United States Government Accountability Office

Report to Congressional Committees

WORK HOURS AND HEALTH

Research Shows That Very Long Hours May Modestly Increase the Risk of Certain Health Outcomes

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Why GAO Did This Study

U.S. workers have a variety of work schedules. Some work long hours by choice or necessity. The Joint Explanatory Statement accompanying the Consolidated Appropriations Act, 2022 includes a provision for GAO to study trends in the work hours of U.S. workers. The Appropriations Committees expressed interest in understanding the relationship between long work hours and poor health outcomes.

This report addresses (1) how work hours for U.S. workers have changed over time, (2) how the characteristics of individuals who worked very long hours in recent years compare to those of standard full-time workers, and (3) research on the relationships between long work hours and health outcomes and behaviors.

GAO analyzed monthly data from the CPS, which is sponsored jointly by the U.S. Bureau of Labor Statistics and the U.S. Census Bureau, from 2003 through 2023. GAO analyzed data for employed workers ages 25 and over.

GAO also conducted a literature search for systematic reviews that synthesized the results of individual studies. GAO identified six reviews that examined the relationships between long work hours and health outcomes and behaviors that are common among U.S. adults (stroke, ischemic heart disease, type 2 diabetes, negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity), alcohol use, and depression). All six reviews met GAO's methodological standards. GAO also interviewed the experts who authored four of the six reviews.

View GAO-24-106772. For more information, contact Thomas Costa at (202) 512-4769 or costat@gao.gov.
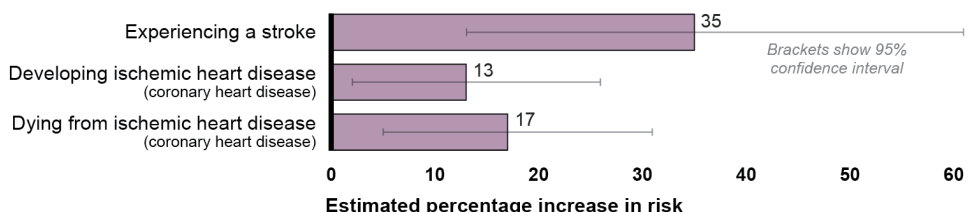
What GAO Found

From 2003 to 2023, average work hours for U.S. workers remained relatively stable at an estimated 38 to 39 hours per week but increased for older workers, according to GAO's analysis of Current Population Survey (CPS) data.

- **Age.** Average weekly hours for older workers (ages 65+) increased by about 3 hours (from about 29 to 32 hours), while average weekly hours for prime-age workers (ages 25-54) remained relatively stable (at about 39 hours). In 2023, older workers comprised about 7 percent of the workforce.

- **Gender.** Men's average weekly work hours decreased by about 1 hour (from about 41 to 40 hours), while women's average weekly work hours increased by nearly 1 hour (from about 35 to 36 hours).

- **Work schedule.** The percentage of workers who usually worked standard full-time hours (35 to 40 hours per week) increased, while the percentages of workers who usually worked long hours (41 or more hours per week) or very long hours (55 or more hours per week) decreased.

GAO also found that on average from 2018 through 2023, compared to individuals who worked standard full-time hours, individuals who worked very long hours were more likely to be male, White (non-Hispanic), have at least a bachelor's degree, earn higher wages, and have multiple jobs, among other differences. Among individuals who worked very long hours, those with multiple jobs were more likely than those with one job to be female, Black (non-Hispanic) or Hispanic, and earn middle or low wages.

The reviews GAO identified found that working very long hours may modestly increase the risk of stroke and ischemic heart disease (coronary heart disease), relative to working standard full-time hours (see figure). While reviews found associations between long work hours and increased risks of type 2 diabetes, negative weight-related outcomes, and increased alcohol use, they did not draw conclusions about whether long work hours caused these increased risks. In addition, a review on long work hours and the risk of depression found no evidence of an association between the two. The experts GAO interviewed said more research is needed on the relationships between long work hours and poor health outcomes and behaviors. This includes whether there is a causal relationship between them, and how health risks may differ based on the type of work, working conditions, and other factors such as age and income level.

Research Results: Increased Risk of Stroke and Heart Disease Associated with Working 55 or More Hours Per Week, Relative to Working 35-40 Hours Per Week

Source: GAO review of selected research: Descatha, A. et al (2020) and Li, J. et al (2020). | GAO-24-106772

United States Government Accountability Office

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GAO
U.S. GOVERNMENT ACCOUNTABILITY OFFICE

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Washington, DC 20548

September 11, 2024

The Honorable Tammy Baldwin
Chair
The Honorable Shelley Moore Capito
Ranking Member
Subcommittee on Labor, Health and Human Services, Education, and
Related Agencies
Committee on Appropriations
United States Senate

The Honorable Robert Aderholt
Chair
The Honorable Rosa DeLauro
Ranking Member
Subcommittee on Labor, Health and Human Services, Education, and
Related Agencies
Committee on Appropriations
House of Representatives

U.S. workers have a variety of work schedules, and some individuals
work long hours by choice or necessity. However, questions have been
raised about the effects of long work hours on health outcomes for
workers. The Joint Explanatory Statement accompanying the
Consolidated Appropriations Act, 2022 includes a provision for GAO to
study trends in the work hours of U.S. workers. The Appropriations
Committees expressed interest in understanding the relationship between
long work hours and poor health outcomes.

