

RESEARCH ARTICLE

Healthcare Access and Health Status by Primary Source of Health Insurance and Occupation

Sharon R. Silver¹  | Jia Li² | Abay Asfaw³ 

¹Division of Field Studies and Engineering, National Institute for Occupational Safety and Health, Health Informatics Branch, Cincinnati, Ohio, USA | ²Retired, Work Performed While Employed With National Institute for Occupational Safety and Health, Division of Field Studies and Engineering, Health Informatics Branch, Cincinnati, Ohio, USA | ³National Institute for Occupational Safety and Health, Office of the Director, Washington, District of Columbia, USA

Correspondence: Sharon R. Silver (ssilver@cdc.gov) and Abay Asfaw (hqp0@cdc.gov)

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ABSTRACT

Background: In the United States, health insurance is strongly associated with healthcare access and health status. How health insurance source, healthcare access, and health status differ by occupation has received less attention.

Methods: We used responses to the 2022 and 2023 Behavioral Risk Factor Surveillance System to estimate the prevalence of primary health insurance source, healthcare access/unmet healthcare needs, and health status by demographic characteristics and major occupation among respondents employed for wages or self-employed. We generated prevalences and adjusted prevalence ratios (PRs) to examine healthcare access and self-reported health status for workers in each occupation and to understand the impacts of adjustment for demographic characteristics (age, sex, race/Hispanic ethnicity), health insurance source, and household income.

Results: Overall, being insured was associated with better healthcare access and self-reported health status. Workers with employer-sponsored insurance or non-group private insurance were least likely to report unmet healthcare needs or to rate their health status as fair or poor. The uninsured were most likely to report unmet healthcare needs. The four occupations with at least 25% of workers uninsured (Farming, Fishing and Forestry; Building and Grounds Cleaning and Maintenance; Food Preparation and Serving; and Construction and Extraction) had statistically significant unadjusted PR elevations for all unmet healthcare need measures and for fair or poor general health. After sequential adjustment for demographic covariates and then primary insurance source, statistically significant elevations remained for being unable to afford needed care and for reporting fair or poor general health in most low-wage occupations. Final adjustment, adding household income, eliminated these remaining elevations for most occupations.

Conclusions: Both healthcare access and health status vary by health insurance status and source, which are differentially distributed by occupation. Workers in lower-wage occupations may have trouble affording medical care, even if insured. Affordable, comprehensive health insurance coverage, along with wages adequate to cover needed care, could help ensure the health and continued employability of all workers.

1 | Introduction

In the United States, having health insurance is strongly associated with better self-reported health status [1–3], and gaining

healthcare coverage has generally been found to improve healthcare access and outcomes [2, 4, 5]. Examples of specific improvements range from earlier diagnosis and control of

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certain chronic physical and mental health conditions [6–8] to lower mortality [9, 10], although results differ by research design and timing [11] and by insurance type [12–14].

Health insurance coverage among U.S. adults of working age differs by demographic characteristics. For 2023, the U.S. Census Bureau reported 10.9% uninsurance (having no health insurance) among all adults aged 19–64 and 10.0% among working adults in that age group [15]. The report found that Hispanic adults were most likely to be uninsured (23.6%), followed by Black adults (11.1%), non-Hispanic White adults (7.0%), and Asian adults (7.0%). Coverage also differed by marital status, with uninsurance most likely among adults who were separated (18.1%), followed by those who had never married (14.7%), and lowest among those who were married (7.9%). Other research has found that among uninsured adults aged 18–64, lack of affordability was the most common primary reason for not having health insurance, cited by 63.2% of respondents [16].

Among working adults, health insurance coverage differs not only by demographic characteristics but also by employment situation (employed vs. self-employed) and occupation. Analyses have found self-employed adults to be less likely to be insured than adults employed for wages [17–19]. By major occupational group, analyses of employed, self-employed, and recently unemployed (< 1 year) respondents to the 2022–2023 Behavioral Risk Factor Surveillance System (BRFSS) observed that more than 20% of workers were unemployed in four occupations: Farming, Fishing, and Forestry (28.8%); Building and Grounds Cleaning and Maintenance (27.2%); Construction and Extraction (24.7%); and Food Preparation and Serving (22.8%) [19]. Census data for working adults aged 19–64 in 2024 showed that uninsurance was most common in these same four groups [20], even though previous research found that farming, construction, and service were among occupations with the largest drops in uninsurance following implementation of the Patient Protection and Affordable Care Act (ACA) [21].

Among those with health insurance, healthcare access and utilization (often measured as unmet healthcare needs), as well as health status and outcomes, may vary by source of insurance. Insurance sources have often been divided into two broad categories: public and private. Private insurance historically encompassed employer-sponsored insurance (through a job or labor union, referred to as ESI) and non-group private insurance (individually purchased from an insurance broker), while public insurance included Medicare (for people aged 65 or older, and younger people with certain long-term disabilities) and Medicaid (for low-income individuals). However, both the health insurance landscape and categorization of insurance sources have become more complex since the ACA was introduced and expanded both public and private programs. These included, for example, Medicaid expansion and subsidized ACA Marketplace coverage (involving private purchase of coverage from an insurance broker or through federal or state insurance marketplace state-sponsored programs, and other programs with government involvement) [22].

According to 2023 US Census estimates, which capture coverage of an individual by multiple types of insurance, 54% of adults had ESI, with Medicaid the next most common at 15.9% [15]. As with insured status, the distribution of insurance

sources differs by demographic characteristics. Among workers aged 19–64, 12.6% were classified by the US Census as having public insurance (Medicare, Medicaid, VA, or Champus [now TriCare]) and 80.1%, private insurance (employment-based, private, or through state or federal marketplace); this compared with 42.8% public and 46.7% private among adults in this age range who did not work at least 1 week [15].

Studies of the distribution of health insurance source by occupation have been limited. Limited data on access to ESI are available; one such study identified three broad occupational groups in which more than 40% of workers could not access ESI through their jobs: Farm, Fishing and Forestry; Construction; and Service [23]. Less attention has been given to the full distribution of workers' health insurance sources by occupation, as well as healthcare access and outcomes. In the current research, we examined associations between demographic characteristics, occupation, health insurance status, primary source of health insurance, healthcare access, and self-reported health status.

2 | Methods

BRFSS is conducted annually by all states and three U.S. territories to survey noninstitutionalized, U.S. civilian residents aged ≥ 18 years. The BRFSS core survey, administered to all respondents, includes questions about sociodemographic characteristics (including employment status), health behaviors, health conditions, and use of health-related services. BRFSS also includes topical modules that jurisdictions can opt to administer. The Industry and Occupation (I&O) optional module is for respondents who reported on the survey core that they were currently employed for wages (henceforth, “employed”), self-employed, or out of work for < 1 year. To ascertain occupation, respondents are asked, “What kind of work do you do, for example, registered nurse, janitor, cashier, auto mechanic?” Free-text responses are recorded and then coded by the National Institute for Occupational Safety and Health's NIOSH Industry and Occupation Computerized Coding System (NIOCCS; <https://csams.cdc.gov/nioccs/>) into one of 22 two-digit standard occupational classification major groups (https://www.bls.gov/soc/2010/2010_major_groups.htm; specific occupational components of each major group are found at the same website). The I&O module was administered by 40 states, Guam, and the U.S. Virgin Islands for at least 1 year in 2022–2023. For 2022, median U.S. BRFSS response rates across jurisdictions were 46.3% for landline and 44.7% for cell phone users [24]. In 2023, median response rates were 54.3% for landline and 40.5% for cellphone users [25].

The BRFSS core survey includes a question about the primary source of insurance. In 2022, the question was “What is the current primary source of your health insurance?” and in 2023, respondents were asked “What is the current source of your primary insurance?” Response categories are employment (“A plan purchased through an employer or union [including plans purchased through another person's employer]”); private (“A private nongovernmental plan that you or another family member buys on your own”); Medicare; Medicaid; Children's Health Insurance Program (CHIP); Military-related health care (“TRICARE (CHAMPUS)/VA health care/CHAMP-VA”); Indian Health Service (IHS); state sponsored health plan;

other government program; and no coverage of any type. For the “employment or union” category, we use the accepted term ESI, although we note that this category also includes insurance from labor unions. We refer to responses of “private” as “non-group private insurance.” For the purposes of these analyses, we combined Medigap with Medicare and CHIP with Medicaid. While enrolled members of Native American tribes are eligible for healthcare coverage under the IHS, the IHS is not a health insurance program, and participants with no other documented health insurance coverage are considered uninsured by the U.S. Census [15]; for comparability, we have followed this practice and grouped respondents reporting IHS as primary source with the uninsured. Because, with the exception of employment-based and non-group private health insurance, most health insurance sources have a governmental component, in this research, we describe results for the grouped BRFSS categories, rather than sorting into “private” and “public” categories.

BRFSS does not ascertain whether the respondent or another family member is the policyholder of this insurance and does not ask about non-primary health insurance sources. Thus, for example, some self-employed respondents may report having ESI although they are not “employees.” These respondents are likely a mix of business owners, those with ESI through family members, and respondents continuing insurance from previous employment for wages through temporary extensions via the Consolidated Omnibus Budget Reconciliation Act (COBRA) [26].

In addition to the question about primary insurance source, BRFSS has three questions about healthcare access. The first concerns whether the person has a primary provider: “Do you have one person (or a group of doctors) that you think of as your personal health care provider?” Answers of “no” were coded as positive for “no personal doctor.” Another question asked, “Was there a time in the past 12 months when you needed to see a doctor but could not because you could not afford it?” Positive answers were coded as positive for “could not afford needed care,” while noting that affording needed care has additional components. The third question was “About how long has it been since you last visited a doctor for a routine checkup?” with cutpoints of less than 1 year, 1–2 years, 2–5 years, and more than 5 years. Responses of 1 year or more were coded as positive for “no checkup past year.” We used each of these variables to measure the prevalence of lacking healthcare access (which we also refer to as unmet healthcare need).

BRFSS also has self-reported health status measures. General health is ascertained by “Would you say that in general your health is—Excellent, Very Good, Good, Fair, Poor?” We grouped answers of “fair” and “poor” into “fair or poor general health.” Two questions, one for physical health and one for mental health, ask the number of days of the last 30 during which the person's health was not good. The physical health question asks “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?” and the mental health question, “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?” For each item, in line with the literature in this area [27], we dichotomized responses so that

respondents reporting their health was not good for at least 14 days were classified as having “frequent physical distress” or “frequent mental distress.” All health status measures were self-reported, with no reference to diagnosis by a healthcare professional.

Study criteria include an age restriction of 18–64 years to focus on the sources of health insurance adults are likely to have access to during most years of their working lives (i.e., not Medicare, which is primarily age-based). We included respondents who indicated they were currently employed for wages (henceforth, “employed”) or self-employed; we excluded the unemployed to minimize recent health insurance changes due to employment status transitions. Because BRFSS is not representative of active-duty military personnel, respondents indicating this status were also excluded; however, some remaining respondents may have military-based insurance through a family member or as veterans currently working in civilian occupations.

Demographic characteristics of interest were sex, age group, race and Hispanic or Latino (henceforth, “Hispanic”) ethnicity, education level, marital status, and household income category. Sex was not missing for any respondents. Age and race/Hispanic ethnicity were imputed by the BRFSS program for 1.2% of respondents and 2.5% of respondents, respectively. While only 0.2% and 0.6% of respondents were missing educational attainment and marital status, respectively, almost 13% did not report household income. Because BRFSS measures household income rather than individual wages and had many missing observations, we also reported mean annual wage data from the U.S. Department of Labor for each occupational group. A total of 5821 respondents were missing information on primary insurance type; of these, 3985 reported that they did not know their primary insurance type, while 1836 declined to answer or were not asked the question. Respondents missing primary insurance source were included in calculations of the population mean but were not assigned a category for insurance coverage or source. Respondents missing information for other variables were retained but excluded from analyses involving those variables.

During 2022–2023, 283,760 BRFSS respondents indicated they were employed or self-employed. After exclusions for age, active-duty military, and lack of codable occupation, we retained 203,780 participants in the analytic dataset.

We calculated weighted prevalences and 95% confidence intervals (CIs) to evaluate several associations: (1) primary source of health insurance with healthcare access and health status; (2) demographic characteristics and employment situation with primary source of health insurance; (3) demographic characteristics with healthcare access and health status; (4) major occupation group with primary source of health insurance. We present weighted, unadjusted prevalences compared to the population mean prevalence to assess statistical significance, considering prevalence estimates with 95% CIs not overlapping those of the population mean to have statistically significant differences.

We also present a set of analyses more deeply exploring associations between major occupation groups and both healthcare access and health status. These include unadjusted prevalence, prevalence ratios (PRs), and adjusted prevalence ratios (aPRs)

comparing healthcare access and health status measures in the occupation under study with those in all other occupations combined. We present both unadjusted PRs and three sets of adjusted PRs. The first adjustment accounts for sex (male, female); age (18–24, 25–34, 35–50, and 60–64); race/Hispanic ethnicity (non-Hispanic Black, non-Hispanic White, Hispanic, non-Hispanic other race or multiracial), and marital status (married, divorced, widowed, separated, never married, member of an unmarried couple). The second adjustment retains these and adds an adjustment for primary insurance source (ESI, military, non-group private, Medicare [including Medicaid], state-sponsored, other governmental, Medicaid, and uninsured [including IHS]). The final adjustment retains everything included in the second adjustment and adds household income.

