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Coal Workers' Pneumoconiosis–Associated Deaths — United States, 2020–2023

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Abstract

Coal workers' pneumoconiosis (CWP) is a preventable, progressive occupational lung disease caused by inhaling respirable coal mine dust, a complex mixture commonly containing coal, crystalline silica, and other silicate minerals. Early pneumoconiosis can be asymptomatic, but advanced disease often leads to disability and premature death. To describe CWP-associated mortality among U.S. residents aged ≥15 years by industry and occupation, CDC conducted an exploratory analysis of National Vital Statistics System multiple cause-of-death data for 2020–2023, the most recent years that include information on decedents' usual industry and occupation. During 2020–2023, CWP was listed on the death certificate of 1,754 decedents (age-adjusted CWP-associated death rate = 1.3 per 1 million). By industry group, the highest number of CWP-associated deaths occurred among workers in the mining industry (1,255). The highest proportionate mortality ratios (PMRs) were among persons employed in the mining industry (PMR = 50.0) and the construction and extraction occupations (6.2). Among workers employed in the mining industry, the highest PMR was among underground mining machine operators (164.6). The continuing occurrence of CWP-associated deaths underscores the potential value of a comprehensive prevention program (maintaining efforts to control occupational coal mine dust exposures, combined with early disease detection efforts and medical care) and supports potential benefits of ongoing surveillance.

Introduction

Coal workers' pneumoconiosis (CWP) is a preventable, progressive occupational lung disease caused by inhaling respirable coal mine dust, a complex mixture commonly containing coal, crystalline silica, and other silicate minerals (*1*,*2*). The disease is characterized by progressive scarring of lung tissue and declining lung function (*1*,*2*). Disease progression can occur after cessation of exposure (*2*,*3*). Early pneumoconiosis can be asymptomatic, but advanced disease often leads to disability and premature death. No specific treatment exists for CWP; patients with CWP receive supportive care. Lung transplantation can be offered to eligible patients with end-stage CWP; median posttransplant survival is 6.6 years (*2*,*4*). Controlling exposure to coal mine dust, combined with early disease detection efforts and medical care, are all important prevention methods to reduce morbidity and mortality associated with CWP (*1*,*2*,*5*,*6*). To describe CWP-associated mortality among U.S. residents aged ≥15 years by decedents' usual industry and occupation (i.e., the industry and occupation the decedents engaged in for most of their working life) and to examine associations between CWP-associated deaths and industry and occupation, CDC conducted an exploratory analysis of 2020–2023 National Vital Statistics System (NVSS) multiple cause-of-death data.

Methods

Case Definition and Data Source

CWP-associated decedents were defined as persons whose death record listed the *International Classification of Diseases, Tenth Revision, Clinical Modification* code J60 (coal workers' pneumoconiosis) as the underlying or a contributing cause

Continuing Education examination available at https://www.cdc.gov/mmwr/mmwr_continuingEducation.html

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of death.* The NVSS public-use multiple cause-of-death files include 13,098,787 records for U.S. resident decedents aged ≥15 years who died during 2020–2023, the most recent years with information on decedents' usual industry and occupation. The NVSS files include decedents' occupation and industry information coded through a collaboration with CDC's National Institute for Occupational Safety and Health (NIOSH). The 2020–2022 occupation and industry information was coded to 2012 CDC Census Occupation and Industry codes, and the 2023 occupation and industry information was coded to 2018 CDC Census Occupation and Industry codes. Overall, 12,796,979 (97.7%) records included information on industry and occupation.

Data Analyses

Death rates (number of deaths per 1 million persons aged ≥15 years) were based on annual postcensal population estimates as of July 1 of the corresponding year. Death rates were age adjusted by applying age-specific death rates to the 2000 U.S. Census Bureau standard population (Multiple Cause of Death 2018–2023 by Single Race). The state on the death record represents the decedent's place of legal residence at the time of death.

For analyses, because of small numbers of observations in certain industry and occupation narratives, major industry categories were reduced from 22 to 21 groupings by combining military, miscellaneous, and unclassifiable categories; major occupation categories were reduced from 25 to 23 groupings by combining military, miscellaneous, unclassified, and homemakers categories. One occupation might be listed under multiple industries.

Proportionate mortality ratios (PMRs) (defined as the observed number of deaths with CWP in a specified industry or occupation, divided by the expected number of deaths with CWP) and 95% CIs (assuming Poisson distribution of the data) were calculated by industry and occupation categories. The expected number of deaths was the total number of deaths in an industry or occupation of interest multiplied by a proportion defined as the number of CWP-associated deaths in all industries or occupations, divided by the total number of deaths in all industries or occupations. PMRs were adjusted by 10-year age groups, sex, race, and ethnicity. PMR >1.0 or <1.0 indicates that more or fewer deaths than expected, respectively, were associated with the condition in a specified occupation or industry. PMRs were considered statistically significant if the 95% CI excluded 1.0.

An additional analysis of PMRs was performed by detailed occupation for the decedents whose longest-held job was in

* Underlying cause of death is defined as "the disease or injury which initiated the chain of morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury." A contributing cause of death (other significant condition) is any disease, condition, or injury that contributed to death but was not part of the chain of morbid events leading to death. Each death certificate contains up to 20 multiple causes of death. Instructions for Classification of Underlying and Multiple Causes of Death - Section I - 2021

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the mining industry. For this analysis, to address the updated occupation coding system, detailed 2012 occupation codes were converted to the 2018 coding scheme (Industry and Occupation Code Lists and Crosswalks | US Census Bureau).

Analyses were conducted using CDC Wide-ranging ONline Data for Epidemiologic Research (WONDER) and SAS software (version 9.4; SAS Institute). This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.†

† 45 C.F.R. part 46; 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.

Results

CWP-Associated Deaths and Death Rates

During 2020–2023, a total of 1,754 deaths with CWP listed as the underlying (576; 32.8%) or a contributing (1,178; 67.2%) cause of death were identified among U.S. residents aged ≥15 years (Table 1), accounting for 0.01% of 13,098,787 deaths from all causes. Overall, the annualized age-adjusted CWP-associated death rate was 1.3 per 1 million persons. During 2020–2023, the annual number of CWP-associated deaths increased from 370 (death rate = 1.1 per million) in 2020 to 462 (1.4) in 2023. Among

TABLE 1. Characteristics of decedents with coal workers' pneumoconiosis and age-adjusted coal workers' pneumoconiosis–associated death rates among persons aged ≥15 years — United States, 2020–2023