This report addresses (1) how work hours for U.S. workers have changed
over time, (2) how the characteristics of individuals who worked very long
hours in recent years compare to the characteristics of those who worked
standard full-time hours, and (3) research on the relationships between
long work hours and health outcomes and behaviors.

For the first and second objectives, we analyzed monthly data from the
Current Population Survey (CPS). The CPS, which is sponsored jointly by
the U.S. Bureau of Labor Statistics (BLS) and the U.S. Census Bureau, is
a monthly survey of a nationally representative sample of U.S.
households that includes data on employment, hours worked, wages, and
demographic information. To examine how work hours for U.S. workers
have changed over time, we analyzed data from 2003 to 2023 on (1)

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average actual work hours and (2) the percentage of workers who usually worked part-time hours, standard full-time hours, long hours, and very long hours.[1] To examine how the characteristics of individuals who worked very long hours in recent years compare to the characteristics of standard full-time workers, we analyzed data from 2018 through 2023.[2] We compared these two groups of workers by demographic characteristics including gender, age, race and ethnicity, education level, marital status, and parental status.[3] We also compared them by employment characteristics: wage group, industry, occupation, and number of jobs.[4]

Our analysis of CPS data is descriptive, and we did not control for any variables.[5] Because the CPS is a sample survey, all of the CPS analysis results presented in this report are estimates, and we express our

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[1]Data from 2023 were the most recent data available at the time of our analysis. We focused our analysis on wage and salary workers ages 25 and older who were employed at the time of the survey. In 2023, these workers comprised an estimated 77 percent of the overall workforce, or about 125 million workers, according to published BLS data. We defined part-time hours as less than 35 hours per week, standard full-time hours as between 35 and 40 hours per week, long hours as 41 or more hours per week, and very long hours as 55 or more hours per week. We defined very long hours as 55 or more hours per week to align with the highest work hour category used in most of the research we reviewed for our third objective. Our analysis of usual work hours primarily focuses on individuals who worked standard full-time hours and those who worked very long hours, but we include some information about individuals who worked part-time hours, those who worked long hours, and those who worked full time (at least 35 hours per week) and whose hours varied.

[2]We defined recent years as 2018 through 2023 to include multiple years prior to the COVID-19 pandemic, given that work schedules may have temporarily shifted during the pandemic.

[3]The CPS asks survey respondents to identify their sex (male or female). In this report, we use the term "gender" to refer to these data, and we generally use the terms "men" and "women" to refer to individuals who identified their sex as male or female, respectively. However, when referring to the characteristics of workers, we use the terms "male" and "female." The CPS does not ask about respondents' gender identity. In some cases, a respondent's gender identity may not align with the sex they identified in the CPS.

[4]For the purposes of our analysis, we defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the hourly wage distribution, middle-wage workers as those in the second through fourth wage quintiles (20 percent through 80 percent), and high-wage workers as those in the top wage quintile (top 20 percent).

[5]Because we did not control for factors that could influence work hours, we were not able to isolate potential causes of changes in work hours over time or differences in work hours between different groups.

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confidence in these estimates with a 95 percent confidence interval.[6] All of the differences that we discuss from our CPS analysis are significant at the 95 percent confidence level, unless otherwise noted. We assessed the reliability of the CPS data from 2003 to 2023 and determined that these data were sufficiently reliable for the purposes of our reporting objectives.[7]

For the third objective, we conducted a comprehensive literature search for systematic reviews that examined the relationship between long work hours and health outcomes and behaviors. We focused on systematic reviews because they provide a broad overview of individual studies on the potential health effects of long work hours.[8] We searched relevant databases to identify systematic reviews from peer-reviewed journals that were published between 2013 and 2023, including both U.S. and international publications. From an initial pool of 82 systematic reviews, we selected six that each included between 14 and 37 individual studies. Specifically, we excluded systematic reviews that did not meet our methodological standards, were duplicative, or did not examine health outcomes and behaviors that are common among adults in the U.S.[9]

The six systematic reviews we selected examined the relationships between long work hours and the following health outcomes and

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[6]For more information on how we constructed confidence intervals and our CPS analysis, see appendix I.

[7]Specifically, we reviewed documentation on the general design and methods of the CPS and on the specific elements of the data that we used in our analysis. We also completed our own electronic data testing to assess the accuracy and completeness of the data, and we interviewed knowledgeable BLS officials to confirm our understanding of the data. Because the definitions of occupational classifications changed over time, we limited the time period for our analysis of occupational data to 2020 to 2023 to ensure comparability across years. For consistency, we also limited the time period for our analysis of industry data to 2020 to 2023.

