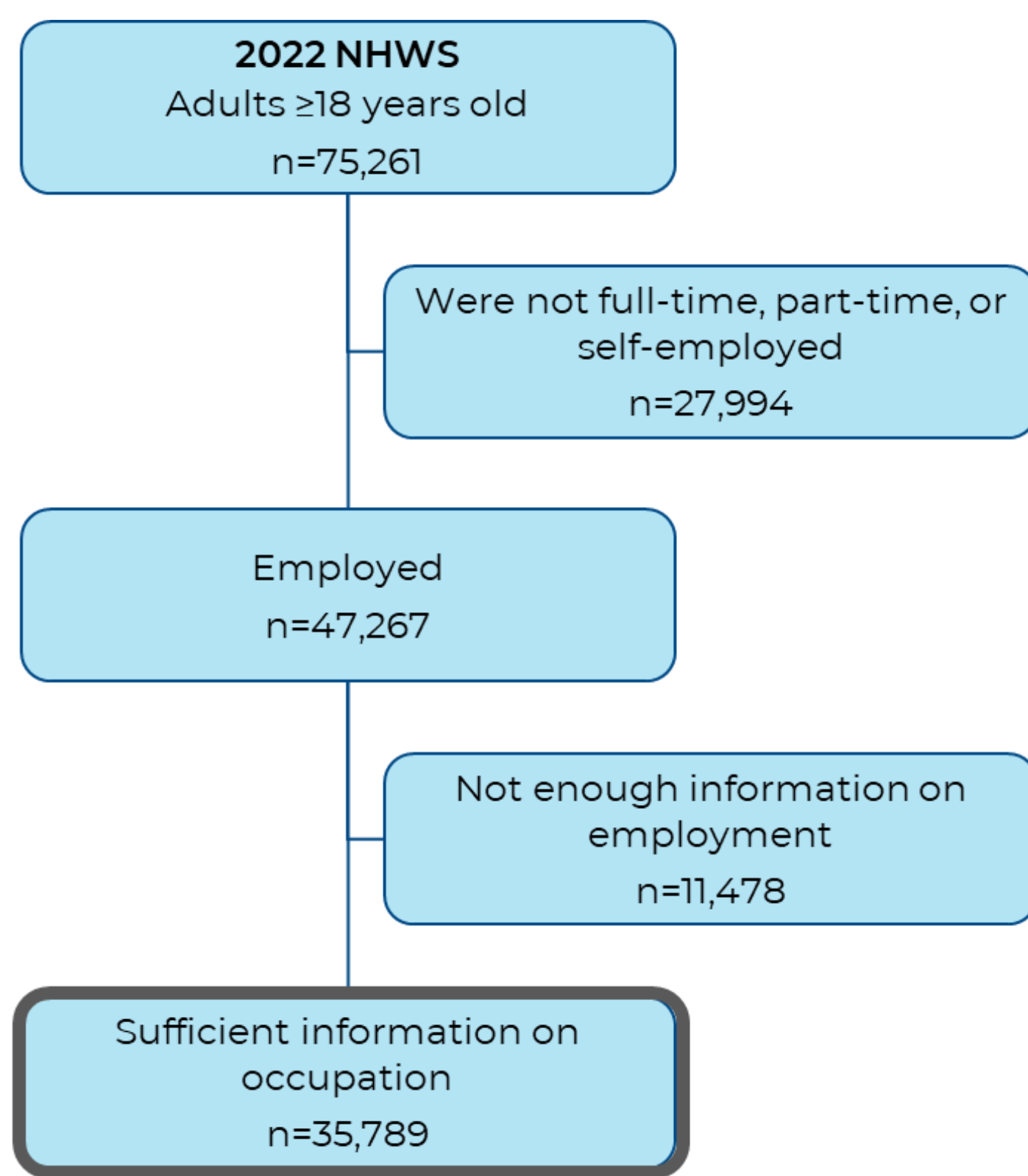
Study Population

- This study used the 2022 data and focused on employed respondents with responses to the occupation variable (**Figure 1**).
 - There are 22 occupation profiles as defined by the US Bureau of Labor Statistics (BLS).
- Key variables included sociodemographic and health characteristics and patient-reported outcomes including vaccinations, healthcare resource utilization (HCRU), work productivity and activity impairment (WPAI), and costs.