Characteristic	CWP-associated deaths,* no. (%)	Death rate† (95% CI)
Total	**1,754 (100.0)**	**1.3 (1.3–1.4)**
Age group, yrs§		
15–44	62 (3.5)	0.1 (0.1–0.2)
45–64	310 (17.7)	0.9 (0.8–1.0)
≥65	1,382 (78.8)	6.1 (5.7–6.4)
Sex		
Female	91 (5.2)	0.1 (0.1–0.2)
Male	1,663 (94.8)	2.8 (2.7–3.0)
Race¶		
Black or African American	45 (2.6)	0.3 (0.2–0. 5)
White	1,692 (96.5)	1.5 (1.5–1.6)
Multiple races	17 (1.0)	—**
Ethnicity		
Hispanic or Latino	39 (2.2)	0.3 (0.2–0.4)
Non-Hispanic	1,715 (97.8)	1.4 (1.4–1.5)
Year		
2020	370 (21.1)	1.1 (1.0–1.2)
2021	459 (26.2)	1.4 (1.3–1.5)
2022	463 (26.4)	1.4 (1.2–1.5)
2023	462 (26.3)	1.4 (1.2–1.5)
State of residence		
≥10 deaths††		
Kentucky	517 (29.5)	27.9 (25.5–30.4)
West Virginia	334 (19.0)	38.4 (34.2–42.5)
Virginia	281 (16.0)	8.1 (7.2–9.1)
Pennsylvania	164 (9.4)	3.3 (2.8–3.9)
Tennessee	82 (4.7)	2.9 (2.3–3.6)
Colorado	48 (2.7)	2.3 (1.7–3.1)
Alabama	21 (1.2)	1.0 (0.6–1.5)
South Carolina	20 (1.1)	0.9 (0.5–1.4)
Ohio	41 (2.3)	0.9 (0.6–1.2)
Illinois	30 (1.7)	0.6 (0.4–0.8)
Texas	43 (2.5)	0.4 (0.3–0.6)
Florida	25 (1.4)	0.3 (0.2–0.4)
Indiana	18 (1.0)	—**
Wisconsin	16 (0.9)	—**
New Mexico	15 (0.9)	—**
North Carolina	14 (0.8)	—**
Utah	14 (0.8)	—**
All other states§§	71 (4.0)	0.1 (0.1–0.2)

TABLE 1. (*Continued*) Characteristics of decedents with coal workers' pneumoconiosis and age-adjusted coal workers' pneumoconiosis–associated death rates among persons aged ≥15 years — United States, 2020–2023

Source: CDC Wide-ranging ONline Data for Epidemiologic Research (WONDER) online databases, Multiple Cause of Death, 2018-2023, Single Race Request.
Abbreviations: AI/AN = American Indian or Alaska Native; A/PI = Asian or Pacific Islander; CWP = coal workers' pneumoconiosis; NCHS = National Center for Health Statistics.

* Death records with *International Classification of Diseases, Tenth Revision, Clinical Modification* multiple cause-of-death code J60 (coal workers' pneumoconiosis).

† Age-adjusted CWP-associated death rates (deaths per 1 million persons) were calculated by applying age-specific death rates to the 2000 U.S. Census Bureau standard population age distribution. Multiple Cause of Death 1999-2020

§ Age-specific CWP-associated deaths per 1 million persons. The minimum age to work in a mine is 18 years; however, Bureau of Labor Statistics data indicate that during 2024, approximately 7,000 workers aged 16–19 years were employed in the mining, quarrying, and oil and gas extraction industries, mainly in support activities for mining. No CWP-associated deaths were reported among persons aged 15–19 years.

¶ Race and Hispanic origin are reported separately on the death certificate. The AI/AN race category includes North, Central, and South American Indians, Eskimos, and Aleuts. The A/PI race category includes Chinese, Filipino, Hawaiian, Japanese, and other A/PIs (Multiple Cause of Death 2018-2023 by Single Race). Race and ethnicity on death certificates might be misclassified. Interpretation of current mortality data relies on the most recent linkage-based evaluation conducted by CDC's NCHS for deaths occurring through 2011. The evaluation study found that race and Hispanic origin reporting is highly accurate for non-Hispanic White and non-Hispanic Black or African American decedents, and generally accurate for Hispanic or Latino (Hispanic) and A/PI decedents. However, the study identified substantial underreporting among AI/AN decedents, with approximately 40% of AI/AN deaths misclassified overall and 33% misclassified among non-Hispanic AI/AN decedents. As a result, the quality of race and Hispanic-origin reporting for the AI/AN population might be poor, and mortality for this group might be underestimated. NCHS, Series 2, no 172

** Dashes indicate death rate is unreliable. NCHS considers death rates based on counts of fewer than 20 deaths unreliable. A death rate based on fewer than 20 deaths has a relative SE ≥23% and is considered statistically unreliable. Multiple Cause of Death 2018-2023 by Single Race

†† NCHS data use restrictions preclude death counts of fewer than 10, as well as death rates based on counts of fewer than 10.

§§ States with fewer than 10 CWP-associated deaths: Alaska, Arizona, Arkansas, California, Connecticut, Georgia, Iowa, Kansas, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New York, Oklahoma, Oregon, South Dakota, Washington, and Wyoming. No CWP-associated deaths occurred in Delaware, the District of Columbia, Hawaii, Idaho, Maine, New Hampshire, North Dakota, Rhode Island, or Vermont.

CWP-associated deaths, 1,382 (78.8%; age-specific death rate = 6.1 per million persons) occurred among persons aged ≥65 years, 1,663 (94.8%; age-adjusted death rate = 2.8) among males, 1,692 (96.5%; 1.5) among White persons, and 1,715 (97.8%; 1.4) among non-Hispanic persons.

During 2020–2023, 17 states reported at least 10 CWP-associated deaths[§] among persons aged ≥15 years. Deaths in four states (Kentucky [517; annualized age-adjusted CWP-associated death rate = 27.9 per million persons], West Virginia [334; 38.4], Virginia [281; 8.1], and Pennsylvania [164; 3.3]) accounted for 1,296 (73.9%) of all CWP-associated decedents.

Industry

Industry and occupation data were available for 1,748 (99.7%) of 1,754 CWP-associated deaths. Among the 21 industry groups, the highest number of CWP-associated deaths occurred among persons employed in the mining industry for most of their working life (1,255; 71.8%), followed by the construction (111; 6.4%) and manufacturing (68; 3.9%) industries (Table 2). PMR among persons working in the mining industry was 50.0, indicating that the observed number of CWP-associated deaths was significantly higher than the expected number of CWP-associated deaths.

Occupation

Among 1,748 workers employed in the 23 occupation groups for most of their working life, the highest number of CWP-associated deaths occurred among persons working in construction and extraction occupations (1,273; 72.8% of CWP-associated deaths), followed by those in transportation and material moving occupations (96; 5.5%). PMR of 6.2 among construction and extraction workers indicated that the observed number of CWP-associated deaths was statistically significantly higher than the expected number of CWP-associated deaths. Among workers in the mining industry, the highest number of CWP-associated deaths occurred among underground mining machine operators (851; PMR = 164.6) followed by other extraction workers (252; PMR = 75.0) (Table 3).