We used SAS version 9.4 (SAS Institute, Carey, N.C.) and SAS-callable SUDAAN version 11.0.1 (RTI International, Research Triangle Park) to account for the complex survey design. We used the SURVEYFREQ procedure to estimate population counts and weighted unadjusted prevalences and 95% CIs. We used the RLOGISTIC procedure (SAS-callable SUDAAN version 11.01.1, RTI International, Research Triangle Park) to perform logistic regression and estimate aPRs comparing the adjusted prevalence of each dependent variable for each major occupation to the adjusted prevalence for workers in all other occupations (except the one being compared) combined. Hence, the aPR compares the prevalence for workers in each group to the expectation based on the prevalence for all other workers combined, after adjustment. We considered aPRs with the lower 95% CI above 1.0 to indicate statistically significant prevalence elevations and aPRs with the upper 95% CI below 1.0 to be in a statistically significant deficit (i.e., below expectation). In the online supplemental materials (Supporting Information S1: Appendix A), we present this last set of results as prevalence figures with the same series of adjustments but compared to the population means.

This activity was reviewed by CDC, deemed not human subjects research, and was conducted consistent with applicable federal law (45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.) and CDC policy.

3 | Results

Of the 203,780 respondents included in our analyses, 62.0% were covered by ESI (Table 1). The next most common sources of health insurance were non-group private (10.1%) and Medicaid (6.9%). State-sponsored, other governmental, and military-based insurance covered 3.3%, 2.9%, and 2.1% of workers, respectively. A total of 9.9% of respondents indicated that they were uninsured (including those enrolled in the IHS).

3.1 | Healthcare Access/Unmet Healthcare Needs by Primary Health Insurance Source

Of the healthcare access/unmet need measures, not having had a checkup in the past year (29.6%) was most common among all workers combined, followed by not having a personal doctor

(20.2%). Not being able to afford needed medical care was the least common (11.9%) (Table 1).

Uninsured workers were more than three times as likely as all workers combined to lack a personal doctor (64.6%) and to be unable to afford needed care (37.7%), and twice as likely to have not had a checkup in the past year (60.7%), with all elevations statistically significant.

Workers with ESI, military-based insurance, or non-group private insurance had significantly lower prevalence than all workers combined for having no personal doctor and being unable to afford needed care than those with non-group private insurance. Those insured through the military had the lowest prevalence estimates for these measures, as well as for no checkup in the past year.

Workers with Medicare, state-sponsored, or other governmental insurance were statistically indistinguishable from the population mean for all three healthcare access measures, with one exception: those with state-sponsored insurance were significantly more likely to be unable to afford needed care (15.8%). Workers on Medicaid had a prevalence significantly higher than the population mean of being unable to afford needed care, but a significantly lower prevalence than the population mean of not having a checkup in the past year.

3.2 | Health Status by Primary Health Insurance Source

Health status measures also differed by primary insurance source (Table 1). Overall, 11.9% of workers reported fair or poor general health, 7.5% reported frequent physical distress, and 14.8% reported frequent mental distress. By primary insurance source, those with Medicaid had the highest prevalence estimates for each adverse health status measure, exceeding the estimates for uninsured workers for frequent physical and mental distress. Workers with ESI or non-group private insurance had the lowest prevalence estimates for each adverse health status measure. In contrast to the results for healthcare access, workers with military-based insurance had point estimates significantly exceeding the population mean for each health status measure, with the differences for frequent physical distress and frequent mental distress statistically significant. Workers with Medicare, state-sponsored, or other governmental insurance had significantly elevated prevalence of all adverse health status measures, with the exception of frequent mental distress among those with other governmental insurance.

3.3 | Employment Situation and Primary Health Insurance Source by Demographic Characteristics

Most respondents were employed (84.4%), with 15.6% self-employed (Table 2). ESI was more than twice as common among the employed (68.3%) as among the self-employed (27.1%). Being uninsured was more than twice as common among the self-employed (20.0%) as among the employed (8.0%). Non-group private insurance was three times as common among the self-employed (23.9% self-employed, 7.6% employed). The self-employed were also significantly more likely

TABLE 1 | Primary health insurance source, healthcare access, and self-reported health status, employed and self-employed adults ages 18–64, Behavioral Risk Factor Surveillance System 2022–2023.*

Primary insurance source**	N	Weighted N (*1000)	% of all respondents reporting health insurance source %		Healthcare access			Self-reported health status		
			No personal doctor % (95% CI)	Could not afford needed care % (95% CI)	No routine checkup past year % (95% CI)	Fair or poor general health % (95% CI)	Frequent physical distress*** % (95% CI)	Frequent mental distress*** % (95% CI)		
All	203,780	87,993	20.2 (19.8, 20.6)	11.9 (11.6, 12.3)	29.6 (29.2, 30.1)	11.9 (11.6, 12.2)	7.5 (7.3, 7.8)	14.8 (14.5, 15.1)		
Employer-sponsored	131,387	52,631	13.6 (13.2, 14.1)	7.7 (7.4, 8.0)	25.8 (25.3, 26.3)	8.9 (8.5, 9.2)	6.1 (5.8, 6.4)	12.9 (12.5, 13.3)		
Military	4559	1781	12.3 (10.2, 14.6)	5.0 (3.9, 6.2)	16.2 (14.2, 18.3)	13.7 (11.6, 16.0)	10.5 (8.8, 12.4)	19.8 (17.4, 22.4)		
Non-group private	19,346	8557	16.0 (14.8, 17.3)	10.2 (9.2, 11.3)	28.2 (26.8, 29.7)	9.4 (8.6, 10.3)	6.7 (5.9, 7.5)	12.8 (11.8, 13.9)		
Medicare	4511	2463	20.9 (18.5, 23.4)	13.6 (11.7, 15.7)	27.0 (24.3, 29.8)	19.5 (17.2, 22.0)	12.1 (10.1, 14.3)	18.8 (16.6, 21.2)		
State sponsored	6685	2791	19.4 (17.2, 21.7)	15.8 (13.7, 18.1)	27.6 (25.3, 30.0)	18.6 (16.7, 20.7)	11.3 (9.8, 13.0)	19.9 (18.0, 21.9)		
Other governmental	4724	2459	22.5 (19.3, 25.9)	13.3 (11.6, 15.2)	28.1 (25.0, 31.4)	16.3 (14.2, 18.7)	10.5 (8.6, 12.7)	14.9 (13.0, 17.1)		
Medicaid (includes CHIP)	11,289	5841	18.7 (17.4, 20.1)	14.9 (13.6, 16.2)	26.3 (24.7, 27.8)	20.7 (19.3, 22.2)	13.3 (12.1, 14.6)	24.0 (22.6, 25.5)		
No health insurance (includes Indian Health Service)	15,458	8393	64.6 (62.9, 66.3)	37.7 (36.0, 39.4)	60.7 (58.9, 62.5)	20.2 (18.8, 21.6)	9.8 (8.8, 10.8)	17.7 (16.3, 19.1)		

Note: Italics indicate statistically significant elevation compared to all workers combined.

Abbreviation: CI, confidence interval.

*Forty U.S. states, Guam, and the U.S. Virgin Islands.

**The 3985 respondents who did not know the source of their primary health insurance, and 1836 who declined to answer or were not asked the question, are included in the population mean but not assigned a primary health insurance source.

***Participants who gave a number ≥ 14 in response to the question “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?”

****Participants who gave a number ≥ 14 in response to the question “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”

TABLE 2 | Employment situation and primary health insurance source by demographic category, employed and self-employed adults ages 18–64, Behavioral Risk Factor Surveillance System 2022–2023.*

Demographic characteristic	N	Weighted N (*1000)	Primary insurance source**							No health insurance*** % (95% CI)
			Self-employed % (95% CI)	Employer-sponsored % (95% CI)	Military % (95% CI)	Non-group private % (95% CI)	Medicare % (95% CI)	State sponsored % (95% CI)	Other governmental % (95% CI)	Medicaid (includes CHIP) % (95% CI)
All	203,780	87,993	15.6 (15.3, 16.0)	62.0 (61.5, 62.5)	2.1 (2.0, 2.2)	10.1 (9.8, 10.4)	2.9 (2.7, 3.1)	3.3 (3.1, 3.5)	2.9 (2.7, 3.1)	6.9 (6.7, 7.1)
Employment status										
Employed for wages	173,143	74,237								
Self-employed	30,637	13,756								
Sex										
Male	105,969	46,853	18.0 (17.5, 18.6)	61.8 (61.1, 62.4)	2.6 (2.4, 2.7)	10.1 (9.7, 10.5)	3.0 (2.8, 3.3)	2.8 (2.6, 3.1)	2.7 (2.5, 2.9)	4.6 (4.4, 4.9)
Female	97,811	41,140	12.9 (12.4, 13.4)	62.2 (61.5, 62.9)	1.6 (1.4, 1.8)	10.1 (9.6, 10.6)	2.8 (2.5, 3.0)	3.8 (3.5, 4.1)	3.1 (2.9, 3.4)	9.4 (9.0, 9.8)
Age in years										
18–24	15,202	10,040	10.0 (9.0, 11.1)	43.3 (41.7, 44.9)	2.2 (1.8, 2.7)	15.5 (14.4, 16.7)	5.9 (5.1, 6.8)	4.2 (3.5, 4.9)	2.5 (2.1, 3.0)	12.0 (11.0, 13.0)
25–34	36,495	20,171	12.7 (12.0, 13.4)	58.3 (57.3, 59.3)	1.8 (1.6, 2.1)	7.8 (7.2, 8.5)	3.0 (2.6, 3.4)	3.7 (3.3, 4.1)	2.7 (2.3, 3.2)	9.7 (9.1, 10.3)
35–49	72,247	30,380	16.3 (15.7, 16.9)	65.0 (64.2, 65.8)	1.8 (1.7, 2.0)	8.7 (8.2, 9.2)	2.4 (2.1, 2.6)	3.1 (2.8, 3.3)	2.6 (2.3, 2.9)	6.5 (6.1, 6.9)
50–64	79,836	27,402	19.2 (18.5, 19.8)	67.5 (66.7, 68.3)	2.5 (2.3, 2.8)	11.5 (10.9, 12.0)	2.4 (2.2, 2.7)	3.0 (2.7, 3.2)	3.5 (3.1, 3.9)	3.6 (3.3, 3.9)
Race/Hispanic ethnicity										
Black or African American, non-Hispanic	15,863	9694	13.9 (12.8, 15.0)	56.6 (55.1, 58.2)	2.8 (2.4, 3.3)	8.6 (7.7, 9.5)	5.2 (4.5, 6.0)	3.5 (2.9, 4.1)	3.5 (2.9, 4.2)	12.0 (11.1, 12.9)
White, non-Hispanic	147,461	51,404	15.3 (14.9, 15.7)	68.7 (68.1, 69.2)	2.1 (2.0, 2.3)	10.7 (10.4, 11.1)	1.9 (1.7, 2.0)	3.0 (2.8, 3.2)	2.3 (2.1, 2.5)	5.1 (4.8, 5.3)
Hispanic	24,218	17,245	18.0 (17.0, 19.0)	43.5 (42.2, 44.8)	1.4 (1.2, 1.7)	9.4 (8.5, 10.3)	4.4 (3.8, 4.9)	4.2 (3.7, 4.7)	4.4 (3.9, 5.1)	9.4 (8.7, 10.0)
Other race or multiracial, non-Hispanic	16,238	9650	14.8 (13.7, 16.0)	64.2 (62.7, 65.8)	2.3 (1.8, 2.9)	9.4 (8.4, 10.5)	3.5 (3.0, 4.2)	3.1 (2.6, 3.5)	2.7 (2.2, 3.2)	7.1 (6.3, 7.9)
Marital status										
Married	113,166	46,295	16.8 (16.3, 17.3)	71.4 (70.8, 72.1)	2.4 (2.2, 2.6)	10.2 (9.8, 10.7)	1.7 (1.5, 1.8)	2.2 (2.0, 2.4)	2.4 (2.2, 2.6)	3.4 (3.1, 3.6)
Divorced	23,164	8069	17.4 (16.3, 18.5)	56.2 (54.7, 57.7)	3.0 (2.6, 3.4)	8.3 (7.5, 9.2)	3.5 (2.9, 4.1)	4.4 (3.7, 5.1)	4.1 (3.2, 5.2)	8.8 (8.1, 9.5)
Widowed	3780	1411	17.2 (14.7, 20.0)	53.7 (49.6, 57.6)	1.8 (1.2, 2.5)	11.0 (8.6, 13.8)	5.1 (3.5, 7.2)	5.1 (3.8, 6.6)	3.3 (2.2, 4.6)	9.2 (7.6, 10.9)
Separated	4501	2138	17.4 (15.3, 19.6)	39.0 (36.2, 41.9)	1.6 (1.2, 2.0)	7.3 (5.8, 9.0)	3.8 (2.9, 4.8)	6.7 (5.1, 8.6)	5.0 (3.8, 6.5)	13.4 (11.6, 15.4)
Never married	45,554	23,698	12.4 (11.8, 13.1)	50.8 (49.9, 51.8)	1.5 (1.3, 1.8)	10.6 (10.0, 11.3)	4.9 (4.4, 5.4)	4.4 (4.1, 4.9)	3.1 (2.8, 3.5)	11.9 (11.3, 12.6)
Member of an unmarried couple	12,433	5818	15.7 (14.4, 17.1)	48.8 (47.0, 50.7)	1.2 (0.8, 1.6)	9.8 (8.6, 11.1)	3.3 (2.6, 4.0)	4.3 (3.6, 4.9)	3.2 (2.6, 4.0)	9.6 (8.6, 10.7)
Educational attainment										
Did not graduate high school	9494	7868	23.8 (22.1, 25.6)	26.0 (24.1, 27.9)	****	7.4 (6.2, 8.6)	5.1 (4.2, 6.0)	6.3 (5.2, 7.5)	5.6 (4.7, 6.5)	13.5 (12.3, 14.9)
Graduated high school	44,303	22,723	17.2 (16.4, 18.0)	51.4 (50.4, 52.4)	2.1 (1.8, 2.3)	11.3 (10.6, 12.1)	4.3 (3.9, 4.7)	4.0 (3.7, 4.4)	3.2 (2.9, 3.6)	10.3 (9.7, 10.8)
Attended college or technical school	51,697	25,958	15.6 (14.9, 16.2)	62.1 (61.2, 63.0)	2.8 (2.5, 3.1)	9.9 (9.4, 10.5)	3.1 (2.7, 3.4)	3.7 (3.4, 4.0)	3.1 (2.7, 3.5)	7.3 (6.9, 7.7)