Statistical Analyses

- Descriptive statistics (means and standard deviations [SD] for numeric variables and counts and percentages for categorical variables) were used to describe characteristics and outcomes.
- Bivariate statistics (one-way ANOVA for numeric variables and Chi-squared tests for categorical variables) were used to assess any differences across occupation profiles.
- Data from the 2020 Medical Expenditure Panel Survey (MEPS) were used to assign the age-adjusted mean expenditure per event (\$) for office-based physician visits, emergency room (ER) visits, and inpatient stays.⁴
- The US BLS report on 2020 earnings was used to assign sex- and occupation-adjusted wages for the calculation of indirect costs of work impairment.⁵

Figure 1. Study Population



Results

Sample Characteristics

- A total of 35,789 respondents were employed and had reported their occupation (**Figure 2**).
- Respondents were predominantly white (62.0%) and male (53.9%) with a mean age of 41.74 years.
- Additionally, most respondents were married/living with a partner (69.0%), had a university degree or higher (61.4%), had commercial health insurance (60.3%), and had never smoked (63.0%).
- The occupation profiles representing the highest proportion of respondents were Education Instruction and Library (10.3%), Business and Financial Operations (10.1%), and Construction and Extraction (8.1%).
- Protective Service (0.7%), Life, Physical and Social Science (1.1%), and Farming, Fishing, and Forestry (1.3%) were the occupation profiles representing the lowest proportion of respondents.
- The occupation profiles with the highest proportion of older respondents (65+ years) were Sales and Related (12.2%), Office and Administrative Support (11.9%), and Education Instruction and Library (11.7%).
- Building and Grounds Cleaning and Maintenance (41.5%), Construction and Extraction (35.5%), and Computer and Mathematical (34.4%) were the occupation profiles representing the highest proportion of current smokers.