[8]A systematic review attempts to answer a specific research question by identifying, appraising, and synthesizing all the empirical evidence—such as published and unpublished studies by other researchers—that meets pre-specified eligibility criteria. Researchers conducting these reviews use explicit, systematic methods that aim to minimize bias and produce more reliable findings than individual studies.

[9]We excluded systematic reviews that focused on work-related injuries or chemical exposures, work-related fatigue or sleep disturbances, shift work, and other health outcomes that only affect specific populations. As part of our review process, we assessed whether the authors (1) used established criteria to review the potential for bias of individual studies, (2) assessed whether estimates varied by type of study research design, and (3) assessed whether estimates varied by different levels of work hours. For more information, see appendix I.

behaviors: (1) stroke, (2) ischemic heart disease (coronary heart disease), (3) type 2 diabetes, (4) negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity), (5) alcohol use, and (6) depression. Each systematic review we selected conducted a meta-analysis, which is a statistical method for combining the results of multiple individual studies. To provide context and further assess the results, we also interviewed the primary authors of four of the six selected systematic reviews, who are experts in their fields.[10] In this report, we also refer to systematic reviews as "reviews." For more information on our methodology, see appendix I.

We conducted this performance audit from April 2023 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Factors That May Influence Work Hours

A variety of factors may influence work hours, including individual circumstances and preferences, employer decisions and scheduling practices, and broader economic trends. For example, individuals may decide to work a certain number of hours based on their personal and family circumstances, including financial needs and caregiving responsibilities.[11] In addition, employers may schedule staff for a certain number of hours based on the employer's circumstances and needs, or based on particular staffing models and scheduling practices.[12] Broader economic trends can also play an important role, with overall work hours

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[10]We requested an interview of all six of the primary authors. Four of them responded to our request, and two did not respond.

[11]For example, one study found that from 1973 to 2014, women with children were less likely, on average, to work long hours (50 or more hours per week) than women without children, while men with children were more likely to work long hours than men without children. See Kim A. Weeden, Youngjoo Cha, and Mauricio Bucca, "Long Work Hours, Part-Time Work, and Trends in the Gender Gap in Pay, the Motherhood Wage Penalty, and the Fatherhood Wage Premium," *RSF: The Russell Sage Foundation Journal of the Social Sciences*, vol. 2, no. 4 (2016).

[12]For example, some employers may choose to employ a greater number of staff through part-time work, while others may choose to employ fewer staff whom they schedule for more hours.

tending to fall during economic downturns (e.g., recessions) and rise during economic expansions.[13] Finally, other factors can also influence work hours, such as labor policies, institutions (e.g., unions), and social norms, among others.

Description and Prevalence of Health Outcomes Examined in Selected Reviews

Table 1 provides information about the health outcomes examined in our selected systematic reviews, including a description of each outcome and its estimated prevalence among the U.S. adult population. The table includes those outcomes for which comparable prevalence information was readily available. Comparable information was not readily available for two of the four negative weight-related outcomes (weight gain and increased body mass index) examined in one review we identified, or for the health behavior (alcohol use) examined in another review we identified.

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[13]For example, one study notes that this pattern is well-established and explains that a reduction in hours due to economic downturns tends to affect workers who earn lower wages more than workers who earn higher wages. See John Pencavel, "Whose Preferences Are Revealed in Hours of Work?", *Economic Inquiry*, vol. 54, no. 1 (2016).

Table 1: Description and Estimated Prevalence of Health Outcomes Examined in Selected Systematic Reviews

Health outcome	Description	Estimated prevalence among U.S. adult population[a] (95% confidence interval)
Stroke	A stroke occurs when blood flow to the brain is blocked or there is sudden bleeding in the brain.	3.1% in 2018 (2.9, 3.3)[b]
Coronary heart disease (ischemic heart disease)	Coronary heart disease, also known as ischemic heart disease, occurs when arteries narrow and cannot deliver enough oxygen-rich blood to the heart. Coronary heart disease comprises about 60 percent of all heart disease cases in the United States, according to the CDC.	4.9% in 2022 (4.7, 5.2)[c]
Diabetes (including type 2 diabetes)[d]	Diabetes is a disease that occurs when the level of glucose (sugar) in the blood is too high. In type 2 diabetes, the body does not make enough insulin—a hormone that helps glucose get into cells to be used for energy—or does not use insulin well. Type 2 diabetes comprises about 90 to 95 percent of all diabetes cases in the United States, according to the CDC.	9.6% in 2022 (9.2, 10.0)[e]
Obesity and overweight[f]	Obesity is defined as when an individual's body mass index (BMI)—a measure of weight relative to height—is 30 and above.[g]	33.6% in 2022 (Median value reported with no confidence interval)[h]
	Overweight is defined as when an individual's BMI is 25 to 29.9.[g]	34.1% in 2022 (Median value reported with no confidence interval)[h]
Depression	Depression is a mood disorder that affects how a person feels, thinks, and handles daily activities (such as sleeping, eating, or working) for at least 2 weeks.	5.1% in 2022 (4.8, 5.5)[i]

Sources: U.S. Department of Health and Human Services' National Institutes of Health and Centers for Disease Control and Prevention (CDC). | GAO-24-106772

Note: All percentages in the table above are unadjusted estimates, and the confidence interval provides the range within which the true value is likely to lie with 95 percent confidence.