(Continues)

TABLE 2 | (Continued)

Demographic characteristic	N	Weighted N (*1000)	Primary insurance source**							Medicaid (includes CHIP) % (95% CI)	No health insurance*** % (95% CI)
			Self-employed % (95% CI)	Employer-sponsored % (95% CI)	Military % (95% CI)	Non-group private % (95% CI)	Medicare % (95% CI)	State sponsored % (95% CI)	Other governmental % (95% CI)		
Graduated college or technical school	97,863	31,257	12.4 (12.0, 12.9)	78.0 (77.5, 78.6)	1.9 (1.7, 2.1)	10.0 (9.5, 10.4)	1.2 (1.1, 1.4)	1.7 (1.6, 1.9)	1.9 (1.7, 2.0)	2.6 (2.4, 2.8)	2.7 (2.5, 2.9)
Household income											
< \$15,000	3048	1741	28.0 (25.1, 30.9)	9.7 (7.8, 11.9)	****	5.9 (4.5, 7.5)	9.1 (7.1, 11.3)	6.8 (5.3, 8.6)	7.4 (5.1, 10.2)	28.3 (25.0, 31.8)	31.9 (28.6, 35.3)
\$15,000–\$19,999	3166	1668	25.9 (22.9, 29.1)	11.7 (9.7, 14.0)	****	5.2 (3.9, 6.7)	9.0 (6.7, 11.8)	8.4 (6.4, 10.7)	7.4 (5.4, 9.9)	27.6 (24.5, 31.0)	30.0 (25.8, 34.6)
\$20,000–\$24,999	5325	2749	21.8 (19.6, 24.0)	16.6 (14.7, 18.6)	0.7 (0.5, 1.1)	7.9 (6.5, 9.5)	8.1 (6.8, 9.6)	8.5 (7.2, 10.1)	6.2 (4.9, 7.8)	23.5 (21.4, 25.8)	28.4 (25.8, 31.1)
\$25,000–\$34,999	14,587	7260	19.4 (18.1, 20.8)	29.4 (28.0, 30.9)	1.8 (1.4, 2.3)	9.4 (8.3, 10.7)	6.7 (5.8, 7.7)	7.6 (6.7, 8.6)	4.5 (3.9, 5.1)	19.2 (17.9, 20.5)	21.3 (19.8, 22.8)
\$35,000–\$49,999	19,888	8523	16.2 (15.1, 17.4)	47.7 (46.2, 49.2)	2.4 (2.0, 2.9)	10.2 (9.3, 11.2)	4.7 (4.0, 5.4)	5.8 (5.1, 6.6)	3.6 (3.0, 4.2)	10.8 (9.9, 11.7)	14.8 (13.6, 16.0)
\$50,000–\$74,999	29,229	12,069	14.4 (13.4, 15.4)	64.8 (63.5, 66.1)	2.7 (2.4, 3.1)	10.5 (9.7, 11.4)	2.3 (1.9, 2.8)	3.1 (2.7, 3.5)	3.2 (2.6, 4.0)	4.7 (4.2, 5.2)	8.5 (7.8, 9.4)
\$75,000–\$99,999	28,022	11,312	13.1 (12.2, 14.0)	73.8 (72.6, 75.0)	2.7 (2.3, 3.1)	10.8 (9.9, 11.7)	1.0 (0.8, 1.3)	1.6 (1.4, 1.9)	2.0 (1.7, 2.5)	2.1 (1.8, 2.6)	5.8 (5.1, 6.6)
\$100,000–\$149,999	35,870	13,986	11.6 (10.9, 12.4)	80.7 (79.7, 81.6)	2.3 (2.0, 2.7)	9.2 (8.5, 9.9)	0.8 (0.6, 1.1)	1.1 (0.9, 1.2)	1.6 (1.3, 1.8)	1.0 (0.8, 1.3)	3.3 (2.8, 3.9)
\$150,000–\$199,999	18,250	7244	13.2 (12.1, 14.4)	82.6 (81.2, 83.9)	2.2 (1.8, 2.6)	9.5 (8.5, 10.6)	0.5 (0.3, 0.7)	1.0 (0.7, 1.3)	1.3 (1.0, 1.7)	0.5 (0.3, 0.8)	2.5 (1.8, 3.3)
≥ \$200,000	20,019	8245	17.0 (15.8, 18.2)	83.3 (82.0, 84.5)	1.2 (1.0, 1.4)	10.5 (9.6, 11.5)	0.8 (0.4, 1.4)	0.6 (0.4, 0.9)	1.4 (1.0, 1.9)	****	1.9 (1.5, 2.3)

Note: Italics indicate statistically significant elevation compared to all workers combined.

Abbreviation: CI, confidence interval.

* Forty U.S. states, Guam, and the U.S. Virgin Islands.

** The 3985 respondents who did not know the source of their primary health insurance, and 1836 who declined to answer or were not asked the question, are included in the population mean but not assigned a primary health insurance source.

*** Includes Indian Health Service.

**** RSE > 30%.

than the employed to be covered by Medicare, state-sponsored plans, other governmental insurance, or Medicaid.

Demographic characteristics were associated with differences in employment situation, percent insured, and primary source of healthcare (Table 2). While men were more likely than women to be self-employed (18.0% vs. 12.9%), there was no significant difference in the prevalence of ESI among men and women. However, men were more likely to be uninsured (12.4% vs. 7.0%) or to have military-based insurance (2.6% vs. 1.6%), while women were more likely than men to be covered by Medicaid (9.4% vs. 4.6%) or state-sponsored insurance (3.8% vs. 2.8%). The prevalence of self-employment increased with age category, but so too did the prevalence of ESI. Both the youngest age group (18–24 years old) and the oldest age group (50–64) were significantly more likely than all workers combined to have non-group private insurance. The prevalence of Medicaid and uninsurance fell with increasing age category. In addition, non-group private insurance, Medicare, and state-sponsored insurance were most commonly reported by those 18–24 years old.

By race and Hispanic ethnicity, Hispanic respondents had a prevalence more than twice the population mean of lacking health insurance (23.3% vs. 9.9%) and also had prevalence figures significantly exceeding the population mean for Medicare, Medicaid, state-sponsored insurance, or other governmental insurance. Non-Hispanic White respondents were significantly more likely to have ESI. The prevalence of having insurance from three sources: the Military, Medicare, and Medicaid, significantly exceeded the population mean in Non-Hispanic Black respondents. Married respondents were most likely (71.4%) and separated respondents least likely (39.0%) to have ESI. The converse was true for lacking health insurance and having Medicaid as the primary insurance source.

The prevalence of ESI increased, prevalence of uninsurance, Medicare, Medicaid, state-sponsored, and other governmental insurance fell as the level of educational attainment increased. Non-group private insurance was most common among high school graduates (11.3%) and least common among those who did not graduate high school (7.4%). As with education, the prevalence of ESI increased with household income, rising from 9.7% for those with household incomes under \$15,000 per year to 83.3% among workers from households earning at least \$200,000 per year. The converse was true for the prevalence of being uninsured or having Medicaid, Medicare, or other governmental insurance. State-sponsored insurance was also most common in lower-income categories and least common in higher-income categories, although the association was less monotonic.

3.4 | Demographics, Healthcare Access/Unmet Healthcare Need, and Self-Reported Health Status

The prevalence of each unmet healthcare need (no personal doctor, inability to afford needed medical care, and no routine checkup in the past year) decreased with increasing age, educational attainment, and income (Table 3). In addition, the prevalence of all three unmet need measures was higher than the population mean among workers who were self-employed, Hispanic, or whose marital status was separated, never married, or a member of an unmarried couple. Male workers were

significantly more likely than female workers to have no personal doctor (25.7% vs. 14.0%) and to not have had a routine checkup in the past year (35.2% vs. 23.3%); however, female workers were more likely to report being unable to afford needed care (13.0% vs. 11.1%). Workers with household incomes less than \$50,000 had statistically significant elevations for each unmet need measure, and those with household incomes from \$50,000–\$74,999 also had higher prevalence estimates than the population mean for being unable to afford needed care and not having had a routine checkup in the past year.

Prevalence figures for adverse health status measures differed by demographic characteristics. Women were significantly more likely than men to report frequent physical distress (8.6% vs. 6.7%) and mental distress (17.8% vs. 12.1%). Workers aged 50–64 had a significantly higher prevalence than the population mean for frequent physical distress, but the prevalence of frequent mental distress decreased with age from 25.4% of 18–24 year olds to 8.9% of 50–64 year olds. The prevalence of fair or poor general health and of frequent physical distress were both highest among Hispanic workers, but there were no statistically significant differences in the prevalence of frequent mental distress from the population mean by race/Hispanic ethnicity. Prevalence of each adverse health status measure was higher than the population mean among workers who were unmarried, with the exception of frequent physical distress among those who had never married. Workers who had not graduated high school reported nearly twice the prevalence of fair or poor general health (27.8%) as those who had graduated high school but not pursued further education (14.0%); those who graduated from college or technical school had the lowest prevalence of fair or poor general health (6.4%). Prevalence figures for frequent physical distress followed a similar but less steep decline with increasing educational attainment. However, frequent mental distress was significantly elevated among those who graduated high school or attended college or technical school but did not graduate. The prevalence of fair or poor general health and of frequent physical distress were inversely related to income. The pattern differed somewhat for frequent mental distress, which had statistically significant prevalence elevations compared to the population mean, with no clear pattern for household income levels below \$75,000 and then declined as income increased.