Discussion

CDC previously examined pneumoconiosis mortality by industry and occupation for selected states for 1999–2018 and identified similar industries (i.e., the coal mining and construction industries) and occupations (i.e., mining machine operators) associated with CWP deaths (*7*). This report expands information on industries and occupations associated with CWP deaths and reinforces the value of analyzing mortality data by industry and occupation.

Although CWP deaths would be expected to be limited to the workers in the mining industry, they were also identified across a range of other industries. The identification of CWP-associated deaths among workers employed in industries other than mining might be explained, in part, by the recording of only one occupation that the decedent held for most of their working life (i.e., usual occupation) on the death certificate and its associated industry. Coal mine workers might have skills that are shared with other industries (such as construction) and might move between the coal mine and other industries because of mine operation closures, poor health, or other reasons. Workers might also leave other long-held jobs and enter the coal mine industry.

A previous CDC analysis found a declining trend in CWP-associated deaths from 1999 (1,002 deaths; age-adjusted rate = 4.7 per million) to 2018 (305; 1.0) (*7*). In this report, the annual number of CWP-associated deaths increased from 370 (death rate = 1.1 per million) in 2020 to 462 (1.4) in 2023. This increase in CWP-associated deaths is consistent with recent findings indicating an increase in CWP prevalence and its most severe form (progressive massive fibrosis, characterized by the development of large, dense, fibrotic masses in the lungs) among coal miners working underground, particularly in central Appalachia (*8*,*9*). These trends in CWP prevalence have been associated with exposure to coal mine dust with a high content of crystalline silica and other silicate minerals, specifically in operations involving mining thin coal seams or cutting rock to access coal (*6*,*10*).

In 2014, a revised standard[¶] decreased the existing permissible limit of exposure to respirable coal mine dust, increased dust sampling frequency and monitoring by mine operators, extended medical surveillance to include surface coal miners, and expanded medical surveillance testing to include spirometry. A long latency is typical between first exposure to coal mine dust and diagnosis of CWP, with disease most frequently identified in miners with ≥25 years' tenure (*1*,*2*). Because persons with CWP can live for many years after

[§] National Center for Health Statistics data use restrictions preclude presenting death counts of fewer than 10, as well as death rates based on counts of fewer than 10.

[¶] The concentration limits for respirable coal mine dust in air were decreased from 2.0 mg/m^3 to 1.5/m^3 at underground and surface coal mines and from 1.0 mg/m^3 to 0.5 mg/m^3 for intake air at underground mines, as well as for miners who already have evidence of developing pneumoconiosis. In addition, mine operators were required to use a continuous personal dust monitor to continuously measure the concentration of respirable coal mine dust and provide sampling results at specific time intervals (optional for surface coal mines and certain other mines). Medical surveillance required to be offered at no cost to underground and surface miners includes periodic occupational history, symptom assessment, chest radiograph, and spirometry with results reported to miners. In addition, part 90 miner transfer rights were extended to surface miners who have evidence of pneumoconiosis. Lowering Miners' Exposure to Respirable Coal Mine Dust, Including Continuous Personal Dust Monitors | Federal Register 2014

TABLE 2. Industries and occupations with coal workers' pneumoconiosis–associated deaths and proportionate mortality ratio among persons aged ≥15 years — selected U.S. jurisdictions, 2020–2023

Characteristic	No. of deaths from all causes	CWP-associated deaths,* no. (%)	PMR† (95% CI)
Total§	**12,796,979**	**1,748 (100)**	—
Industry¶			
Agriculture	270,274	15 (0.9)	0.3 (0.2–0.5)
Mining	91,110	1,255 (71.8)	50.0 (47.3–52.9)**
Construction	946,095	111 (6.4)	0.5 (0.4–0.6)
Manufacturing	1,568,911	68 (3.9)	0.3 (0.2–0.3)
Retail trade	891,149	18 (1.0)	0.2 (0.1–0.3)
Transportation and warehousing	668,960	42 (2.4)	0.3 (0.2–0.4)
Administrative and support and waste management and remediation services	302,018	21 (1.2)	0.5 (0.3–0.8)
Health care and social assistance	1,118,129	21 (1.2)	0.3 (0.2–0.5)
Accommodation and food services	467,120	18 (1.0)	0.4 (0.3–0.7)
Other services (except public administration)	598,929	41 (2.3)	0.5 (0.3–0.6)
Public administration	598,745	21 (1.2)	0.2 (0.1–0.3)
Military, miscellaneous, or unclassifiable	2,744,071	79 (4.5)	0.4 (0.3–0.5)
All other industries††	2,531,468	38 (2.2)	—
Occupation¶			
Management	1,073,693	41 (2.3)	0.2 (0.1–0.3)
Business and financial operations	329,310	10 (0.6)	0.2 (0.1–0.4)
Community and social services	172,892	12 (0.7)	0.5 (0.3–1.0)
Protective service	227,043	13 (0.7)	0.3 (0.2–0.5)
Food preparation and serving related	372,610	12 (0.7)	0.5 (0.3–0.9)
Building and grounds cleaning and maintenance	385,595	37 (2.1)	0.8 (0.6–1.1)
Sales and related	884,097	19 (1.1)	0.1 (0.1–0.2)
Construction and extraction	854,943	1,273 (72.8)	6.2 (5.8–6.5)**
Installation, maintenance, and repair	448,690	43 (2.5)	0.4 (0.3–0.5)
Production	955,637	55 (3.1)	0.3 (0.3–0.5)
Transportation and material moving	897,877	96 (5.5)	0.6 (0.5–0.7)
Military, miscellaneous, unclassifiable, and homemakers	2,674,437	83 (4.7)	0.4 (0.4–0.6)
All other occupations§§	3,520,155	54 (3.1)	—

Source: National Vital Statistics System public use multiple cause files 2020–2023. Data Access - Vital Statistics Online | CDC

Abbreviations: CWP = coal workers' pneumoconiosis; PMR = proportionate mortality ratio.

* Death records with *International Classification of Diseases, Tenth Revision, Clinical Modification* multiple cause-of-death code J60 (coal workers' pneumoconiosis).

† PMR was defined as the observed number of deaths with CWP in a specified occupation, divided by the expected number of deaths with CWP. The expected number of deaths was the total number of deaths in the occupation of interest multiplied by a proportion defined as the number of CWP-associated deaths in all occupations, divided by the total number of deaths in all occupations. CWP-associated PMRs were adjusted by 10-year age groups, sex, race, and ethnicity.

§ In 2020, 47 jurisdictions participated in the industry and occupation information coding program (Arizona, North Carolina, Rhode Island, and the District of Columbia did not participate). Iowa participated in the program in 2020, but the data were inconsistent with those from other jurisdictions and were excluded. In 2021, a total of 49 jurisdictions participated (Rhode Island and the District of Columbia did not participate). In 2022 and 2023, a total of 52 jurisdictions (50 states, New York City, and the District of Columbia) participated in the program. Industry and Occupation Data Mortality 2020

¶ Recorded on decedents' death certificates as the industry associated with the occupation the person held for most of their working life (i.e., usual industry and occupation).