[a]Prevalence is the proportion of the population that has the condition in a certain time period, e.g., the proportion of individuals in 2024 who had ever been diagnosed with heart disease. The estimated prevalence values in the table are based on self-reported survey data, which do not include fatal cases and may not reflect the true prevalence of the condition. Prevalence values are for the general U.S. adult population and may differ for the working population.

[b]CDC National Health Interview Survey, 2018.

[c]National Health Interview Survey, 2022.

[d]The systematic review we selected examined type 2 diabetes.

[e]National Health Interview Survey, 2022. This prevalence estimate is for diabetes overall; comparable data were not readily available for type 2 diabetes.

[f]Obesity and overweight are two of several negative weight-related outcomes examined in the systematic review we selected, but the only two for which comparable prevalence data were readily available.

[g]A BMI score of 18.5 to 24.9 is considered normal.

[h]CDC Behavioral Risk Factor Surveillance System Prevalence and Trends Data, 2022.

[i]National Health Interview Survey, 2022.

Average Work Hours for U.S. Workers Have Remained Relatively Stable Since 2003 but Have Increased for Older Workers

Average Work Hours Have Remained Relatively Stable Since 2003 but Have Increased by About 3 Hours Per Week for Older Workers, among Other Trends

We found that, from 2003 to 2023, average work hours for U.S. workers remained relatively stable at an estimated 38 to 39 hours per week, with temporary decreases of about 1 hour per week during economic recessions, according to our analysis of CPS data (see fig. 1).[14] Our analysis focused on wage and salary workers—who were not self-employed—ages 25 and over.[15]

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[14]All of the differences that we discuss from our CPS analysis are significant at the 95 percent confidence level, unless otherwise noted. Workers report their work hours for the week preceding the survey. Our analysis includes workers who were employed but absent from work during this week. We count these workers' weekly work hours as zero. From 2003 to 2023, on average, 3.5 percent of workers were employed but absent from work during the week preceding the survey.

[15]We excluded younger workers from our analysis to focus on workers who are more likely to be financially independent and finished with their schooling. We also excluded self-employed workers because they generally have greater control over their work hours than workers with a traditional employer-employee relationship.

Figure 1: Estimated Average Weekly Work Hours for U.S. Workers, 2003 to 2023
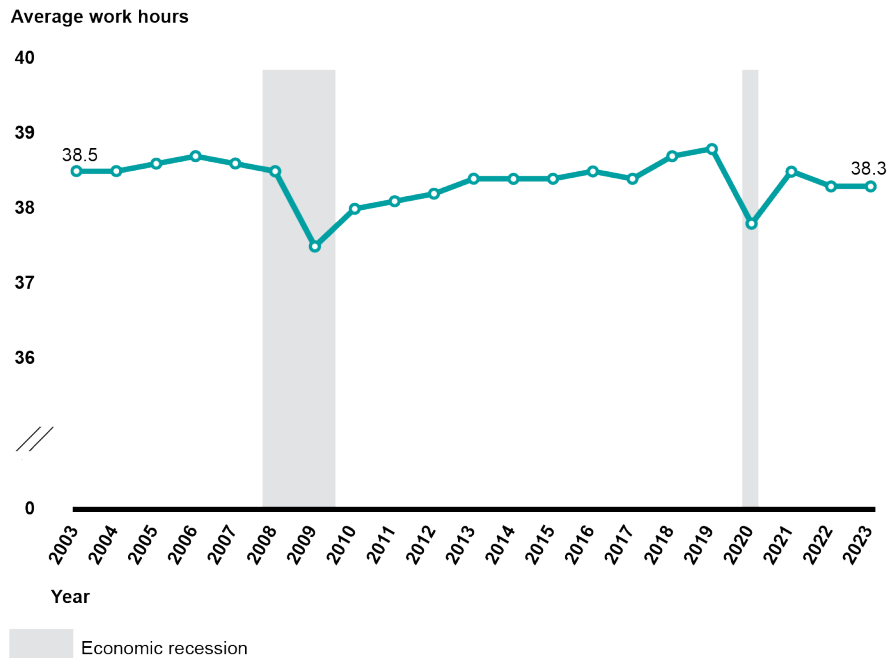
Average work hours

Year

Economic recession

Source: GAO analysis of Current Population Survey (CPS) data and presentation of National Bureau of Economic Research data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.1 hours at the 95 percent level of confidence.

While average work hours remained relatively stable for U.S. workers overall from 2003 to 2023, our analysis found different trends by gender, age, and wage group.

- **Gender.** Over this time period, men's average weekly work hours decreased by about 1 hour, while women's work hours increased by about 1 hour (see fig. 2).[16] However, on average, men still worked more hours than women.