Patient Outcomes

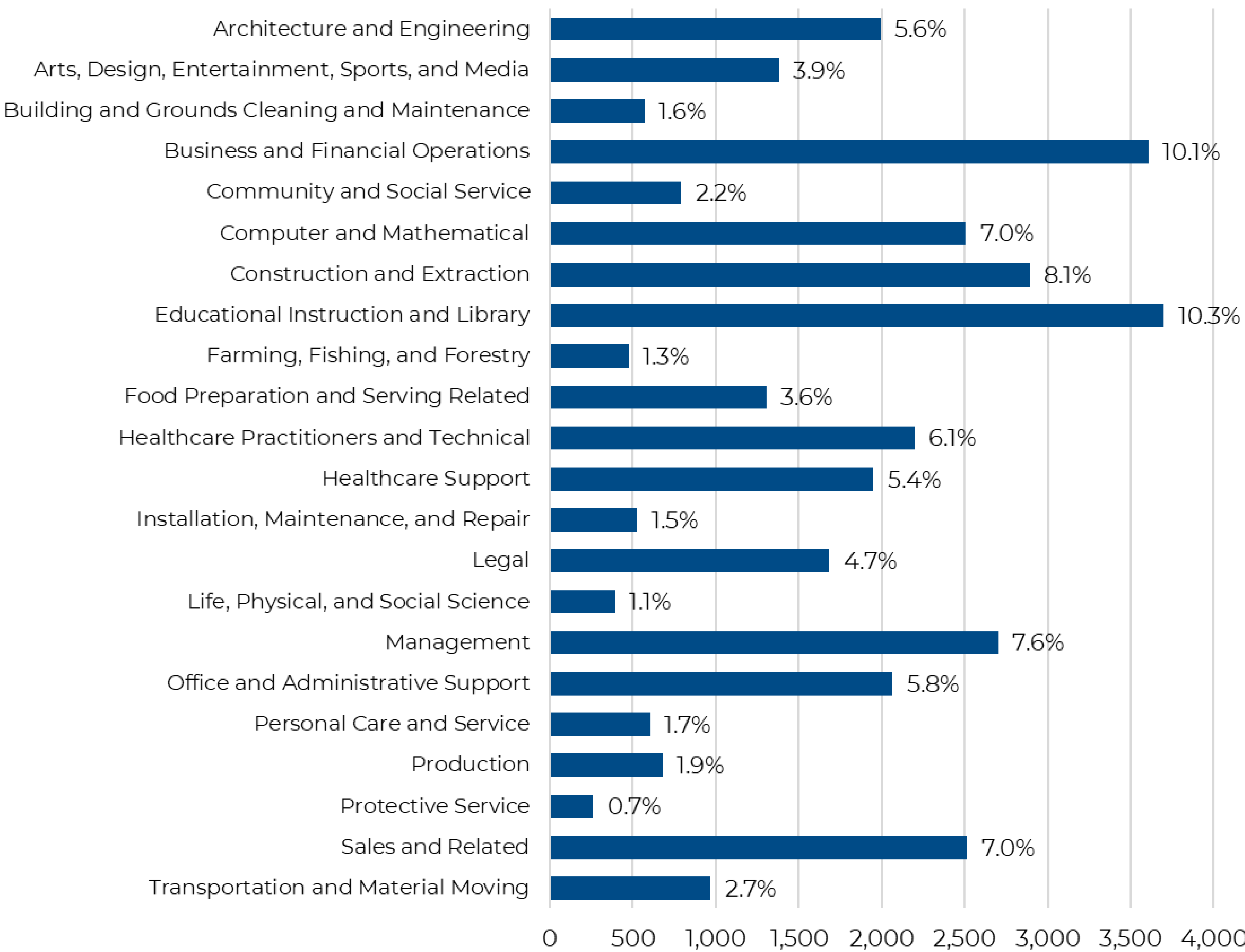
- Sales and Related occupations had the greatest proportion of respondents reporting a COVID-19 diagnosis (16.1%) while Building and Grounds Cleaning and Maintenance had the lowest proportion (3.8%).
- Life, Physical, and Social Science had the most respondents reporting that they had received a COVID-19 vaccine in the past 12 months (66.5%) while Farming, Fishing, and Forestry had the least respondents (45.0%).
- Healthcare Practitioners and Technical had the greatest flu vaccination rate over the past year (58.6%) while Personal Care and Service had the lowest (32.1%).
- For all occupation profiles, a higher proportion of respondents reported having a COVID-19 vaccine in the past 12 months compared to the flu vaccine.
- Office and Administrative Support had the greatest proportion of respondents with a traditional healthcare provider (HCP) visit (79.8%) but the lowest proportion with an ER visit (12.7%) or a hospitalization (8.1%). Farming, Fishing, and Forestry had the greatest proportion of respondents with an ER visit (41.6%) or hospitalization (41.6%).
 - Office and Administrative Support occupations also had the lowest average direct costs of HCRU (\$7,478) while Building and Grounds Cleaning and Maintenance occupations had the highest average direct costs (\$43,419).
- The greatest proportion of respondents with any overall work impairment or activity impairment was in Farming, Fishing, and Forestry (work: 91.1%, activity: 87.4%) while the lowest proportion was in Office and Administrative Support (work: 50.0%, activity: 53.3%).
 - Even though Farming, Fishing, and Forestry had the greatest overall work impairment, these occupations also had the lowest average indirect cost of work impairment (\$4,893). Management occupations had the highest average indirect cost of work impairment (\$16,273).