** A lower bound of the 95% CI level with a value >1.0 indicates a statistically significantly elevated PMR.

†† Industries with fewer than 10 CWP-associated deaths: utilities; wholesale trade; information; finance and insurance; real estate and rental and leasing; professional, scientific, and technical services; management of companies and enterprises; education services; and arts, entertainment, and recreation.

§§ Occupations with fewer than 10 CWP-associated deaths: computer and mathematical; architecture and engineering; life, physical, and social science; legal; education, training, and library; arts, design, entertainment, sports, and media; health care practitioners and technical; health care support; personal care and service; office and administrative support; and farming, fishing, and forestry.

diagnosis, the latency until death is even longer. Thus, insufficient time would likely have elapsed for the changes in regulations to substantially affect the findings in this report. Continued monitoring of mortality trends, with attention to industry and occupation, is important to assess the effects of these changes.

Limitations

The findings in this report are subject to at least six limitations. First, CWP reported on death certificates were not validated using medical records. Some CWP deaths might have been attributed to other chronic respiratory diseases caused by exposure to coal mine dust (e.g., silicosis or chronic obstructive pulmonary disease) (*1*,*2*). Thus, CWP deaths might have been overascertained or underascertained. Second, some decedents might have never received a diagnosis of CWP (*6*). Therefore, occupations well-known to be associated with CWP deaths (e.g., underground mining machine operator) (*8*) might be underreported. Third, complete work histories were not available to enable assessment of changes in employment. Death

TABLE 3. Occupations with coal workers' pneumoconiosis–associated deaths and proportionate mortality ratio among persons aged ≥15 years employed in the mining industry — selected U.S. jurisdictions,* 2020–2023

Occupation in mining industry†	No. of deaths from all causes (N = 91,110)	CWP-associated deaths,§ no. (%) (n = 1,255)	PMR¶ (95% CI)
Underground mining machine operators**	16,218	851 (67.8)	164.6 (153.7–176.0)††
Other extraction workers§§	12,609	252 (20.1)	75.0 (66.1–84.9)††
Electricians	1,365	25 (2.0)	58.0 (37.6–85.7)††
Construction equipment operators	2,849	25 (2.0)	29.5 (19.1–43.5)††
Driver/sales workers and truck drivers	3,309	22 (1.8)	24.2 (15.2–36.7)††
First-line supervisors of construction trades and extraction workers	4,879	11 (0.9)	7.9 (3.9–14.1)††
All other occupations¶¶	49,881	69 (5.5)	5.3 (4.1–6.7)††

Source: National Vital Statistics System public use multiple cause files 2020–2023. Data Access - Vital Statistics Online | CDC

Abbreviations: CWP = coal workers' pneumoconiosis; PMR = proportionate mortality ratio.

* In 2020, 47 jurisdictions participated in the industry and occupation information coding program (Arizona, North Carolina, Rhode Island, and the District of Columbia did not participate). Iowa participated in the program in 2020, but the data were inconsistent with those from other jurisdictions and were excluded. In 2021, a total of 49 jurisdictions participated (Rhode Island and the District of Columbia did not participate). In 2022 and 2023, a total of 52 jurisdictions (50 states, New York City, and the District of Columbia) participated in the program. Industry and Occupation Data Mortality 2020

† Mining industry recorded on decedents' death certificates as the industry associated with the occupation the person held for most of their working life. Industry and Occupation Code Lists & Crosswalks

§ Death records with *International Classification of Diseases, Tenth Revision, Clinical Modification* multiple cause-of-death code J60 (coal workers' pneumoconiosis).

¶ PMR was defined as the observed number of deaths with CWP in a specified occupation, divided by the expected number of deaths with CWP. The expected number of deaths was the total number of deaths in the occupation of interest multiplied by a proportion defined as the number of CWP-associated deaths in all occupations, divided by the total number of deaths in all occupations. CWP-associated PMRs were adjusted by 10-year age groups, sex, race, and ethnicity.

** Continuous mining machine operators; roof bolters and mining; and underground loading and moving machine operators.

†† Statistically significantly higher PMR based on a lower bound of the 95% CI with a value >1.0.

§§ Rock splitters, quarry; helpers and extraction workers; and all other extraction workers, not elsewhere specified.

¶¶ Occupations with fewer than 10 CWP-associated deaths: general and operations managers; property, real estate, and community association managers; compliance officers; industrial engineers, including health and safety; mining and geological engineers, including mining safety engineers; occupational health and safety specialists and technicians; first-line supervisors of firefighting and prevention workers; security guards and gambling surveillance officers; animal caretakers; first-line supervisors of retail sales workers; construction laborers; derrick, rotary drill, and service unit operators, oil and gas; first-line supervisors of mechanics, installers, and repairers; heavy vehicle and mobile equipment service technicians and mechanics; industrial and refractory machinery mechanics; maintenance and repair workers, general; first-line supervisors of production and operating workers; machinists; welding, soldering, and brazing workers; stationary engineers and boiler operators; miscellaneous plant and system operators; inspectors, testers, sorters, samplers, and weighers; laborers and freight, stock, and material movers, hand; earth drillers, except oil and gas; and other material moving workers.

Summary

What is already known about this topic?

Coal workers' pneumoconiosis (CWP) is an occupational lung disease caused by inhaling coal mine dust. Although the disease is preventable, new cases and CWP-associated deaths continue to occur.

What is added by this report?

In this exploratory analysis of 2020–2023 national cause-of-death data, 1,754 deaths associated with CWP among U.S. residents aged ≥15 years were reported (age-adjusted CWP death rate = 1.3 per 1 million). Increased risk for CWP-associated death was observed among workers in the mining industry and among construction and extraction workers.

What are the implications for public health practice?

The continuing occurrence of CWP-associated deaths underscores the potential value of a comprehensive prevention program (control of exposures to coal mine dust, early disease detection, and medical care) and supports potential benefits of ongoing surveillance.

certificate data relating to the decedent's usual occupation and industry might not always reflect jobs in which causative exposures occurred. Some miners might have changed their jobs within the mining industry (e.g., miners with radiographic evidence of CWP moving to a low-dust mine environment under part 90 rights**), changed to another industry, or left the workforce; thus, PMRs might not accurately represent occupational risk. Fourth, the state issuing a death certificate might not be the state in which the decedent's exposures occurred. Fifth, mortality rates might not correctly represent CWP frequency. The rates were calculated using data on the general population that include those who are not at an occupational risk for developing CWP. Finally, small numbers of deaths among certain groups did not permit a more detailed characterization of CWP-associated deaths.