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[16]These trends were similar when focusing only on prime-age workers (ages 25-54). We estimated that men comprised about 52 percent of wage and salary workers ages 25 and over during this time period, on average, while women comprised about 48 percent.

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Figure 2: Estimated Average Weekly Work Hours by Gender, 2003 to 2023
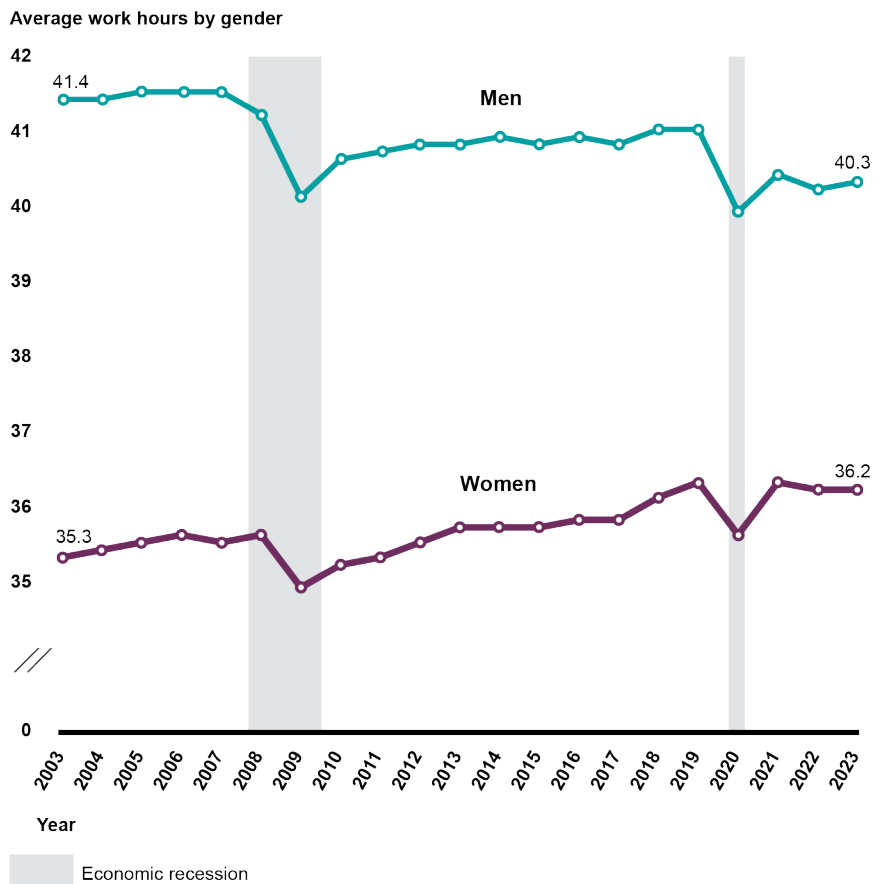
Average work hours by gender

Year

Economic recession

Source: GAO analysis of Current Population Survey (CPS) data and presentation of National Bureau of Economic Research data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.1 hours at the 95 percent level of confidence.

- **Age.** Over this time period, average weekly work hours for older workers (ages 65 and over) increased by about 3 hours per week, and work hours for workers ages 55-64 increased by about 1 hour per week, while work hours for prime-age workers (ages 25-54) remained

relatively stable (see fig. 3).[17] However, on average, prime-age workers still worked more hours than workers in other age groups.

Figure 3: Estimated Average Weekly Work Hours by Age, 2003 to 2023
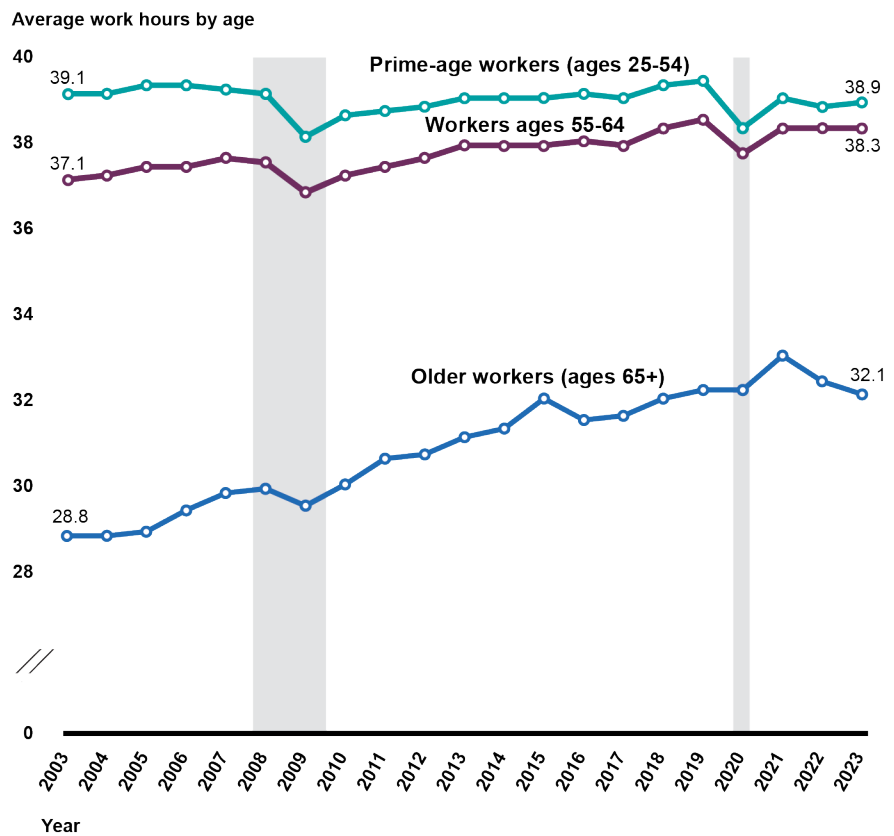
Average work hours by age