3.5 | Employment Situation and Primary Health Insurance Source by Major Occupation Group

In five major occupation groups, between approximately one-quarter and one-half of respondents reported being self-employed (Table 4): Farming, Fishing, and Forestry; Building and Grounds Cleaning and Maintenance; Construction and Extraction; Personal Care and Services; and Arts, Design, Entertainment, Sports and Media. The first two of these had the highest prevalences of uninsurance (31.0% for Farming, Fishing, and Forestry and 27.4% for Building Cleaning and Maintenance). Arts, Design, and Entertainment workers had the highest level of non-group private insurance, and Personal Care and Service workers had significant elevations for non-group private insurance, Medicare, state-sponsored, other governmental insurance, and Medicaid. One occupation group, Food

TABLE 3 | Healthcare access and self-reported health status by demographic category, employed and self-employed adults ages 18–64, Behavioral Risk Factor Surveillance System 2022–2023.*

	Healthcare access			Self-reported health status		
	No personal doctor % (95% CI)	Could not afford needed care % (95% CI)	No routine checkup past year % (95% CI)	Fair or poor general health % (95% CI)	Frequent physical distress** % (95% CI)	Frequent mental distress*** % (95% CI)
All	20.2 (19.8, 20.6)	11.9 (11.6, 12.3)	29.6 (29.2, 30.1)	11.9 (11.6, 12.2)	7.5 (7.3, 7.8)	14.8 (14.5, 15.1)
Employment status						
Employed for wages	19.1 (18.6, 19.5)	11.4 (11.1, 11.8)	28.6 (28.1, 29.1)	11.9 (11.6, 12.3)	7.4 (7.1, 7.7)	15.2 (14.9, 15.6)
Self-employed	26.5 (25.4, 27.7)	14.7 (13.9, 15.6)	35.1 (33.9, 36.3)	11.8 (11.0, 12.6)	8.3 (7.7, 9.0)	12.4 (11.6, 13.2)
Sex						
Male	25.7 (25.1, 26.3)	11.1 (10.6, 11.5)	35.2 (34.6, 35.8)	11.8 (11.3, 12.2)	6.7 (6.3, 7.0)	12.1 (11.7, 12.5)
Female	14.0 (13.5, 14.6)	13.0 (12.5, 13.4)	23.3 (22.7, 23.9)	12.1 (11.6, 12.5)	8.6 (8.2, 9.0)	17.8 (17.3, 18.3)
Age group (years)						
18–24	32.9 (31.4, 34.4)	15.7 (14.5, 16.9)	39.5 (38.0, 41.1)	12.3 (11.2, 13.4)	7.4 (6.6, 8.3)	25.4 (24.2, 26.8)
25–34	30.3 (29.4, 31.3)	16.4 (15.6, 17.1)	37.9 (36.9, 38.9)	10.8 (10.2, 11.4)	6.6 (6.1, 7.0)	18.9 (18.2, 19.7)
35–49	18.3 (17.7, 19.0)	11.8 (11.2, 12.4)	29.1 (28.3, 29.8)	11.9 (11.3, 12.4)	7.4 (7.0, 7.9)	13.8 (13.3, 14.4)
50–64	10.4 (9.8, 11.0)	7.5 (7.1, 7.9)	20.6 (20.0, 21.3)	12.6 (12.1, 13.2)	8.5 (8.0, 8.9)	8.9 (8.5, 9.4)
Race and ethnicity						
Black or African American, non-Hispanic	16.3 (15.2, 17.6)	13.2 (12.0, 14.4)	21.1 (19.8, 22.4)	13.3 (12.3, 14.4)	7.3 (6.6, 8.1)	15.2 (14.1, 16.3)
White, non-Hispanic	16.9 (16.4, 17.3)	9.6 (9.3, 9.9)	29.7 (29.2, 30.2)	9.6 (9.3, 9.9)	7.1 (6.9, 7.4)	15.2 (14.8, 15.5)
Hispanic	33.6 (32.4, 34.9)	19.1 (18.1, 20.2)	34.3 (33.1, 35.6)	18.8 (17.8, 19.8)	9.1 (8.4, 9.9)	14.1 (13.2, 15.0)
Other race or multiracial, non-Hispanic	18.2 (17.0, 19.4)	10.3 (9.4, 11.3)	29.5 (28.1, 31.0)	10.6 (9.7, 11.6)	7.2 (6.4, 8.1)	13.6 (12.6, 14.6)
Marital status						
Married	14.5 (14.0, 15.0)	8.1 (7.7, 8.5)	25.5 (25.0, 26.1)	9.5 (9.1, 10.0)	6.4 (6.1, 6.7)	10.1 (9.8, 10.5)
Divorced	18.5 (17.2, 19.8)	14.9 (13.9, 16.0)	28.3 (26.9, 29.8)	14.7 (13.7, 15.6)	10.3 (9.5, 11.2)	17.0 (16.0, 18.1)
Widowed	15.9 (13.2, 18.9)	12.4 (10.3, 14.7)	22.1 (19.2, 25.2)	16.1 (13.8, 18.8)	10.6 (8.7, 12.7)	17.8 (15.4, 20.5)
Separated	30.3 (27.4, 33.3)	24.8 (22.3, 27.4)	32.7 (29.9, 35.6)	21.1 (18.8, 23.5)	12.4 (10.4, 14.6)	21.1 (18.8, 23.6)
Never married	28.2 (27.3, 29.1)	15.0 (14.3, 15.7)	35.7 (34.8, 36.6)	13.6 (13.0, 14.2)	7.9 (7.4, 8.4)	20.9 (20.2, 21.7)
A member of an unmarried couple	32.6 (30.9, 34.3)	20.8 (19.3, 22.3)	39.9 (38.1, 41.7)	15.7 (14.4, 17.0)	9.0 (8.0, 10.1)	20.5 (19.1, 22.0)
Education level						
Did not graduate high school	43.5 (41.5, 45.5)	24.8 (23.0, 26.6)	41.2 (39.2, 43.2)	27.8 (25.9, 29.6)	12.1 (10.8, 13.4)	15.8 (14.3, 17.4)
Graduated high school	25.7 (24.8, 26.5)	14.7 (14.0, 15.5)	33.8 (32.9, 34.7)	14.0 (13.4, 14.7)	8.8 (8.2, 9.4)	17.2 (16.5, 17.9)

(Continues)

TABLE 3 | (Continued)

	Healthcare access			Self-reported health status		
	No personal doctor % (95% CI)	Could not afford needed care % (95% CI)	No routine checkup past year % (95% CI)	Fair or poor general health % (95% CI)	Frequent physical distress** % (95% CI)	Frequent mental distress*** % (95% CI)
Attended college or technical school	18.5 (17.8, 19.2)	12.5 (11.9, 13.0)	29.2 (28.3, 30.0)	11.9 (11.3, 12.4)	8.0 (7.5, 8.5)	17.0 (16.4, 17.7)
Graduated from college or technical school	11.8 (11.4, 12.3)	6.3 (6.0, 6.6)	24.1 (23.6, 24.7)	6.4 (6.1, 6.7)	5.2 (4.9, 5.5)	11.0 (10.6, 11.4)
Annual household income						
< \$15,000	43.3 (39.8, 46.9)	29.6 (26.3, 33.1)	38.4 (34.9, 42.0)	30.2 (26.8, 33.7)	19.2 (16.1, 22.7)	21.7 (18.9, 24.6)
\$15,000–\$19,999	39.5 (35.4, 43.7)	31.6 (27.5, 35.9)	35.8 (32.3, 39.5)	28.6 (24.6, 33.0)	14.9 (12.6, 17.6)	22.4 (18.3, 26.9)
\$20,000–\$24,999	36.9 (34.2, 39.7)	27.8 (25.2, 30.4)	35.6 (33.0, 38.2)	24.7 (22.4, 27.0)	12.6 (10.9, 14.5)	19.2 (17.3, 21.4)
\$25,000–\$34,999	29.8 (28.2, 31.4)	23.9 (22.4, 25.3)	35.4 (33.8, 37.0)	19.9 (18.6, 21.2)	10.7 (9.7, 11.7)	20.4 (19.2, 21.6)
\$35,000–\$49,999	26.4 (25.0, 27.7)	18.7 (17.6, 19.9)	35.2 (33.7, 36.6)	15.9 (14.8, 17.0)	8.4 (7.7, 9.3)	19.3 (18.2, 20.4)
\$50,000–\$74,999	20.3 (19.2, 21.5)	13.3 (12.4, 14.2)	31.8 (30.6, 33.1)	11.7 (10.9, 12.5)	8.2 (7.5, 8.9)	17.6 (16.6, 18.6)
\$75,000–\$99,999	16.5 (15.5, 17.5)	8.8 (8.1, 9.5)	28.3 (27.1, 29.5)	9.7 (8.9, 10.5)	6.8 (6.1, 7.6)	13.8 (12.9, 14.7)
\$100,000–\$149,999	13.3 (12.5, 14.1)	5.5 (4.9, 6.1)	25.6 (24.6, 26.6)	7.2 (6.6, 7.8)	5.4 (5.0, 5.9)	11.4 (10.7, 12.1)
\$150,000–\$199,999	11.2 (10.2, 12.3)	3.1 (2.6, 3.6)	23.9 (22.5, 25.4)	5.2 (4.7, 5.9)	5.1 (4.4, 5.8)	9.5 (8.5, 10.5)
≥ \$200,000	9.5 (8.7, 10.3)	2.2 (1.7, 2.7)	23.0 (21.9, 24.2)	4.1 (3.6, 4.7)	4.4 (3.8, 5.2)	8.1 (7.3, 8.9)

Note: Italics indicate statistically significant elevation (lower confidence interval exceeds upper confidence interval for all-worker comparison group).

Abbreviation: CI, confidence interval.

* Forty U.S. states, Guam, and the U.S. Virgin Islands.

** Participants who gave a number ≥ 14 in response to the question “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?”

*** Participants who gave a number ≥ 14 in response to the question “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”

TABLE 4 | Employment situation and primary health insurance source by major occupation group, employed and self-employed adults ages 18–64, Behavioral Risk Factor Surveillance System 2022–2023.*

Major occupation group (mean annual wages***)	N	Weighted N (*1000)	Primary insurance source**								No health insurance**** % (95% CI)
			Self-employed % (95% CI)	Employer-sponsored % (95% CI)	Military % (95% CI)	Non-group private % (95% CI)	Medicare % (95% CI)	State sponsored % (95% CI)	Other governmental % (95% CI)	Medicaid (includes CHIP)	
All (\$65,470)	203,780	87,993	15.6 (15.3, 16.0)	62.0 (61.5, 62.5)	2.1 (2.0, 2.2)	10.1 (9.8, 10.4)	2.9 (2.7, 3.1)	3.3 (3.1, 3.5)	2.9 (2.7, 3.1)	6.9 (6.7, 7.1)	9.9 (9.6, 10.2)
Farming, Fishing, and Forestry (\$39,970)	1,444	615	24.2 (19.3, 29.7)	24.2 (19.8, 29.2)	*****	12.2 (6.8, 19.7)	*****	5.8 (3.8, 8.6)	4.6 (2.6, 7.5)	18.7 (12.2, 26.7)	31.0 (25.1, 37.3)
Building and Grounds Cleaning and Maintenance (\$38,320)	7087	3658	31.1 (28.9, 33.4)	30.1 (27.9, 32.4)	2.1 (1.4, 2.9)	9.8 (8.0, 11.8)	5.7 (4.7, 6.9)	5.5 (4.5, 6.6)	5.7 (4.7, 6.9)	13.8 (12.2, 15.4)	27.4 (25.3, 29.6)
Food Preparation and Serving (\$34,490)	6277	3385	6.3 (5.2, 7.5)	29.3 (26.9, 31.8)	1.5 (1.0, 2.0)	10.9 (9.2, 12.7)	6.0 (4.9, 7.1)	6.5 (5.5, 7.6)	3.9 (3.1, 4.9)	16.9 (15.1, 18.8)	25.1 (22.3, 28.1)
Construction and Extraction (\$61,500)	13,193	6398	33.2 (31.5, 34.9)	45.8 (44.0, 47.6)	2.1 (1.7, 2.6)	11.1 (10.0, 12.3)	3.2 (2.6, 4.0)	3.8 (3.0, 4.8)	3.1 (2.5, 3.8)	5.8 (5.1, 6.7)	25.0 (23.4, 26.7)
Transportation and Material Moving (\$46,690)	11,466	5811	17.9 (16.5, 19.5)	50.9 (49.0, 52.9)	3.0 (2.4, 3.6)	9.9 (8.6, 11.2)	5.2 (4.3, 6.2)	3.9 (3.3, 4.7)	3.6 (3.0, 4.4)	9.1 (8.1, 10.1)	14.4 (13.1, 15.8)
Installation, Maintenance, and Repair (\$58,500)	7128	3544	17.0 (15.3, 18.9)	61.5 (59.1, 63.9)	4.1 (3.2, 5.1)	8.8 (7.3, 10.5)	2.2 (1.7, 2.8)	2.2 (1.7, 2.8)	2.7 (1.6, 4.1)	4.8 (3.9, 5.9)	13.8 (12.1, 15.5)
Personal Care and Service (\$38,430)	3867	1929	50.1 (46.5, 53.6)	36.8 (33.2, 40.4)	1.8 (1.3, 2.6)	13.8 (11.7, 16.0)	5.0 (3.7, 6.5)	7.7 (5.5, 10.4)	4.7 (3.1, 6.8)	18.1 (15.6, 20.8)	12.2 (9.7, 15.0)
Production (\$47,620)	8209	3734	8.9 (7.6, 10.4)	65.8 (63.5, 68.0)	1.8 (1.4, 2.4)	6.3 (5.4, 7.3)	2.8 (2.1, 3.6)	3.8 (2.8, 5.0)	2.4 (1.8, 3.3)	5.2 (4.4, 6.1)	11.9 (10.3, 13.6)
Sales and Related (\$53,280)	16,594	8099	21.6 (20.1, 23.1)	51.6 (49.8, 53.3)	1.8 (1.4, 2.2)	13.4 (12.1, 14.7)	4.4 (3.6, 5.2)	4.4 (3.8, 5.2)	4.1 (3.2, 5.2)	10.1 (9.2, 11.1)	10.2 (9.0, 11.5)
Healthcare Support (\$38,220)	6256	3194	10.3 (8.6, 12.4)	40.2 (37.4, 43.1)	1.6 (1.1, 2.3)	10.5 (8.7, 12.5)	7.0 (5.5, 8.8)	6.6 (5.5, 7.8)	4.9 (3.8, 6.2)	19.7 (17.6, 21.9)	9.5 (7.8, 11.5)
Arts, Design, Entertainment, Sports and Media (\$75,520)	4304	1820	47.1 (44.0, 50.2)	54.0 (50.9, 57.1)	1.2 (0.7, 2.0)	17.7 (15.0, 20.6)	4.7 (3.3, 6.4)	4.9 (3.8, 6.3)	2.6 (1.9, 3.6)	7.4 (6.2, 8.9)	7.4 (6.0, 9.0)*
Office and Administrative Support (\$47,940)	17,106	7511	6.0 (5.3, 6.8)	66.8 (65.2, 68.4)	1.7 (1.3, 2.2)	9.0 (8.1, 10.0)	2.4 (2.0, 2.9)	3.0 (2.5, 3.5)	2.9 (2.3, 3.6)	7.6 (6.9, 8.4)	6.5 (5.5, 7.7)
Management (\$137,750)	23,708	8684	18.7 (17.5, 20.0)	71.1 (69.7, 72.5)	2.1 (1.6, 2.6)	12.3 (11.2, 13.4)	1.2 (0.9, 1.6)	2.1 (1.8, 2.5)	2.3 (1.8, 2.9)	3.1 (2.7, 3.5)	5.8 (5.1, 6.6)
Protective Services (\$57,710)	4073	1826	3.6 (2.0, 5.8)	72.2 (69.1, 75.2)	3.7 (3.0, 4.6)	5.9 (4.7, 7.4)	3.4 (1.8, 5.7)	4.0 (2.6, 6.0)	1.6 (1.1, 2.4)	4.2 (3.2, 5.5)	4.7 (3.4, 6.4)
Business and Financial Operations (\$90,580)	12,533	5175	12.2 (11.0, 13.5)	77.6 (75.8, 79.4)	2.2 (1.7, 2.7)	8.8 (7.7, 9.9)	1.1 (0.7, 1.7)	1.8 (1.3, 2.4)	2.1 (1.5, 2.8)	2.4 (1.9, 3.1)	4.0 (3.0, 5.3)
Healthcare Practitioners and Technical (\$102,060)	17,372	6897	6.5 (5.7, 7.3)	76.0 (74.5, 77.4)	2.3 (1.8, 2.9)	10.5 (9.5, 11.6)	1.4 (1.0, 1.9)	1.4 (1.0, 1.8)	1.7 (1.2, 2.2)	3.4 (2.8, 4.1)	3.4 (2.8, 4.0)