Implications for Public Health Practice

The continuing occurrence of CWP-associated deaths underscores the potential value of a comprehensive prevention program, including control of exposures to coal mine dust, early disease detection, and medical care (*1*,*2*,*5*,*6*) and supports potential benefits of ongoing surveillance. CDC's NIOSH Coal Workers' Health Surveillance Program provides information on diseases caused by coal mine dust, offers health screening to miners, informs miners with developing pneumoconiosis about their rights to work in a low-dust environment of the mine, and monitors disease occurrence. Miners' awareness and participation in the Coal Workers' Health Surveillance Program

** Miners with pneumoconiosis are protected under part 90 of Title 30 of the Code of Federal Regulations.

and mine operators' support for respiratory health screenings are essential parts of the prevention efforts to reduce CWP morbidity and mortality.

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All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Leisure-Time Physical Activity Among Women of Reproductive Age — United States, 2022 and 2024

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Abstract

Physical activity has numerous health benefits, including for women of reproductive age (18–44 years), among whom it can prevent chronic disease, including osteoporosis, and improve maternal health. Understanding the prevalence of leisure-time physical activity among different sociodemographic groups of women of reproductive age can help guide public health interventions and messaging. Data from the 2022 and 2024 National Health Interview Survey were used to examine the prevalences of self-reported leisure-time physical activity and meeting recommendations in the *Physical Activity Guidelines for Americans, 2nd edition*, among 10,981 women aged 18–44 years by race and ethnicity, age, and educational attainment. Overall, an estimated 25.1% of women aged 18–44 years reported leisure time activity meeting recommendations for both aerobic and muscle-strengthening physical activity, 27.1% reported leisure time activity meeting only the aerobic activity recommendation, and 6.1% reported leisure time activity meeting only the muscle-strengthening activity recommendation. An estimated 47.2% of women reported leisure-time physical activity insufficient to meet either recommendation (including those reporting no leisure time physical activity). Prevalences of reported aerobic and muscle-strengthening physical activity varied by race and ethnicity, age, and educational attainment: higher percentages of younger women (women aged 18–24 years), non-Hispanic White (White) women, and women with higher levels of educational attainment met both recommendations than did older women (women aged 30–34 or 40–44 years), women who are not White, and those with less educational attainment. Given the benefits of physical activity for maternal, physical, and mental health, addressing possible population-specific barriers to physical activity among women of reproductive age could be an important strategy for improving health outcomes.

Introduction

Physical activity improves health across the lifespan (*1*). Among women of reproductive age,* regular physical activity provides immediate benefits, including improved sleep and mental health (*1*). Aerobic physical activity and muscle-strengthening activity can both improve critical indicators of cardiometabolic health (e.g., blood pressure, body composition,† and glucose metabolism) and lower the risk for debilitating and costly chronic diseases later in life (*1*). Muscle-strengthening activity provides unique benefits, including increased bone strength and density and muscle mass retention during weight loss (*1*). During pregnancy, regular aerobic physical activity can reduce the risk for delivering a low-birthweight infant, gestational diabetes, hypertension, and postpartum depression (*1*,*2*), and muscle-strengthening activity can reduce the risk for low back pain and Cesarean delivery (*2*). However, most U.S. women do not meet the recommendations included in the *Physical Activity Guidelines for Americans, 2nd edition* (*3*), which are for moderate-to-vigorous aerobic physical activity (≥150 minutes per week at moderate intensity, ≥75 minutes per week at vigorous intensity, or an equivalent combination) and muscle-strengthening activities (two or more sessions per week) (*1*). National estimates of physical activity among women of reproductive age stratified by sociodemographic characteristics are unavailable, although studies find that adult leisure-time physical activity generally varies by race and ethnicity, age, and educational attainment (*4*). Ascertaining the prevalences of meeting physical activity guidelines stratified by these factors can identify groups that might most benefit from physical activity–promoting initiatives. Data from the 2022 and 2024 National Health Interview Survey (NHIS) were analyzed to describe the prevalence of meeting physical activity guidelines and participation in leisure-time moderate-to-vigorous aerobic physical activity and muscle-strengthening activity among U.S. women aged 18–44 years by race and ethnicity, age, and educational attainment.

Methods

Data Source

NHIS is a continuous cross-sectional household interview survey of the noninstitutionalized, U.S. civilian population across 50 states and the District of Columbia

* Many U.S.-based studies define reproductive age in women as 15–49 years; this study included women aged 18–44 years to be consistent with CDC reproductive health indicators (CDC's Division of Reproductive Health works to improve mental health among women of reproductive age) and the focus on adult physical activity.

† Body composition refers to a person's distribution of fat, bone, and muscle and is a predictor of metabolic and overall health. Physical activity can improve body composition (e.g., reduce body fat and increase muscle) and reduce risk of chronic disease independent of weight loss.

(2022 and 2024 response rates: 48%).[§] The 2 most recent years with physical activity data (2022 and 2024) were combined to increase precision of estimates, yielding 11,412 female respondents aged 18–44 years. Sensitivity analyses verified that 2022 and 2024 data were comparable, with no substantial between-year differences among demographic groups in prevalences of physical activity sufficiency or of meeting the physical activity guidelines. The 521 (4.6%) respondents for whom data on moderate-to-vigorous aerobic physical activity, muscle-strengthening activity, or educational attainment were missing were excluded, resulting in an analytic sample of 10,891 respondents (weighted to nationally represent 56,087,223 women).[¶]

Characterization of Physical Activity

Respondents reported participation in leisure-time moderate-to-vigorous aerobic physical activity[**] and muscle-strengthening activity[††] and were classified into one of four categories of meeting physical activity guidelines: 1) meeting neither guideline (neither aerobic nor muscle-strengthening activities); 2) meeting both physical activity guidelines; 3) meeting aerobic physical activity guidelines only; or 4) meeting muscle-strengthening physical activity guidelines only.[§§] Separately, four levels of moderate-to-vigorous aerobic physical activity participation (none, insufficient, sufficient, or high)[¶¶] and three levels of muscle-strengthening activity participation (none, insufficient, or sufficient)[***] were assessed.

Data Analysis

Prevalence estimates (and 95% CIs) were calculated for physical activity measures. Wald chi-square tests were used to evaluate differences in prevalence estimates of physical activity measures across demographic groups; where appropriate, a Bonferroni correction accounted for multiple tests. Statistical significance was defined as a p-value <0.05; all reported differences are statistically significant. To generate national estimates, analyses in Stata (version 17; StataCorp) used survey weights to account for the complex survey design and nonresponse. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[†††]

Results

Meeting Physical Activity Guidelines

Overall, an estimated 47.2% of women aged 18–44 years reported leisure-time physical activity that met neither aerobic nor muscle-strengthening physical activity guidelines, 25.1% reported activity that met both physical activity guidelines, 21.7% reported activity that met aerobic physical activity guidelines only, and 6.1% reported activity that met muscle-strengthening guidelines only (Table 1). Non-Hispanic Asian (Asian) women, non-Hispanic Black or African American (Black) women, and Hispanic or Latino (Hispanic) women were less likely to report leisure-time activity meeting both physical activity guidelines (20.4%, 21.4%, and 23.4%, respectively) compared with non-Hispanic White (White) women (27.6%). The prevalence of reporting activity meeting aerobic physical activity guidelines only was highest among White women (24.2%) compared with Black women (18.0%) and Hispanic women (18.5%).