Economic recession

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.4 hours at the 95 percent level of confidence.

[17]The Bureau of Labor Statistics describes workers ages 25-54 as "prime-age" workers, but does not otherwise define this term. Other researchers note that these workers have for the most part finished their schooling and are not on the verge of retirement. We defined older workers as ages 65 and over because these workers are at or near retirement age. Our analysis found that, among wage and salary workers ages 25 and over, the percentage of older workers has more than doubled in recent decades, increasing from an estimated 3.2 percent (about 3.4 million workers) in 2003 to 6.7 percent (about 8.3 million workers) in 2023, with 95 percent confidence intervals of (3.2, 3.3) and (6.5, 6.8), respectively.

- **Wage group.** Over this time period, average work hours for low-wage and middle-wage workers remained relatively stable (see fig. 4).[18] In comparison, average weekly hours for high-wage workers remained relatively stable until 2019, but then declined by about 1 hour between 2019 and 2023.[19] However, on average, high-wage workers still worked more hours than middle-wage and low-wage workers.

[18]Average work hours for low-wage workers recovered at a slower rate from the Great Recession (2007-2009) than for other wage groups we examined. For the purposes of this report, we define low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers.

[19]These trends by wage group were similar when focusing only on prime-age workers (ages 25-54).

Figure 4: Estimated Average Weekly Work Hours by Wage Group, 2003 to 2023
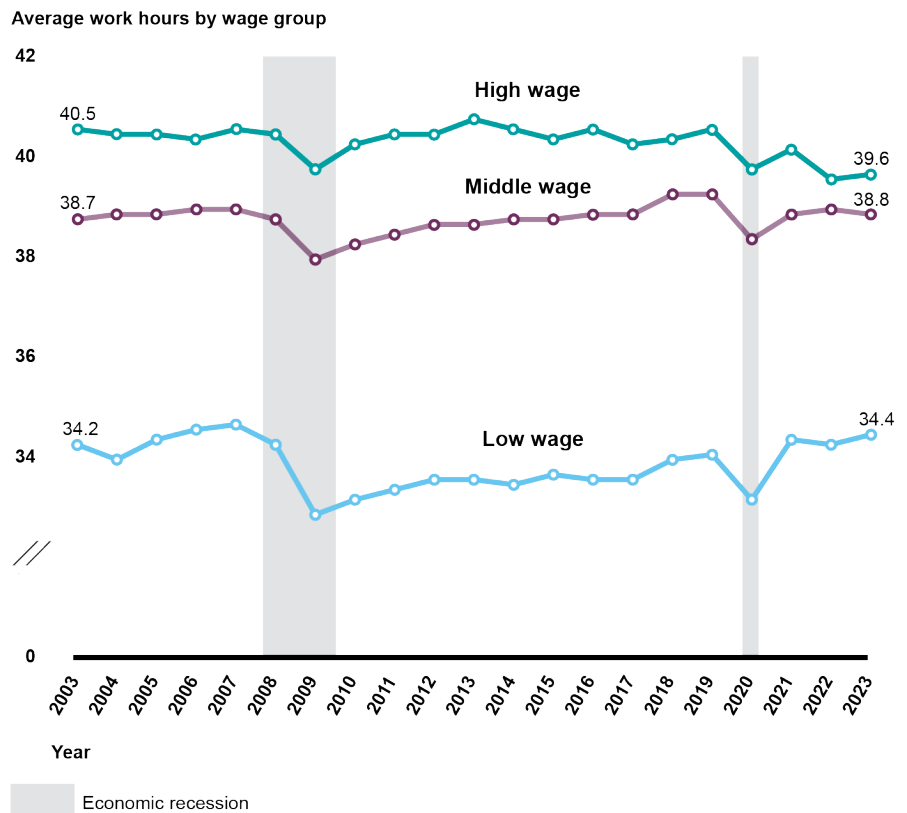
Average work hours by wage group

Economic recession

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.3 hours at the 95 percent level of confidence.