(Continues)

TABLE 4 | (Continued)

Major occupation group (mean annual wages***)	N	Weighted N (*1000)	Primary insurance source**								
			Self-employed % (95% CI)	Employer-sponsored % (95% CI)	Military % (95% CI)	Non-group private % (95% CI)	Medicare % (95% CI)	State sponsored % (95% CI)	Other governmental % (95% CI)	Medicaid (includes CHIP)	No health insurance**** % (95% CI)
Community and Social Services (\$58,980)	5305	1720	8.3 (6.8, 10.0)	71.6 (69.0, 74.0)	2.4 (1.6, 3.3)	10.1 (8.5, 11.9)	1.2 (0.8, 1.7)	2.9 (2.1, 3.8)	3.0 (2.1, 4.1)	6.0 (4.6, 7.7)	3.0 (2.2, 3.9)
Life, Physical, and Social Science (\$87,870)	4047	1354	8.4 (6.7, 10.4)	81.2 (78.6, 83.6)	1.6 (0.9, 2.5)	7.6 (6.0, 9.4)	1.2 (0.6, 2.0)	1.2 (0.7, 1.9)	2.6 (1.8, 3.5)	2.0 (1.3, 3.0)	2.7 (1.6, 4.4)
Architecture and Engineering (\$99,090)	7013	2825	5.4 (4.2, 6.8)	85.7 (83.9, 87.4)	1.5 (1.1, 1.9)	6.5 (5.5, 7.6)	*****	1.2 (0.7, 1.8)	1.2 (0.8, 1.6)	0.6 (0.4, 1.0)	2.2 (1.4, 3.2)
Education, Training, and Library (\$66,400)	14,345	4630	3.5 (2.9, 4.2)	76.7 (75.1, 78.2)	1.8 (1.4, 2.3)	7.2 (6.3, 8.3)	2.0 (1.5, 2.7)	2.8 (2.3, 3.5)	2.5 (1.9, 3.2)	4.8 (4.1, 5.6)	2.1 (1.7, 2.7)
Computer and Mathematical (\$113,140)	9582	4049	6.1 (5.0, 7.4)	85.4 (83.8, 86.9)	2.2 (1.7, 2.9)	6.5 (5.4, 7.8)	0.5 (0.3, 0.8)	0.8 (0.6, 1.2)	1.2 (0.8, 1.9)	1.1 (0.8, 1.7)	2.1 (1.6, 2.7)
Legal (\$133,820)	2871	1132	18.6 (15.7, 21.8)	76.2 (72.6, 79.6)	0.9 (0.4, 1.5)	13.9 (11.1, 17.0)	1.0 (0.5, 1.7)	*****	1.5 (0.9, 2.4)	2.6 (1.5, 4.3)	2.0 (1.3, 3.0)

Note: Italics indicate statistically significant elevation (lower confidence interval exceeds upper confidence interval for all-worker comparison group).

Abbreviation: CI, confidence interval.

* Forty US states, Guam, and the U.S. Virgin Islands.

** The 3985 respondents who did not know the source of their primary health insurance, and 1836 who declined to answer or were not asked the question, are included in the population mean but not assigned a primary health insurance source.

*** May 2023 National Occupational Employment and Wage Estimates: U.S. Bureau of Labor Statistics.

***** Includes Indian Health Service.

***** Relative SE > 30%.

Preparation and Serving, had a high prevalence of uninsurance (25.1%), despite having few self-employed workers. Of the occupations with high levels of self-employment, workers from Arts, Design, Entertainment, Sports, and Media were most likely to have ESI (54.0%), followed by Construction and Extraction workers (45.8%), although prevalences for both groups were significantly below the population mean. Several groups with lower levels of self-employment had uninsurance prevalences that were significantly higher than the population mean: Transportation and Material Moving Workers (14.4%); Installation, Maintenance, and Repair workers (13.8%); and Production workers (11.9%).

The prevalence of ESI differed by the mean annual 2023 wages for each occupation. No occupation with mean wages below \$40,000 had more than 40% of workers reporting ESI, while, with the exception of Arts, Design, Entertainment, Sports, and Media, all occupations with wages of at least \$70,000 had at least 70% of workers covered by ESI. No occupation group with greater than 75% of workers with ESI had more than 4% of workers uninsured.

Healthcare Support was the occupational group with the highest prevalence of reporting either Medicaid or Medicare (19.7% and 7.0%, respectively); this group also had the second-highest prevalence of state-sponsored and other governmental insurance. Military-based insurance was highest among Installation, Maintenance, and Repair workers (4.1%) and Protective Service workers (3.7%).

Occupations with the lowest levels of uninsurance (< 3%) were Legal; Computer and Mathematical, Education, Training, and Library; Architecture and Engineering; and Life, Physical, and Social Science. At least three-quarters of workers in these occupations had ESI.

Some occupations with high uninsurance (Farming, Fishing, and Forestry; Building and Grounds Cleaning and Maintenance; Food Preparation and Serving) also had high prevalence figures for demographic characteristics associated with high levels of uninsurance (e.g., Hispanic ethnicity, young age, or not completing high school) (Supporting Information S1: Appendix B). Moreover, even workers from these occupations who did have health insurance reported lower prevalence than the population mean for ESI coverage.

3.6 | Major Occupational Group, Healthcare Access, and Self-Reported Health Status

3.6.1 | Healthcare Access

Before adjustment, the four occupation groups with at least 25% uninsured workers (Farming, Fishing, and Forestry; Building and Grounds Cleaning and Maintenance; Food Preparation and Serving; Construction and Extraction) had high unadjusted prevalence and significantly elevated PRs (each occupation compared to all other occupations combined) for unmet healthcare needs (Table 5). At least one in three workers in these occupations had no personal doctor, at least one in six could not afford needed care, and at least one in three had not had a checkup in the past year.

Some occupations with fewer uninsured workers also had high prevalences and significantly elevated unadjusted PRs for

unmet healthcare needs: Transportation (every access measure); Installation, Maintenance, and Repair (no personal doctor and no checkup in the past year); and Production (no personal doctor and no checkup in the past year); Sales and Related Occupations (every access measure). Three occupations, Healthcare Support and Office and Administrative Support, and Personal Care and Service, had significantly elevated PRs for being unable to afford needed care, despite having PRs at or below the null for the other two measures. In contrast, occupations with uninsurance below 5% had low prevalences and unadjusted PRs significantly below the expectation for no personal doctor and being unable to afford care; unadjusted PRs for no routine checkup in the past year were at or below expectation for these occupations.

After adjustment for age, sex, race/Hispanic ethnicity, and marital status, aPRs for unmet healthcare need among workers in occupations with the highest levels of uninsurance decreased but remained significantly elevated. For occupations with uninsurance below 5%, aPRs for unmet need were at or below expectation.

Additional adjustment for primary insurance source further reduced aPRs for unmet healthcare need measures, with some aPR elevations for occupations with high levels of uninsurance losing statistical significance. Among occupations with uninsurance below 5%, aPR deficits remained statistically significant for being unable to afford needed care, but lost statistical significance for no personal doctor and no routine checkup in the past year for some occupations.

Finally, adding household income to the adjustment variables generally continued this pattern. Only one broad occupation, Sales and Related, retained a statistically significant aPR elevation for being unable to afford needed care. Of occupations with at least 25% of respondents uninsured, Farming, Fishing, and Forestry, and Food Preparation and Serving had no remaining aPR elevations for any unmet healthcare need. In occupations with < 5% unemployment, point estimates increased in some cases, but no statistically significant elevations were observed.

3.6.2 | Health Status Measures

The four occupations with at least 25% of workers uninsured had statistically significant unadjusted PR elevations for at least one adverse health status measure: Farming, Fishing, and Forestry (fair or poor general health); Building and Grounds Cleaning and Maintenance (fair or poor health and frequent physical distress); Food Preparation and Service (all three measures); and Construction and Extraction (fair or poor general health). Notably, Construction and Extraction had a significant deficit for frequent mental distress.

As with healthcare access, some occupations with fewer uninsured workers also had statistically significant PR elevations for adverse health status: Healthcare Support workers (all three health status measures; Transportation (fair or poor general health and frequent physical distress); Production (fair or poor general health and frequent physical distress); and Sales and Related Occupations (fair or poor general health and frequent mental distress). No occupation with uninsurance below 5% had a statistically significant elevation for any of the three measures.

TABLE 5 | Healthcare access and self-reported health status by major occupation group, employed and self-employed adults ages 18–64, Behavioral Risk Factor Surveillance System 2022–2023.*