[§] Data come from the Sample Adult questionnaire (National Health Interview Survey | National Health Interview Survey | CDC). Information for the final Sample Adult response rates can be found at Survey Description, National Health Interview Survey, 2022 and Survey Description, National Health Interview Survey, 2024.

[¶] Respondents with less than a high school diploma or equivalent were more likely to be missing data for moderate-to-vigorous aerobic physical activity than were respondents with some college or an associate, bachelor's, or graduate degree, and were more likely to be missing data for muscle-strengthening data than were respondents with a bachelor's or graduate degree. Non-Hispanic Black or African American respondents were more likely to be missing data for moderate-to-vigorous aerobic physical activity and more likely to be missing data for muscle-strengthening activities than were non-Hispanic American Indian or Alaska Native, non-Hispanic Asian, Hispanic or Latino, and non-Hispanic White respondents.

[**] Survey prompts for aerobic activity are available at 2024 National Health Interview Survey (NHIS) Questionnaire. The 2024 prompts were the same as those in 2022. Minutes of vigorous-intensity activity were multiplied by 2, as is standard practice, to be equivalent to moderate-intensity minutes. Frequency and duration of activity were multiplied to calculate minutes per week.

[††] The survey prompt for muscle-strengthening activity included the question regarding frequency of muscle-strengthening activity, "Including activities that you mentioned earlier, how often do you do leisure-time physical activities specifically designed to strengthen your muscles such as sit-ups, push-ups, or lifting weights?"

[§§] Meeting physical activity guidelines: ≥150 minutes per week of moderate intensity aerobic activity, ≥75 minutes per week of vigorous intensity aerobic activity, or an equivalent combination, and two or more sessions per week of muscle-strengthening activities. Meeting aerobic physical activity guidelines only: ≥150 minutes per week of moderate intensity aerobic activity, ≥75 minutes per week of vigorous intensity aerobic activity, or an equivalent combination. Meeting muscle-strengthening physical activity guidelines only: two or more sessions per week of muscle-strengthening activities. Meeting neither: <150 minutes per week of moderate intensity aerobic activity, <75 minutes per week of vigorous intensity aerobic activity, or an equivalent combination, and fewer than two sessions per week of muscle-strengthening activities.

[¶¶] Consistent with the physical activity guideline's classification, levels of moderate-to-vigorous aerobic physical activity include: 0 minutes per week (no moderate-to-vigorous aerobic physical activity), 1–149 minutes per week (insufficient moderate-to-vigorous aerobic physical activity), 150–300 minutes per week (sufficient moderate-to-vigorous aerobic physical activity), and >300 minutes per week (high moderate-to-vigorous aerobic physical activity).

[***] Levels of muscle-strengthening activities include: zero sessions per week (no muscle-strengthening activities), one session per week (insufficient muscle-strengthening activities), and two or more sessions per week (sufficient muscle-strengthening activities).

[†††] 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.

TABLE 1. Estimated prevalence of self-reported leisure-time physical activity meeting aerobic and muscle-strengthening physical activity guidelines among women aged 18–44 years, by race and ethnicity, age, and educational attainment* — National Health Interview Survey, United States, 2022 and 2024

Characteristic	Study population†		% (95% CI)			
	Unweighted no.	Weighted %	Meet neither	Meet both	Aerobic only	Muscle-strengthening only
Total	**10,891**	**100.0**	**47.2 (46.0–48.4)**	**25.1 (24.1–26.1)**	**21.7 (20.7–22.6)**	**6.1 (5.5–6.7)**
Race and ethnicity						
AI/AN, NH§	192	1.7	52.4 (43.7–60.9)	21.2 (14.9–29.2)	15.6 (10.1–23.1)	10.9 (6.6–17.6)
Asian, NH	869	6.8	51.5 (47.4–55.5)	20.4 (17.5–23.7)	22.2 (19.2–25.4)	6.0 (4.4–8.1)
Black or African American, NH	1,286	13.4	53.6 (50.4–56.8)	21.4 (18.8–24.2)	18.0 (15.7–20.7)	7.0 (5.5–8.7)
White, NH	5,910	53.3	42.7 (41.1–44.3)	27.6 (26.2–29.1)	24.2 (23.2–25.6)	5.5 (4.8–6.3)
Hispanic or Latino	2,369	22.3	51.9 (49.4–54.5)	23.4 (21.6–25.3)	18.5 (16.6–20.4)	6.2 (5.2–7.5)
Other single, multiple races	265	2.5	52.7 (44.9–60.4)	20.5 (15.3–26.8)	17.8 (12.7–24.5)	9.0 (5.4–14.5)
Age group, yrs						
18–24	1,778	25.1	44.4 (41.8–47.1)	27.8 (25.5–30.3)	22.0 (19.8–24.3)	5.7 (4.6–7.2)
25–29	1,971	18.2	46.1 (43.4–48.8)	26.2 (24.0–28.5)	22.0 (20.0–24.2)	5.7 (4.7–7.0)
30–34	2,382	19.5	49.2 (46.8–51.5)	23.2 (21.3–25.2)	20.7 (19.0–22.6)	6.9 (65.8–8.1)
35–39	2,923	22.3	48.6 (46.4–50.7)	24.2 (22.4–26.1)	21.2 (19.5–23.0)	6.1 (5.2–7.2)
40–44	1,837	14.9	48.7 (46.0–51.4)	22.7 (20.7–24.9)	22.6 (20.4–24.9)	6.0 (4.7–7.5)
Educational attainment						
Less than high school	729	9.0	63.2 (58.6–67.4)	13.2 (10.5–16.6)	18.6 (15.6–22.0)	5.0 (3.4–7.4)
High school diploma or GED certificate equivalent	2,288	23.7	56.3 (53.8–58.8)	17.1 (15.4–18.9)	21.3 (19.3–23.4)	5.3 (4.3–6.5)
Some college or associate degree	3,025	30.8	46.6 (44.6–48.6)	24.5 (22.8–26.3)	22.4 (20.7–24.2)	6.5 (5.5–7.7)
Bachelor's degree	3,021	23.5	38.0 (35.9–40.2)	33.4 (31.4–35.4)	22.5 (20.8–24.3)	6.1 (5.1–7.2)
Graduate degree or professional school	1,828	12.9	37.7 (35.2–40.2)	34.0 (31.7–36.4)	21.2 (19.2–23.3)	7.1 (5.9–8.6)

Abbreviations: AI/AN = American Indian or Alaska Native; GED = general educational development; NH = non-Hispanic.