Since 2003, the Percentage of Workers Who Usually Work Standard Full-Time Hours Has Increased, While the Percentage Who Usually Work Long Hours Has Decreased

In examining trends in usual work schedules (see text box for definitions), we estimated that from 2003 to 2023, the percentage of workers who usually worked standard full-time hours increased by 6.2 percentage points, while the percentage of workers who usually worked long hours decreased by 2.6 percentage points (see fig. 5, which presents data for 2003, 2013, and 2023).[20] In addition, the percentage of workers who usually worked very long hours decreased by 1.1 percentage points over this time period.[21]

Definitions of Usual Work Schedules

For the purposes of this report, we use the following definitions of usual work schedules:

- **Part time**: Less than 35 hours per week.
- **Standard full time:** Between 35 and 40 hours per week.
- **Full time with variable hours:** At least 35 hours per week, but hours vary.
- **Long hours:** 41 or more hours per week.
- **Very long hours:** 55 or more hours per week (subset of the "long hours" category).

Source: GAO. | GAO-24-106772

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[20]The 95 percent confidence intervals for these estimates are (5.8, 6.5) and (2.4, 2.9), respectively. Between 2003 and 2023, the percentage of workers who usually worked part-time hours decreased, and the percentage of full-time workers whose usual hours varied also decreased, according to our estimates. In 2023, on average, an estimated 82.2 million workers usually worked standard full-time hours, 23.7 million workers usually worked long hours (including 7.8 million who usually worked very long hours), 14.4 million workers usually worked part-time hours, and 4.6 million workers usually worked full-time but their hours varied. The 95 percent confidence intervals for these population estimates are (81.4, 82.9), (23.4, 24.0), (7.7, 8.0), (14.1, 14.6), and (4.4, 4.7) million, respectively.

[21]The 95 percent confidence interval for this estimate is (0.9, 1.3). For the percentages of workers in each state who usually worked very long hours and standard full-time hours in recent years, see appendix II.

Figure 5: Estimated Percentage of Workers by Usual Work Schedule in 2003, 2013, and 2023
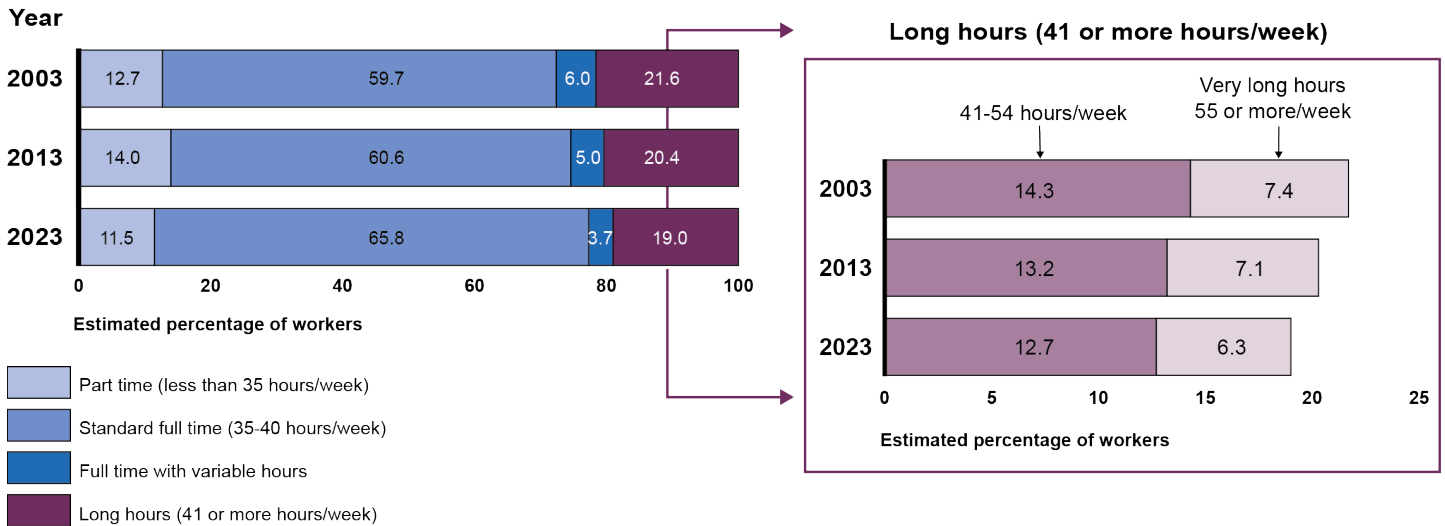
Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. Percentages are rounded to the nearest tenth and individual percentages may not sum to totals due to rounding. The "full time with variable hours" category comprises workers who usually work at least 35 hours per week but who reported that their weekly hours vary. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.3 percentage points at the 95 percent level of confidence.

While the percentage of workers who usually worked very long hours decreased overall, we found different trends by gender, age, and wage group. Specifically, as shown in figure 6, we estimated that from 2003 to 2023:

- **Gender.** The percentage of men who usually worked very long hours decreased by 2.4 percentage points, while the percentage of women who usually worked very long hours increased by 0.2 percentage points;[22]

- **Age.** The percentage of prime-age workers who usually worked very long hours decreased by 1.3 percentage points, while the percentage of older workers who usually worked very long hours increased by 1.4 percentage points;[23] and

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[22]The 95 percent confidence intervals for these estimates are (2.1, 2.6) and (0.0, 0.4), respectively.