Major occupation group	Healthcare access			Self-reported health status		
	Unadjusted prevalence (95% CI)	Unadjusted prevalence ratio (PR)	Adjusted PR (aPR, adjusted for age, sex, race/ethnicity)**	Unadjusted prevalence (95% CI)	Unadjusted prevalence ratio (PR)	Adjusted PR (aPR, adjusted for age, sex, race/ethnicity)**
						aPR (age, sex, race/ethnicity*, health insurance source)***
						aPR (age, sex, race/ethnicity, health insurance source, household income)****
Major occupation group	No personal doctor	Could not afford needed care	No routine checkup past year	Fair or poor general health	Frequent physical distress****	Frequent mental distress*****
All	20.2 (19.8, 20.6)	11.9 (11.6, 12.3)	29.6 (29.2, 30.1)	11.9 (11.6, 12.2)	7.5 (7.3, 7.8)	14.8 (14.5, 15.1)
Farming, Fishing, and Forestry	38.9 (32.9, 45.3)	22.2 (16.4, 29.4)	42.4 (36.2, 49.0)	29.6 (23.5, 36.5)	10.2 (5.9, 17.2)	12.3 (8.8, 16.8)
	1.94 (1.65, 2.27)	1.87 (1.40, 2.51)	1.44 (1.23, 1.67)	2.51 (2.01, 3.13)	1.36 (0.79, 2.33)	0.83 (0.60, 1.15)
	1.44 (1.22, 1.70)	1.47 (1.09, 1.99)	1.26 (1.07, 1.48)	2.08 (1.65, 2.62)	1.24 (0.71, 2.15)	0.86 (0.63, 1.18)
	1.18 (1.00, 1.40)	1.15 (0.82, 1.60)	1.13 (0.93, 1.36)	1.77 (1.39, 2.26)	1.05 (0.60, 1.85)	0.82 (0.60, 1.14)
	1.03 (0.85, 1.25)	0.96 (0.66, 1.39)	1.17 (0.96, 1.42)	1.66 (1.29, 2.14)	0.96 (0.54, 1.71)	0.77 (0.53, 1.11)
Building and Grounds Cleaning and Maintenance	37.0 (34.7, 39.4)	21.6 (19.8, 23.5)	36.2 (33.9, 38.5)	20.2 (18.5, 22.0)	10.7 (9.4, 12.2)	15.3 (13.7, 17.1)
	1.90 (1.78, 2.03)	1.87 (1.71, 2.05)	1.23 (1.16, 1.32)	1.75 (1.59, 1.92)	1.45 (1.27, 1.65)	1.04 (0.93, 1.16)
	1.56 (1.46, 1.68)	1.50 (1.36, 1.65)	1.17 (1.09, 1.25)	1.36 (1.24, 1.51)	1.28 (1.11, 1.47)	1.04 (0.93, 1.17)
	1.28 (1.18, 1.39)	1.16 (1.04, 1.30)	1.06 (0.98, 1.13)	1.17 (1.05, 1.30)	1.11 (0.96, 1.29)	0.99 (0.88, 1.12)
	1.12 (1.02, 1.22)	0.99 (0.87, 1.11)	1.01 (0.94, 1.10)	0.93 (0.82, 1.05)	0.94 (0.79, 1.10)	0.91 (0.80, 1.05)
Food Preparation and Serving	33.5 (30.8, 36.4)	22.1 (19.7, 24.7)	38.2 (35.7, 40.9)	20.7 (18.3, 23.3)	10.4 (9.0, 12.0)	24.9 (22.3, 27.6)
	1.70 (1.56, 1.85)	1.92 (1.70, 2.15)	1.31 (1.22, 1.40)	1.79 (1.58, 2.03)	1.40 (1.21, 1.63)	1.73 (1.55, 1.93)
	1.31 (1.19, 1.44)	1.53 (1.34, 1.74)	1.14 (1.06, 1.23)	1.59 (1.39, 1.82)	1.31 (1.13, 1.53)	1.33 (1.17, 1.52)
	1.05 (0.96, 1.16)	1.24 (1.09, 1.41)	1.01 (0.93, 1.11)	1.38 (1.21, 1.58)	1.16 (0.99, 1.36)	1.28 (1.12, 1.46)
	1.03 (0.93, 1.14)	1.13 (0.99, 1.28)	1.02 (0.92, 1.12)	1.22 (1.06, 1.42)	1.19 (1.00, 1.42)	1.27 (1.09, 1.47)
Construction and Extraction	38.0 (36.3, 39.8)	16.6 (15.4, 17.9)	42.3 (40.6, 44.1)	13.4 (12.3, 14.7)	7.4 (6.5, 8.3)	11.8 (10.7, 13.0)
	2.02 (1.92, 2.12)	1.43 (1.32, 1.56)	1.48 (1.41, 1.54)	1.14 (1.04, 1.26)	0.98 (0.86, 1.11)	0.78 (0.71, 0.87)
	1.55 (1.46, 1.64)	1.42 (1.31, 1.55)	1.25 (1.19, 1.31)	1.08 (0.98, 1.19)	1.04 (0.92, 1.19)	0.95 (0.86, 1.05)
	1.29 (1.22, 1.37)	1.10 (1.00, 1.21)	1.12 (1.06, 1.18)	0.98 (0.88, 1.08)	0.97 (0.86, 1.11)	0.92 (0.83, 1.02)
	1.26 (1.18, 1.35)	1.02 (0.92, 1.13)	1.11 (1.04, 1.17)	0.90 (0.81, 1.01)	0.88 (0.77, 1.01)	0.84 (0.75, 0.95)
Transportation and Material Moving	29.1 (27.4, 30.9)	14.6 (13.2, 16.1)	34.1 (32.3, 36.0)	16.3 (15.0, 17.8)	9.0 (8.0, 10.2)	14.8 (13.5, 16.2)
	1.48 (1.39, 1.58)	1.24 (1.12, 1.38)	1.17 (1.10, 1.23)	1.41 (1.29, 1.54)	1.22 (1.08, 1.37)	1.00 (0.91, 1.10)
	1.23 (1.16, 1.32)	1.18 (1.07, 1.31)	1.05 (0.99, 1.11)	1.31 (1.19, 1.44)	1.26 (1.11, 1.42)	1.04 (0.95, 1.14)

(Continues)

TABLE 5 | (Continued)

Major occupation group	No personal doctor	Could not afford needed care	No routine checkup past year	Fair or poor general health	Frequent physical distress****	Frequent mental distress*****
Installation, Maintenance, and Repair	1.19 (1.12, 1.27)	1.14 (1.03, 1.27)	1.04 (0.98, 1.10)	1.22 (1.11, 1.34)	1.23 (1.08, 1.39)	1.02 (0.92, 1.12)
	1.17 (1.09, 1.26)	1.05 (0.93, 1.17)	1.02 (0.96, 1.09)	1.15 (1.04, 1.27)	1.12 (0.97, 1.28)	0.94 (0.84, 1.05)
	29.8 (27.5, 32.1)	12.1 (10.7, 13.8)	39.3 (37.0, 41.7)	12.6 (11.2, 14.2)	7.1 (6.1, 8.4)	13.2 (11.7, 14.8)
	1.50 (1.39, 1.62)	1.02 (0.89, 1.16)	1.35 (1.27, 1.43)	1.06 (0.94, 1.20)	0.94 (0.80, 1.11)	0.89 (0.79, 1.00)
	1.17 (1.07, 1.27)	1.07 (0.94, 1.22)	1.13 (1.06, 1.21)	1.08 (0.95, 1.22)	1.06 (0.90, 1.26)	1.04 (0.93, 1.17)
Personal Care and Service	1.16 (1.07, 1.26)	1.07 (0.93, 1.22)	1.13 (1.06, 1.21)	1.08 (0.95, 1.23)	1.03 (0.87, 1.23)	1.07 (0.95, 1.20)
	1.12 (1.02, 1.22)	1.04 (0.90, 1.20)	1.11 (1.03, 1.19)	1.00 (0.87, 1.15)	1.02 (0.85, 1.23)	1.04 (0.91, 1.18)
	19.5 (16.8, 22.4)	14.4 (12.0, 17.1)	29.7 (26.5, 33.0)	13.0 (10.8, 15.6)	10.1 (8.0, 12.6)	18.6 (16.3, 21.3)
	0.96 (0.83, 1.11)	1.21 (1.01, 1.45)	1.00 (0.90, 1.12)	1.10 (0.91, 1.32)	1.34 (1.06, 1.70)	1.27 (1.11, 1.45)
	1.09 (0.95, 1.26)	1.08 (0.90, 1.30)	1.10 (0.99, 1.23)	1.08 (0.90, 1.31)	1.25 (0.98, 1.58)	1.01 (0.87, 1.17)
Production	1.02 (0.90, 1.17)	0.94 (0.78, 1.14)	1.07 (0.96, 1.20)	0.95 (0.78, 1.15)	1.09 (0.86, 1.40)	0.96 (0.83, 1.12)
	1.00 (0.87, 1.16)	0.86 (0.73, 1.01)	1.09 (0.97, 1.22)	0.92 (0.75, 1.13)	1.01 (0.78, 1.30)	0.97 (0.82, 1.14)
	25.9 (24.0, 28.0)	12.7 (11.4, 14.1)	34.4 (32.2, 36.7)	15.8 (14.4, 17.4)	8.8 (7.6, 10.3)	14.4 (13.0, 16.0)
	1.30 (1.20, 1.41)	1.06 (0.95, 1.19)	1.17 (1.09, 1.25)	1.35 (1.22, 1.49)	1.18 (1.01, 1.38)	0.98 (0.88, 1.09)
	1.11 (1.03, 1.21)	1.01 (0.91, 1.13)	1.06 (1.00, 1.14)	1.30 (1.17, 1.44)	1.21 (1.03, 1.41)	1.02 (0.92, 1.13)
Sales and Related	1.14 (1.05, 1.22)	1.04 (0.94, 1.16)	1.07 (1.00, 1.15)	1.34 (1.21, 1.49)	1.26 (1.07, 1.47)	1.02 (0.92, 1.13)
	1.07 (0.98, 1.16)	0.94 (0.84, 1.05)	1.04 (0.96, 1.12)	1.17 (1.04, 1.31)	1.16 (0.97, 1.39)	0.96 (0.86, 1.08)
	21.8 (20.3, 23.4)	14.5 (13.3, 15.8)	31.6 (30.0, 33.2)	13.0 (12.0, 14.2)	8.3 (7.4, 9.3)	17.3 (16.1, 18.5)
	1.09 (1.01, 1.17)	1.24 (1.13, 1.36)	1.07 (1.02, 1.13)	1.11 (1.01, 1.21)	1.11 (0.99, 1.26)	1.19 (1.10, 1.28)
	1.02 (0.95, 1.10)	1.18 (1.08, 1.30)	1.04 (0.98, 1.10)	1.09 (1.00, 1.20)	1.09 (0.97, 1.24)	1.06 (0.99, 1.14)
Healthcare Support	1.03 (0.96, 1.11)	1.15 (1.04, 1.26)	1.04 (0.98, 1.10)	1.08 (0.98, 1.18)	1.05 (0.93, 1.19)	1.05 (0.98, 1.14)
	1.02 (0.94, 1.11)	1.16 (1.05, 1.28)	1.03 (0.96, 1.09)	1.14 (1.03, 1.26)	1.07 (0.93, 1.22)	1.07 (0.99, 1.17)
	16.0 (13.9, 18.4)	17.4 (15.2, 19.8)	23.5 (21.2, 26.0)	18.1 (15.9, 20.5)	10.3 (8.8, 12.0)	22.2 (20.2, 24.3)
	0.79 (0.68, 0.90)	1.48 (1.29, 1.70)	0.79 (0.71, 0.87)	1.55 (1.36, 1.77)	1.38 (1.18, 1.62)	1.53 (1.39, 1.68)
	0.88 (0.77, 1.00)	1.25 (1.09, 1.43)	0.89 (0.81, 0.99)	1.41 (1.24, 1.61)	1.21 (1.03, 1.42)	1.21 (1.09, 1.34)
Arts, Design, Entertainment, Sports, and Media	0.86 (0.76, 0.97)	1.20 (1.05, 1.38)	0.91 (0.83, 1.00)	1.27 (1.11, 1.47)	1.07 (0.91, 1.26)	1.15 (1.04, 1.28)
	0.83 (0.72, 0.95)	0.96 (0.85, 1.08)	0.92 (0.83, 1.02)	1.05 (0.91, 1.20)	1.03 (0.87, 1.21)	1.14 (1.02, 1.28)
	18.3 (16.1, 20.7)	11.9 (10.3, 13.7)	31.7 (28.8, 34.7)	9.6 (8.1, 11.5)	7.1 (5.8, 8.5)	16.8 (14.6, 19.3)
	0.90 (0.80, 1.03)	1.00 (0.86, 1.15)	1.07 (0.97, 1.18)	0.81 (0.68, 0.96)	0.93 (0.77, 1.13)	1.14 (0.99, 1.31)
	0.96 (0.86, 1.09)	1.05 (0.91, 1.21)	1.08 (0.98, 1.19)	0.88 (0.74, 1.04)	0.95 (0.79, 1.15)	1.12 (0.97, 1.28)
	0.95 (0.85, 1.06)	1.05 (0.92, 1.21)	1.09 (0.99, 1.20)	0.86 (0.72, 1.01)	0.93 (0.77, 1.14)	1.13 (0.99, 1.30)
	0.98 (0.87, 1.10)	1.10 (0.95, 1.27)	1.11 (1.00, 1.24)	0.87 (0.72, 1.05)	0.90 (0.73, 1.11)	1.12 (0.97, 1.29)

(Continues)

TABLE 5 | (Continued)