* Physical activity guideline levels: meet neither = 0–149 minutes of moderate-to-vigorous aerobic activity and one or fewer sessions of muscle-strengthening activity per week; meet muscle-strengthening only = two or more sessions of muscle-strengthening activity and 0–149 minutes of moderate-to-vigorous aerobic activity per week; meet moderate-to-vigorous physical activity only = ≥150 minutes of moderate-to-vigorous physical activity and one or fewer muscle-strengthening activity sessions per week; and meet both aerobic and muscle-strengthening = ≥150 minutes of moderate-to-vigorous physical activity and two or more muscle-strengthening activity sessions per week.

† N = 10,891 unweighted and n = 56,087,223 weighted. Data weighted to account for National Health Interview Survey complex survey design and nonresponse.

§ Alone or in combination with another race.

Women with higher educational attainment were more likely to report activity meeting both physical activity guidelines. One third of women with a bachelor's (33.4%) or graduate degree (34.0%) reported activity meeting both physical activity guidelines compared with 17.1% of those with a high school diploma or equivalent and 13.2% of those who had completed less than high school.

Older women were less likely to report activity meeting both physical activity guidelines: whereas 27.8% of women aged 18–24 years reported activity meeting both physical activity guidelines, 23.2% and 22.7% of those aged 30–34, and 40–44 years, respectively, did so. The percentage of respondents who reported meeting muscle-strengthening physical activity guidelines only did not differ by demographic characteristics.

Levels of Physical Activity Participation

An estimated 55.3% of women aged 18–44 years reported engaging in no muscle-strengthening activity (Table 2). Sufficient and insufficient muscle-strengthening activity were reported by 31.1% and 13.6% of women, respectively. High, sufficient, insufficient, and no moderate-to-vigorous aerobic physical activity were reported by 26.4%, 20.3%, 30.0%, and 23.2% of women, respectively. Women with a bachelor's or graduate degree were more likely to report sufficient or high levels of moderate-to-vigorous aerobic physical activity than were those with a high school diploma or equivalent or less.

More White women reported sufficient muscle-strengthening activity (33.1%) than did Asian (26.4%) women. Women aged 18–24 years reported the lowest prevalences of no muscle-strengthening activity (50.5%); prevalence increased with increasing age. Prevalence of sufficient muscle-strengthening activity increased with educational attainment: the highest prevalence was reported by women with more education (41.2% among those who completed graduate school), and the lowest (18.3%) was reported by women with less than a high school education.

High levels of moderate-to-vigorous aerobic physical activity were more commonly reported by White women (30.0%) than by women who were Asian (19.7%), Black (22.3%), or Hispanic (23.3%). Younger women were also more likely to report high levels of moderate-to-vigorous aerobic physical activity: 30.0% of women aged 18–24 years and 29.2% of women aged 25–29 years reported high moderate-to-vigorous aerobic physical activity, compared with 23.3% of women aged

TABLE 2. Estimated prevalence of self-reported leisure-time aerobic and muscle-strengthening physical activity among women aged 18–44 years, by level of participation, race and ethnicity, age, and educational attainment — National Health Interview Survey, United States, 2022 and 2024

Characteristic	Study population*		% (95% CI)						
			Moderate-to-vigorous aerobic physical activity†				Muscle-strengthening activity§		
	Unweighted no.	Weighted %	None	Insufficient	Sufficient	High	None	Insufficient	Sufficient
Total	**10,891**	**100.0**	**23.2 (22.1–24.5)**	**30.0 (28.9–31.2)**	**20.3 (19.5–21.2)**	**26.4 (25.4–27.4)**	**55.3 (54.0–56.5)**	**13.6 (12.8–14.4)**	**31.1 (30.1–32.2)**
Race and ethnicity									
AI/AN, NH¶	192	1.7	25.7 (17.9–35.5)	37.5 (29.4–46.4)	14.7 (9.4–22.1)	22.1 (15.8–29.9)	55.1 (46.4–63.5)	12.8 (8.4–19.0)	32.1 (24.8–40.4)
Asian, NH	869	6.8	22.0 (18.7–25.6)	35.4 (32.0–39.0)	22.9 (19.8–26.4)	19.7 (16.8–22.9)	57.1 (53.0–61.2)	16.5 (13.7–19.7)	26.4 (23.1–30.0)
Black or African American, NH	1,286	13.4	31.1 (28.1–34.2)	29.5 (26.2–32.9)	17.2 (14.8–19.9)	22.3 (19.7–25.0)	59.9 (56.9–62.8)	11.7 (9.8–14.0)	28.4 (25.6–31.3)
White, NH	5,910	53.3	18.3 (16.9–19.7)	29.9 (28.5–31.3)	21.9 (20.7–23.2)	30.0 (28.5–31.4)	52.1 (50.4–53.8)	14.8 (13.7–15.9)	33.1 (31.6–34.7)
Hispanic or Latino	2,369	22.3	30.0 (27.6–32.5)	28.2 (26.1–30.4)	18.5 (16.6–20.5)	23.3 (21.3–25.5)	59.5 (57.1–61.9)	10.9 (9.5–12.4)	29.6 (27.6–31.7)
Other single, multiple races	265	2.5	28.8 (22.4–36.2)	32.8 (26.1–40.3)	15.8 (11.0–22.2)	22.5 (17.2–29.0)	54.6 (46.5–62.5)	16.0 (11.2–22.3)	29.4 (22.8–37.1)
Age group, yrs									
18–24	1,778	25.1	22.3 (20.6–25.4)	27.3 (24.8–29.9)	19.8 (17.8–21.9)	30.0 (27.7–32.5)	50.5 (47.8–53.3)	15.9 (14.0–18.0)	33.6 (31.1–36.1)
25–29	1,971	18.2	23.8 (21.6–26.1)	28.0 (25.7–30.5)	19.0 (17.2–21.0)	29.2 (26.8–31.7)	53.4 (50.8–55.9)	14.7 (12.9–16.8)	31.9 (29.5–34.4)
30–34	2,382	19.5	23.7 (21.6–26.0)	32.3 (30.2–34.6)	20.1 (18.3–21.9)	23.9 (22.0–25.9)	56.9 (54.6–59.3)	13.0 (11.6–14.5)	30.1 (27.9–32.3)
35–39	2,923	22.3	22.6 (20.7–24.6)	32.0 (30.1–34.0)	21.1 (19.3–22.9)	24.3 (22.6–26.1)	57.8 (55.6–59.9)	12.0 (10.6–13.4)	30.3 (28.3–32.3)
40–44	1,837	14.9	23.5 (21.2–26.0)	31.2 (28.7–33.8)	22.0 (19.9–24.3)	23.3 (21.2–25.5)	59.6 (56.8–62.3)	11.7 (10.1–13.5)	28.7 (26.3–31.2)
Educational attainment									
Less than high school	729	9.0	42.7 (38.3–47.2)	25.5 (21.9–29.4)	12.9 (10.4–16.0)	18.9 (15.8–22.5)	72.8 (68.6–76.7)	8.9 (6.8–11.7)	18.3 (15.0–22.1)
High school diploma or GED certificate equivalent	2,288	23.7	33.0 (30.6–35.6)	28.6 (26.4–30.9)	16.6 (14.9–18.5)	21.7 (19.8–23.8)	67.6 (65.3–69.8)	10.0 (8.7–11.5)	22.4 (20.6–24.3)
Some college or associate degree	3,025	30.8	22.5 (20.7–24.4)	30.6 (28.7–32.6)	19.5 (17.9–21.3)	27.4 (25.6–29.2)	55.0 (52.9–57.0)	14.0 (12.5–15.6)	31.0 (29.2–32.9)
Bachelor's degree	3,021	23.5	12.8 (11.5–14.3)	31.3 (29.3–33.2)	25.5 (23.8–27.3)	30.4 (28.5–32.3)	44.6 (42.4–46.8)	15.9 (14.4–17.6)	39.4 (37.3–41.6)
Graduate degree or professional school	1,828	12.9	12.6 (11.0–14.4)	32.2 (29.8–34.8)	24.5 (22.3–26.9)	30.6 (28.2–33.2)	40.5 (38.1–43.1)	18.3 (16.3–22.1)	41.2 (38.8–43.6)