Table 1. Patient-Reported Outcomes by Occupation Profile

Occupation Profile	COVID-19 Diagnosis Rate	Any COVID-19 Vaccination Rate	COVID-19 Vaccination Rate (past 12 months)	Flu Vaccination Rate (past 12 months)	Any Traditional HCP Visit (past 6 months)	Any ER Visit (past 6 months)	Any Hospitalization (past 6 months)	Average Total Direct Costs (\$, past 12 months)	Absenteeism >0%	Presenteeism >0%	Overall Work Impairment >0%	Activity Impairment >0%	Average Total Indirect Costs (\$, past 12 months)
Architecture and Engineering	5.7%	59.7%	53.2%	42.3%	58.2%	23.1%	21.5%	22,090	68.7%	72.6%	76.6%	72.1%	12,741
Arts, Design, Entertainment, Sports, and Media	12.1%	71.8%	62.6%	48.2%	70.9%	25.2%	20.8%	25,472	52.5%	69.5%	73.7%	68.7%	10,855
Building and Grounds Cleaning and Maintenance	3.8%	57.8%	49.8%	48.4%	77.0%	41.5%	41.3%	43,419	78.3%	85.2%	87.3%	84.5%	5,401
Business and Financial Operations	7.9%	68.7%	60.1%	44.7%	67.3%	30.8%	29.6%	30,341	59.1%	68.2%	72.9%	68.5%	14,601
Community and Social Service	9.2%	66.8%	56.4%	50.0%	76.7%	32.2%	29.2%	26,604	69.1%	79.3%	81.4%	79.9%	10,003
Computer and Mathematical	8.6%	71.8%	62.4%	42.1%	70.8%	26.4%	26.1%	25,228	56.2%	68.3%	72.3%	68.1%	15,697
Construction and Extraction	5.8%	56.6%	48.0%	32.9%	54.2%	26.0%	24.5%	22,413	62.8%	68.7%	74.5%	66.1%	8,662
Educational Instruction and Library	14.9%	79.2%	65.5%	50.9%	76.8%	14.0%	10.8%	11,070	32.1%	58.1%	59.2%	60.1%	9,031
Farming, Fishing, and Forestry	5.9%	52.9%	45.0%	45.6%	72.7%	41.6%	41.6%	28,184	78.5%	90.0%	91.1%	87.4%	4,893
Food Preparation and Serving Related	14.9%	65.5%	52.8%	36.3%	70.2%	25.7%	19.8%	18,151	46.4%	70.3%	71.8%	69.4%	5,015
Healthcare Practitioners and Technical	15.5%	76.8%	62.7%	58.6%	78.2%	20.5%	16.5%	15,317	36.8%	58.9%	60.6%	60.5%	10,971
Healthcare Support	14.8%	70.9%	57.9%	49.9%	74.2%	22.2%	16.3%	12,678	39.6%	64.9%	66.2%	68.3%	5,809
Installation, Maintenance, and Repair	10.6%	54.4%	46.8%	40.2%	67.6%	35.8%	32.8%	29,778	61.7%	74.9%	77.5%	72.9%	9,322
Legal	5.4%	56.3%	49.1%	45.0%	51.9%	27.6%	26.4%	21,626	68.4%	58.0%	80.1%	59.0%	12,908
Life, Physical, and Social Science	13.5%	75.4%	66.5%	57.6%	78.9%	25.4%	23.6%	28,144	52.6%	70.9%	72.4%	72.3%	11,906
Management	12.3%	73.1%	63.3%	46.3%	72.8%	23.2%	21.1%	23,617	44.9%	63.9%	66.1%	64.9%	16,273
Office and Administrative Support	15.5%	77.0%	61.6%	43.2%	79.8%	12.7%	8.1%	7,478	23.4%	48.6%	50.0%	53.3%	5,939
Personal Care and Service	12.9%	62.3%	51.4%	32.1%	71.1%	19.0%	12.1%	15,292	37.4%	62.4%	63.5%	62.0%	6,855
Production	11.7%	68.5%	55.1%	40.4%	65.3%	17.7%	13.0%	13,395	34.9%	57.9%	59.9%	59.9%	6,903
Protective Service	12.0%	62.8%	47.7%	47.7%	70.5%	27.5%	18.6%	16,055	39.8%	63.2%	65.4%	67.4%	8,818
Sales and Related	16.1%	72.8%	58.1%	39.5%	71.7%	16.1%	9.9%	9,252	31.0%	59.4%	60.9%	60.2%	8,001
Transportation and Material Moving	12.5%	61.8%	50.6%	32.3%	62.3%	18.4%	14.4%	11,550	36.8%	58.9%	61.6%	60.9%	6,402