Major occupation group	No personal doctor	Could not afford needed care	No routine checkup past year	Fair or poor general health	Frequent physical distress****	Frequent mental distress*****
Office and Administrative Support	14.0 (12.9, 15.2)	13.6 (12.5, 14.8)	25.0 (23.6, 26.4)	13.2 (12.1, 14.3)	9.1 (8.2, 10.1)	18.9 (17.7, 20.1)
	0.67 (0.62, 0.73)	1.15 (1.05, 1.26)	0.83 (0.79, 0.88)	1.12 (1.02, 1.22)	1.23 (1.10, 1.38)	1.31 (1.22, 1.40)
	0.83 (0.76, 0.89)	1.12 (1.03, 1.23)	0.96 (0.91, 1.01)	1.11 (1.02, 1.21)	1.14 (1.01, 1.28)	1.19 (1.11, 1.28)
	0.87 (0.81, 0.94)	1.17 (1.08, 1.28)	0.98 (0.93, 1.03)	1.15 (1.05, 1.25)	1.18 (1.04, 1.32)	1.20 (1.12, 1.29)
	0.87 (0.80, 0.94)	1.08 (0.99, 1.18)	0.97 (0.91, 1.03)	1.06 (0.97, 1.17)	1.14 (1.01, 1.30)	1.16 (1.08, 1.26)
Management	14.7 (13.6, 15.7)	7.7 (7.0, 8.5)	26.1 (24.9, 27.4)	8.1 (7.4, 8.9)	5.7 (5.1, 6.4)	11.8 (10.9, 12.7)
	0.70 (0.65, 0.76)	0.62 (0.56, 0.69)	0.87 (0.83, 0.92)	0.66 (0.60, 0.72)	0.74 (0.66, 0.83)	0.78 (0.72, 0.84)
	0.86 (0.80, 0.92)	0.75 (0.67, 0.83)	0.93 (0.89, 0.98)	0.72 (0.65, 0.79)	0.77 (0.69, 0.86)	0.91 (0.84, 0.99)
	0.91 (0.85, 0.97)	0.81 (0.73, 0.90)	0.95 (0.90, 1.00)	0.76 (0.69, 0.84)	0.81 (0.72, 0.91)	0.93 (0.86, 1.01)
	0.97 (0.91, 1.04)	0.97 (0.87, 1.08)	0.98 (0.93, 1.03)	0.91 (0.83, 1.01)	0.88 (0.78, 1.00)	1.00 (0.92, 1.08)
Protective Service	16.0 (13.8, 18.5)	7.5 (6.2, 9.1)	23.5 (20.7, 26.5)	9.5 (7.9, 11.4)	7.8 (6.1, 10.0)	12.3 (10.4, 14.5)
	0.79 (0.68, 0.92)	0.62 (0.51, 0.76)	0.79 (0.70, 0.89)	0.79 (0.66, 0.95)	1.04 (0.81, 1.33)	0.83 (0.70, 0.98)
	0.73 (0.63, 0.85)	0.66 (0.54, 0.80)	0.74 (0.65, 0.83)	0.81 (0.67, 0.98)	1.13 (0.88, 1.45)	0.89 (0.75, 1.05)
	0.85 (0.75, 0.97)	0.80 (0.66, 0.96)	0.81 (0.73, 0.91)	0.89 (0.75, 1.07)	1.24 (0.96, 1.58)	0.94 (0.80, 1.11)
	0.86 (0.75, 0.99)	0.81 (0.67, 0.98)	0.83 (0.73, 0.93)	0.90 (0.75, 1.09)	1.29 (1.00, 1.67)	0.95 (0.81, 1.12)
Business and Financial Operations	13.1 (11.7, 14.6)	8.2 (7.2, 9.3)	25.5 (23.8, 27.3)	7.1 (6.3, 8.0)	5.8 (5.0, 6.6)	11.8 (10.7, 13.0)
	0.63 (0.56, 0.71)	0.67 (0.59, 0.77)	0.85 (0.80, 0.92)	0.58 (0.52, 0.66)	0.75 (0.65, 0.87)	0.79 (0.72, 0.87)
	0.79 (0.71, 0.87)	0.74 (0.65, 0.84)	0.95 (0.89, 1.02)	0.63 (0.56, 0.71)	0.76 (0.65, 0.87)	0.82 (0.75, 0.91)
	0.90 (0.82, 0.99)	0.86 (0.76, 0.97)	1.00 (0.94, 1.06)	0.71 (0.62, 0.80)	0.83 (0.72, 0.96)	0.85 (0.77, 0.94)
	0.99 (0.89, 1.09)	1.09 (0.97, 1.24)	1.02 (0.95, 1.09)	0.87 (0.76, 0.98)	0.91 (0.78, 1.06)	0.92 (0.83, 1.02)
Healthcare and Technical	9.5 (8.6, 10.4)	7.8 (7.0, 8.7)	22.1 (20.8, 23.4)	7.3 (6.4, 8.3)	5.2 (4.5, 6.0)	14.4 (13.4, 15.5)
	0.45 (0.41, 0.49)	0.64 (0.57, 0.71)	0.73 (0.69, 0.77)	0.59 (0.52, 0.67)	0.68 (0.58, 0.78)	0.97 (0.90, 1.05)
	0.63 (0.57, 0.69)	0.67 (0.60, 0.75)	0.87 (0.82, 0.92)	0.65 (0.57, 0.73)	0.66 (0.56, 0.76)	0.91 (0.84, 0.99)
	0.74 (0.68, 0.80)	0.78 (0.70, 0.86)	0.91 (0.86, 0.96)	0.72 (0.63, 0.82)	0.72 (0.61, 0.83)	0.94 (0.87, 1.01)
	0.80 (0.73, 0.87)	0.92 (0.83, 1.03)	0.92 (0.87, 0.97)	0.87 (0.76, 0.99)	0.79 (0.67, 0.93)	0.99 (0.91, 1.07)
Community and Social Services	9.8 (8.2, 11.7)	8.8 (7.6, 10.2)	21.1 (19.0, 23.4)	10.1 (8.8, 11.7)	7.3 (6.0, 8.9)	15.2 (13.4, 17.2)
	0.48 (0.40, 0.57)	0.74 (0.63, 0.85)	0.71 (0.64, 0.79)	0.85 (0.73, 0.99)	0.97 (0.80, 1.18)	1.03 (0.91, 1.17)
	0.62 (0.53, 0.73)	0.72 (0.62, 0.84)	0.84 (0.76, 0.92)	0.86 (0.74, 0.99)	0.93 (0.77, 1.14)	0.96 (0.84, 1.09)
	0.75 (0.65, 0.87)	0.85 (0.74, 0.98)	0.89 (0.82, 0.98)	0.93 (0.80, 1.07)	0.96 (0.78, 1.17)	0.99 (0.87, 1.13)
	0.74 (0.63, 0.86)	0.83 (0.72, 0.95)	0.88 (0.80, 0.97)	0.96 (0.83, 1.12)	0.98 (0.80, 1.21)	0.95 (0.83, 1.08)

(Continues)

TABLE 5 | (Continued)

Major occupation group	No personal doctor	Could not afford needed care	No routine checkup past year	Fair or poor general health	Frequent physical distress****	Frequent mental distress*****
Life, Physical, and Social Science	12.7 (10.8, 14.9)	5.3 (4.3, 6.5)	25.1 (22.5, 27.9)	5.3 (4.2, 6.6)	7.2 (5.3, 9.6)	13.1 (10.8, 15.8)
	0.62 (0.53, 0.73)	0.44 (0.36, 0.54)	0.85 (0.76, 0.94)	0.44 (0.35, 0.55)	0.95 (0.71, 1.28)	0.88 (0.73, 1.07)
	0.67 (0.58, 0.78)	0.47 (0.38, 0.57)	0.85 (0.76, 0.94)	0.49 (0.39, 0.62)	1.00 (0.74, 1.36)	0.88 (0.73, 1.06)
	0.79 (0.69, 0.89)	0.59 (0.48, 0.71)	0.88 (0.80, 0.97)	0.57 (0.45, 0.71)	1.03 (0.78, 1.36)	0.88 (0.74, 1.05)
	0.81 (0.71, 0.91)	0.66 (0.54, 0.81)	0.90 (0.82, 0.99)	0.67 (0.52, 0.85)	1.07 (0.79, 1.44)	0.89 (0.74, 1.09)
Architecture and Engineering	16.9 (15.1, 18.9)	4.6 (3.7, 5.7)	29.6 (27.3, 32.0)	6.7 (5.6, 8.0)	3.9 (3.2, 4.8)	8.1 (6.9, 9.5)
	0.83 (0.74, 0.93)	0.37 (0.30, 0.47)	1.00 (0.92, 1.08)	0.56 (0.47, 0.66)	0.51 (0.42, 0.62)	0.54 (0.46, 0.63)
	0.80 (0.71, 0.89)	0.46 (0.37, 0.57)	0.91 (0.84, 0.98)	0.64 (0.53, 0.76)	0.59 (0.49, 0.72)	0.64 (0.56, 0.75)
	0.96 (0.87, 1.05)	0.62 (0.50, 0.76)	0.98 (0.91, 1.05)	0.75 (0.63, 0.89)	0.66 (0.54, 0.80)	0.68 (0.58, 0.78)
	1.01 (0.92, 1.11)	0.81 (0.66, 1.00)	0.97 (0.90, 1.05)	0.86 (0.73, 1.02)	0.73 (0.59, 0.91)	0.76 (0.65, 0.88)
Education, Training, and Library	9.6 (8.6, 10.7)	7.3 (6.5, 8.2)	21.5 (20.1, 22.9)	8.4 (7.4, 9.4)	6.8 (6.0, 7.7)	14.4 (13.2, 15.7)
	0.46 (0.41, 0.51)	0.60 (0.53, 0.68)	0.72 (0.67, 0.76)	0.69 (0.61, 0.78)	0.89 (0.79, 1.02)	0.97 (0.89, 1.06)
	0.67 (0.60, 0.74)	0.67 (0.60, 0.76)	0.86 (0.81, 0.92)	0.76 (0.67, 0.86)	0.88 (0.77, 1.00)	0.97 (0.89, 1.06)
	0.79 (0.73, 0.87)	0.79 (0.71, 0.88)	0.92 (0.86, 0.98)	0.81 (0.72, 0.92)	0.90 (0.79, 1.03)	0.99 (0.90, 1.08)
	0.78 (0.71, 0.85)	0.80 (0.71, 0.90)	0.91 (0.85, 0.97)	0.81 (0.71, 0.91)	0.94 (0.81, 1.08)	0.96 (0.87, 1.05)
Computer and Mathematical	15.2 (13.9, 16.7)	6.8 (5.7, 7.9)	28.4 (26.5, 30.3)	8.1 (7.1, 9.2)	5.9 (4.9, 7.0)	10.8 (9.6, 12.2)
	0.74 (0.68, 0.82)	0.55 (0.47, 0.65)	0.96 (0.89, 1.02)	0.67 (0.59, 0.77)	0.77 (0.64, 0.92)	0.72 (0.64, 0.81)
	0.74 (0.67, 0.81)	0.66 (0.56, 0.78)	0.90 (0.84, 0.96)	0.76 (0.67, 0.88)	0.88 (0.73, 1.05)	0.85 (0.76, 0.96)
	0.90 (0.83, 0.98)	0.86 (0.74, 1.00)	0.97 (0.91, 1.04)	0.89 (0.78, 1.02)	1.00 (0.84, 1.20)	0.90 (0.80, 1.01)
	0.99 (0.91, 1.08)	1.11 (0.96, 1.28)	1.01 (0.94, 1.08)	1.11 (0.96, 1.27)	1.10 (0.91, 1.33)	0.99 (0.88, 1.12)
Legal	11.8 (9.5, 14.6)	4.2 (3.2, 5.4)	25.4 (22.1, 29.0)	5.2 (4.1, 6.5)	5.8 (4.5, 7.6)	9.3 (7.6, 11.2)
	0.58 (0.47, 0.72)	0.35 (0.27, 0.45)-	0.86 (0.75, 0.98)	0.43 (0.34, 0.54)	0.77 (0.59, 1.00)	0.62 (0.51, 0.76)
	0.82 (0.68, 0.99)	0.42 (0.33, 0.54)	0.97 (0.86, 1.10)	0.50 (0.40, 0.63)	0.79 (0.61, 1.03)	0.68 (0.56, 0.82)
	0.95 (0.81, 1.12)	0.51 (0.40, 0.65)	1.02 (0.91, 1.15)	0.55 (0.44, 0.69)	0.87 (0.67, 1.13)	0.71 (0.59, 0.85)
	1.06 (0.89, 1.26)	0.74 (0.58, 0.94)	1.09 (0.97, 1.23)	0.76 (0.60, 0.97)	1.03 (0.78, 1.36)	0.83 (0.69, 1.01)

Note: Italics indicate statistically significant elevation or deficit (confidence interval excludes the null).

Abbreviation: CI, confidence interval.

* Forty US states, Guam, and the U.S. Virgin Islands.

** Adjusted for sex, race/Hispanic ethnicity (non-Hispanic Black, non-Hispanic White, Hispanic, non-Hispanic other race or multiracial), age (18–24, 25–34, 35–49, 50–64), and marital status (married, divorced, widowed, separated, never married, member of an unmarried couple).

*** Adjusted for sex, race/Hispanic ethnicity, age, and marital status as described above, as well as for primary insurance source (employer-sponsored insurance, Military, non-group private, Medicare, state-sponsored, other governmental, Medicaid [including Children's Health Insurance Program], and uninsured [including Indian Health Service]).

**** Adjusted for sex, race/Hispanic ethnicity, age, marital status, and primary insurance as described above, as well as for household income category (\$15k, \$15,000–19,999, \$20,000–24,999, \$25,000–34,999, \$35,000–49,999, \$50,000–74,999, \$75,000–99,999, \$100,000–149,999, \$150,000–199,999, ≥ \$200,000).

***** Participants who gave a number ≥ 14 in response to the question “Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?”

***** Participants who gave a number ≥ 14 in response to the question “Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?”

For occupations with high uninsurance prevalence ($\geq 25\%$), adjustment for demographic characteristics reduced point estimates somewhat without changing statistical significance, with the exception of Construction and Extraction, for which no health status measure remained significantly elevated. For occupations with low uninsurance prevalence, adjustment for demographic characteristics generally produced small increases in point estimates but did not lead to changes in statistical significance.