Abbreviations: AI/AN = American Indian or Alaska Native; GED = general educational development; NH = non-Hispanic.
* N = 10,891 unweighted and n = 56,087,223 weighted. Data weighted to account for National Health Interview Survey complex survey design and nonresponse.
† Sufficiency of aerobic moderate-to-vigorous physical activity: none = 0 minutes per week, insufficient = 1–149 minutes per week, sufficient = 150–300 minutes per week, and high = >300 minutes per week.
§ Sufficiency of muscle-strengthening activity: none = zero sessions per week, insufficient = one session per week, and sufficient = two or more sessions per week.
¶ Alone or in combination with another race.

40–44 years. Pairwise comparisons highlighted differences among groups based on race and ethnicity, age, and highest level of educational attainment (Supplementary Table).

Discussion

Among U.S. women of reproductive age, approximately one fourth reported leisure-time activity meeting both aerobic and muscle-strengthening physical activity guidelines during 2022 and 2024. These findings align with a CDC National Center for Health Statistics data brief that found that 28.7% and 22.7% of women aged 18–34 and 35–44, respectively, met both physical activity guidelines in 2020 (*3*). Although the national prevalence of meeting physical activity guidelines has increased in recent decades (*4*), this report's estimates suggest that significant differences in level of leisure-time physical activity exist among women of reproductive age, with differences by race and ethnicity, age, and educational attainment. White women, younger women, and those with more educational attainment reported higher prevalences of engaging in sufficient or high moderate-to-vigorous aerobic physical activity, engaging in any muscle-strengthening physical activity, and meeting both physical activity guidelines. These findings

Summary

What is already known about this topic?

Physical activity has numerous health benefits for women of reproductive age. National guidelines include recommendations for both aerobic and muscle-strengthening physical activity.

What is added by this report?

In this 2022 and 2024 national survey, an estimated 25.1%, 21.7%, and 6.1% of U.S. women aged 18–44 years reported leisure time physical activity meeting recommendations for both aerobic and muscle-strengthening activity, aerobic activity only, and muscle-strengthening activity only, respectively; an estimated 47.2% reported leisure-time physical activity insufficient to meet either recommendation. Prevalences of aerobic and muscle-strengthening activity varied by race and ethnicity, age, and educational attainment.

What are the implications for public health practice?

Addressing possible population-specific barriers to physical activity among women could be an important strategy for improving health outcomes.

are consistent with those from previous research findings that leisure-time physical activity participation is lower among Black and Hispanic adults than among White adults and among those with less educational attainment than among those with more educational attainment (*4*).

Some groups with lower leisure-time physical activity participation, including Hispanic and Black adults and those with less educational attainment, also experience higher rates of chronic disease–associated morbidity and mortality (*5*,*6*). Given that physical activity can help to prevent or mitigate chronic diseases (*1*), focused interventions that increase physical activity, particularly among these groups, could help reduce preventable differences in health outcomes.

Physical activity also has numerous maternal health benefits, including lowering risk of preeclampsia and gestational diabetes (*1*,*2*). Safely increasing physical activity among women of reproductive age could be an important strategy for improving these and other pregnancy-related outcomes, including reducing the length of labor and postpartum recovery (*1*,*2*). Evidence suggests most adults maintain or reduce leisure-time physical activity as they age; therefore, establishing physical activity habits during early adulthood might attenuate decreases later in life (*7*).

Approximately one half of women of reproductive age did not participate in any muscle-strengthening activities, highlighting opportunities to promote this beneficial activity. Approximately one in four women reported activity meeting aerobic physical activity guidelines only, whereas approximately one in 15 reported activity meeting muscle-strengthening physical activity guidelines only, suggesting that moderate-to-vigorous aerobic physical activity might be more accessible or prioritized over muscle-strengthening activity. This might be related to barriers specific to muscle-strengthening activity, such as accessing weights or resistance bands, knowing proper techniques, or social perceptions (*8*). Incorporating muscle-strengthening activity into existing aerobic physical activity programs might increase participation in muscle-strengthening activity.

In the United States, access to physical activity opportunities and resources varies, with marked differences in open space, safely walkable neighborhoods, group exercise opportunities, gym equipment, and resources (e.g., free time, childcare, and social support), necessitating health promotion strategies that consider social and structural factors (*9*,*10*). Active People, Healthy Nation, CDC's national initiative to improve physical activity by 2027, promotes evidence-based strategies, including communications campaigns designed for different levels of educational attainment, to increase physical activity and address related differences in health outcomes. Tailored approaches (e.g., creating safe and convenient places for physical activity in underserved areas, including rural and low income counties, and developing walking groups or buddy systems (*1*)), might help address physical activity differences.

Limitations

The findings in this report are subject to at least three limitations. First, this cross-sectional study uses self-reported physical activity data, which are potentially subject to recall or social desirability bias. Second, NHIS asks about leisure-time physical activity only and does not account for other types (e.g., occupational physical activity), potentially underestimating participation in physical activity. Finally, smaller sample sizes, (e.g., among American Indian and Alaska Native women) might have limited statistical power to identify differences among groups. Reliability of estimates was not assessed, and some estimates might be unstable.

Implications for Public Health Practice

Nearly three fourths (74.9%) of U.S. women of reproductive age do not meet both physical activity guideline recommendations. Significant differences in meeting recommendations by race and ethnicity, age, and educational attainment underscore the value of addressing possible barriers to physical activity among specific groups, which could be an important strategy for improving health outcomes and reducing related differences in outcomes.

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