Note: Bold values indicate the three largest and three smallest results. Red indicates greater values. Blue indicates lesser values. All p-values <0.001.

Figure 2. Distribution of Occupation Profiles



Limitations

- Given the cross-sectional nature of the survey, causality cannot be made from the study results.
- Data collected are self-reported, and there is no way to independently verify the information reported.
- The NHWS likely underrepresents people without access to internet, elderly people, institutionalized patients, and people with more severe comorbidities and disabilities.
- The 2020 MEPS and wage estimates were not adjusted for inflation and likely result in undervalued direct and indirect costs, respectively. However, this should not affect relative comparisons of costs across occupation profiles.

Conclusion

The 2022 NHWS results highlight differences in all outcomes that may be dependent on occupation, with physical labor of Farming, Fishing, and Forestry noting some of the greatest impairment. While different occupations may be associated with different types of impairment, healthcare providers should be considerate of occupation when evaluating their patients. Workplace managers and administration should also be cognizant of potential negative impacts that may affect their colleagues and staff in lower-level positions. Further research may benefit from investigating occupation profile as an independent factor when evaluating patient-reported outcomes.

Acknowledgment

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References

- Ravesteijn B, van Kippersluis H, van Doorslaer E. The contribution of occupation to health inequality. *Res Econ Inequal*. 2013 Jan 1;21:311-332. [https://doi.org/10.1108/S1049-2585\(2013\)0000021014](https://doi.org/10.1108/S1049-2585(2013)0000021014).
- Yokoi K, Miyai N, Utsumi M, Hattori S, Kurasawa S, Uematsu Y, Arita M. The relationship between meaningful occupation and self-rated health in Japanese individuals: The Wakayama Study. *Occupational Therapy in Health Care*. 2020;34(2), 116-130. <https://doi.org/10.1080/07380577.2020.1746469>.
- Gueorgieva R, Sindelar JL, Falba TA, Fletcher JM, Keenan P, Wu R, Gallo WT. The impact of occupation on self-rated health: cross-sectional and longitudinal evidence from the health and retirement survey. *J Gerontol B Psychol Sci Soc Sci*. 2009 Jan;64(1):118-24. <https://doi.org/10.1093/geronb/gbn006>.
- Agency for Healthcare Research and Quality. (2022). *Medical Expenditure Panel Survey (MEPS) Household Component (HC)*. MEPS-HC Data Tools | AHRQ Data Tools. Retrieved January 5, 2023, from <http://dataools.ahrq.gov/meeps-hc?type=tab&tab=mepshch3uep>.
- U.S. Bureau of Labor Statistics. (2021, September). (rep. 1094). *Highlights of women's earnings in 2020*. [Table 1] Retrieved January 5, 2023, from <https://www.bls.gov/opub/reports/womens-earnings/2020/home.htm>.

ANOVA, analysis of variance; BLS, Bureau of Labor Statistics; COVID-19, coronavirus disease 2019; ER, emergency room; HCP, healthcare provider; HCRU, healthcare resource utilization; MEPS, Medical Expenditure Panel Survey; NHWS, National Health and Wellness Survey; SD, standard deviation; SOC, Standard Occupational Classification; US, United States; WPAI, work productivity and activity impairment