Adding the primary insurance source to the adjustment further decreased point estimates among occupations with high uninsurance prevalence. While fair or poor general health remained significantly elevated for those occupations (except Construction and Extraction), frequent physical distress was no longer significantly elevated for any of the four occupations, and frequent mental distress was significantly elevated only for Food Preparation and Serving. For occupations with low uninsurance prevalence ($< 5\%$ uninsured), point estimates were unchanged or increased slightly, and in some cases, deficits were no longer statistically significant. Elevated PRs for some occupations with intermediate levels of insurance coverage remained statistically significant for adverse health status even after adding primary insurance source to the adjustment: Production (fair or poor general health and frequent physical distress); Healthcare Support (fair or poor general health and frequent mental distress); and Office Administration and Support (all three measures).

After adjustment was expanded to include household income, two of the high-uninsurance occupations (Building and Grounds Cleaning and Maintenance, Construction and Extraction) had no statistically significant elevations. The aPR for fair or poor general health remained significantly elevated for Farming, Fishing, and Forestry, and aPRs for all three measures were significantly elevated for Food Preparation and Serving. For Healthcare Support, the aPR for frequent physical distress lost statistical significance, but the aPR for frequent mental distress remained significantly elevated. For Office and Administrative Support, the aPR for fair or poor general health lost statistical significance, but aPRs remained significantly elevated for the other two measures. As with healthcare access, in occupations with $< 5\%$ unemployment, point estimates for adverse health status increased in some cases after full adjustment, but no statistically significant elevations were observed.

4 | Discussion

In our study of employed and self-employed 2022–2023 BRFSS respondents, being insured was associated with better healthcare access and health status. By insurance source, workers from occupations with high prevalences of ESI or non-group private insurance (generally high-wage occupations) reported the best access and health status. In contrast, workers from occupations with a high prevalence of uninsurance (generally low-wage occupations) had high prevalence of unmet healthcare need and adverse health status.

Despite working, more than 1 in 10 employed or self-employed adults in our study could not afford needed care, 1 in 5 had no personal doctor, and more than 1 in 4 reported no routine checkup in the past year. Among uninsured workers, more than

one in three reported not being able to afford needed medical care, more than 60% had not had a routine checkup in the past year, and more than 60% did not have a personal doctor. Other research has shown that low-wage workers are less likely to have paid sick leave; the need to take unpaid time off to visit a healthcare provider is yet another economic barrier to care [28, 29].

Employment situation, wages, demographic characteristics, and occupation were associated with the prevalence of insurance and primary insurance source, as well as healthcare access and self-reported health status; these associations were intertwined. For example, healthcare access varied by occupation and was associated with the mean annual wages for an occupation. The prevalence of ESI was higher for occupations with higher mean annual wages, as was the ability to afford needed care. Other research has found that employee costs for both health insurance premiums and other out-of-pocket healthcare costs have been increasing [23]. Given our findings that the inability to afford needed care was highest among workers in occupations with the lowest mean household income, these cost increases could further decrease the ability of lower-wage workers to access healthcare, even if their employers offer ESI. The ability to afford needed care was uneven, even in occupations with more than half of workers reporting having ESI: in addition to occupations with high levels of uninsurance, several occupation groups with intermediate coverage levels and annual wages near \$50,000 also had significantly elevated prevalences for being unable to afford needed care. These include Transportation and Material Moving, Sales and Related, Healthcare Support, and Office and Administrative Support. The decrease in these elevations in almost all occupations after adjustment for household income highlights the role of adequate wages, in addition to healthcare coverage, in healthcare access.

In our study, 13%–16% of workers with Medicare, Medicaid, state-sponsored, or other governmental insurance reported not being able to afford needed care in 2022–2023. The differing implementation of Medicaid expansions by state, with variations in income cutoffs for eligibility, coverage, and patient cost-sharing [30], may contribute to this finding. Given that these insurance sources are most commonly reported by low-wage workers and provide coverage for more than 50% of respondents with mean household incomes below \$20,000, increases in healthcare costs, including higher premiums, would likely lead to a higher prevalence of being unable to afford needed care among these workers.

A number of occupations with high prevalence of uninsurance also had elevated PRs for fair or poor general health and, for several occupations, frequent physical distress. Adjustment for demographic covariates (to account for demographic sorting into occupations) led to aPRs for unmet health need and health status in these groups that were lower but remained significantly elevated. Several of the industries (Agriculture, Fishing, and Forestry; Transportation and Warehousing; and Healthcare and Social Assistance) employing the most workers in these occupations have some of the highest nonfatal occupational injury and illness incidence rates [31]. Access to comprehensive, affordable healthcare is important for ensuring these workers can obtain needed care in order to remain employed in these occupations, particularly in Agriculture, which is exempt from workers' compensation coverage in some states [32]. The

results of further adjustment for primary insurance source, which yielded lower but still statistically significantly elevated aPRs for unmet healthcare need, suggest that health insurance alone does not guarantee adequate financial means to utilize healthcare. The final adjustment for household income reduced the number of occupations with statistically significant elevations for unmet healthcare need, particularly for being unable to afford needed care. Other research has shown that being unable to afford care, particularly copays for prescriptions, can lead to strategies such as insulin rationing [33], highlighting the potentially serious effects of being uninsured or being unable to cover all healthcare costs, even if insured. The same adjustments reduced aPRs for fair or poor health in occupations with high levels of uninsurance.

4.1 | Limitations

Limitations pertinent to these analyses fall into several categories: the cross-sectional nature of the BRFSS, misclassification due to self-reporting, the limited scope of the included questions, and our use of major occupation categories.

The BRFSS is a cross-sectional survey administered throughout the year. The cross-sectional nature of the data precludes assigning causality to the associations observed between occupation, primary health insurance source, and the dependent variables, such as health status. Health status may precede insurance enrollment; those enrolling in Medicaid, state-sponsored programs, other governmental insurance, or Medicare are more likely to be low-wage workers than those enrolling in ESI or non-group private insurance. Eligibility and benefits for Medicaid and state-sponsored programs differ by jurisdiction and over time. Moreover, along with our research showing differences in health insurance source by occupation, jobs have differing effects on health that are not mediated by insurance-related healthcare access. For instance, the high frequency of mental distress among those with military insurance (either military family member or veteran) may reflect the stress of military service rather than, or in addition to, provisions of their health insurance. Injuries among construction workers, while requiring healthcare access for treatment, may be more amenable to prevention by safety measures than by traditional access to care, so lack of routine checkups in this group may be less closely linked to health status than in some sedentary occupations.

In addition, respondents completing the BRFSS questionnaire near the beginning of the year may have recently changed insurance source or jobs, with their healthcare access and health status responses more reflective of previous than current insurance and occupation. For workers who recently left a long-term physically or mentally demanding job for a less demanding occupation, the health consequences of the demanding job could be misattributed to the new, less demanding occupation. At the same time, the healthy worker survivor effect (those remaining employed tending to be healthier than those who leave employment) may be particularly strong in physically demanding occupations like Construction and Extraction, and may partially explain the relatively low prevalence of frequent physical distress reported by workers in this occupation.

The BRFSS data used in these analyses have other limitations related to the survey structure and content. Because the I&O module is optional, our analytic dataset is not nationally representative. BRFSS only ascertains primary health insurance source; the extent to which access measures are bolstered by holding multiple sources of coverage cannot be determined from the dataset. Moreover, BRFSS did not ask in 2022–2023 whether the respondent was offered ESI or whether the primary insurance source was from a family member, rather than the respondent, leading to potential misattribution of observed associations between demographic characteristics, occupations, and outcomes. Whether a respondent worked full-time or part-time was not asked, nor was employer size; both characteristics affect the employer's obligations to provide ESI. Finally, results for ESI by occupation may underestimate the availability of such insurance in low-wage occupations. The reasons for uninsurance are not ascertained in the survey. Relatively healthy workers might not feel the need to purchase health insurance, particularly young workers, who are disproportionately uninsured and overrepresented in occupations like Food, Preparation, and Serving. Furthermore, employees in low-wage occupations (again, including Food, Preparation, and Serving) may have lower uptake of ESI due to difficulty affording insurance premiums. In addition, some of the healthcare access measures are stronger indicators of economic barriers than others. Being unable to afford needed care is clearly financial, although the measure may reflect some degree of perception and prioritization, while annual checkups are not universally recommended, and uptake has been found in a previous analysis of BRFSS data to be associated with not only insurance status but also a number of demographic factors [34]. Other components of being able to afford needed care, such as being able to afford prescribed medications, were not ascertained in the 2022–2023 BRFSS.

All BRFSS data are self-reported and subject to bias. In addition to the potential effects of stigma on reporting health outcomes, primary source of health insurance may be misreported due to the complex and changing nature of the health insurance landscape, with frequent changes to eligibility requirements and the scope of Medicaid expansion, state-sponsored programs, the ACA marketplace, and other program changes, as well as additional changes specific to this time period (e.g., continuous Medicaid coverage during the COVID-19 Public Health Emergency, which ended in May 2023). Misclassification of health insurance source within public programs may be substantial. Medicare eligibility for persons younger than 65 is limited to those affected by end-stage renal disease (ESRD), amyotrophic lateral sclerosis, or certain disabilities. Of our study respondents (all younger than 65), 2.9% reported Medicare as their primary source, although only 5% of those reported any functional disability (although this BRFSS question does not cover all disabilities resulting in Medicare eligibility), and only 7% had chronic kidney disease (a category more expansive than ESRD). However, healthcare access and health outcome results for Medicare, state-sponsored programs, and other governmental insurance were generally similar, so the effects of this misclassification within the group of primarily public programs on interpretations of healthcare access and status were likely limited.

Major occupational groupings can obscure within-group differences. For example, research using older BRFSS data found that within the U.S. Census occupational grouping of Patient Care Aides, household income and health insurance status differed by healthcare industry, with 20.7% of home care aides, 16.9% of nursing home aides, and 6.8% of hospital aides reporting being uninsured [3]. These differences in coverage within the occupation may be reflected in the seemingly disparate findings for healthcare access among Healthcare Support workers in this study, with statistically significant elevations for being unable to afford needed care and all three adverse health outcomes, despite better access than all other occupations combined for having a personal doctor and a routine checkup in the past year. Moreover, disproportionate non-response in a specific occupation with a greater proportion of workers lacking ESI (e.g., home health workers) could, for example, bias unmet need estimates for the major occupation (healthcare support) downward.

5 | Future Research and Implications

In our study of health insurance, occupation, healthcare access, and health status, differences between uninsured workers and the insured, particularly those with ESI or non-group private insurance, show clear associations between health insurance coverage and the health status of U.S. workers. Longitudinal studies are needed to assess the causality of the associations observed in this study between occupation and both healthcare access and health status. Positive results would suggest that future disruptions to healthcare coverage could lead to overall declines in healthcare access and the health status of workers. This trajectory would contrast with results observed for Medicaid expansion, including associations with improved access to care [35], better awareness and control of chronic conditions [8], and increased early-stage diagnosis rates for cancer and lower rates for some causes of mortality [16].

Increases in the proportion of workers unemployed or working in occupations less likely to offer ESI or wages adequate for workers to pay premiums and other healthcare costs, along with changes in the health insurance landscape that would reduce workers' access to Medicaid and other programs with a public element, could combine to leave more workers uninsured, with potentially deleterious effects on healthcare access and the health status of workers. The impact could be particularly pronounced on workers in two types of occupations: (1) those that already have a high percentage of workers uninsured and on Medicaid (Farming, Fishing, and Forestry; Building and Grounds Cleaning and Maintenance; Food Preparation and Serving); and (2) those with an intermediate percentage of uninsured workers but many workers reliant on Medicaid, state-sponsored programs, other governmental insurance, and Medicare. An example of the latter is Healthcare Support, one of the occupations expected to grow most quickly between 2023 and 2033 [36] as the U.S. population ages. Increasing premiums could lead to substantially lower levels of worker enrollment in ESI and Marketplace programs, and potentially higher levels of unmet healthcare needs and poor health status, than those seen in these analyses.

6 | Conclusions

In this study of U.S. workers, we found large differences by occupation in the prevalence of healthcare coverage through ESI, uninsurance, healthcare access, and self-reported health status. Our results highlight the importance of both comprehensive health insurance and wages adequate to purchase and utilize healthcare coverage for the health and employability of all workers.

Author Contributions

Sharon Silver conceived of the paper. Jia Li conducted the analyses. Abay Asfaw provided economics expertise. All authors have participated in (a) interpretation of the data; (b) drafting the article or revising it critically for important intellectual content; and (c) approval of the final version. All authors approved the version to be published; all authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethics Statement

The BRFSS study protocol was reviewed and approved by the Institutional Review Board at CDC.

Conflicts of Interest

The authors declare no conflicts of interest.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.

Supplemental Appendix A – Healthcare Access and Self-Reported Health Status by Broad Occupation (sorted by % uninsured), Behavioral Risk Factor Surveillance System 2022-2023*. Distribution of selected demographic characteristics by broad occupation groups, Behavioral Risk Factor Surveillance System 2022-2023*.