[23]The 95 percent confidence intervals for these estimates are (1.1, 1.5) and (0.8, 2.0), respectively.

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- **Wage group.** The percentage of high-wage workers who usually worked very long hours decreased by 3.3 percentage points, while the percentage of middle-wage workers who usually worked very long hours decreased by 0.4 percentage points.[24] The percentage of low-wage workers who worked very long hours was similar in 2003 and 2023.[25]

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[24]The 95 percent confidence intervals for these estimates are (2.8, 3.8) and (0.1, 0.7), respectively.

[25]While we estimated that the percentage of low-wage workers who worked very long hours decreased from 2003 to 2023, this change was not statistically significant.

Figure 6: Estimated Percentage of Workers Who Usually Worked Very Long Hours (55 or More Hours Per Week), by Selected Characteristics, in 2003, 2013, and 2023
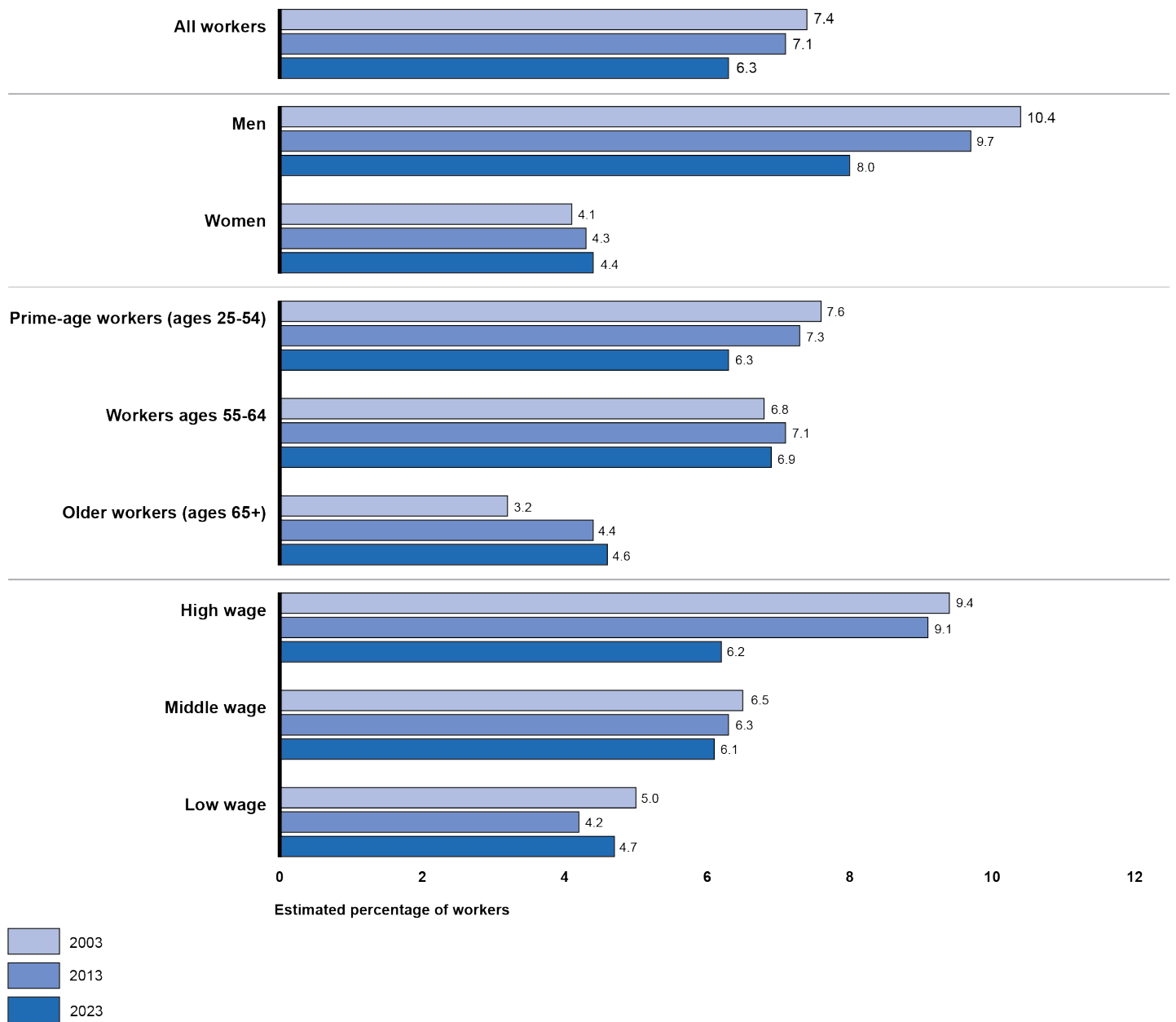
All workers
- 7.4
- 7.1
- 6.3

Men
- 10.4
- 9.7
- 8.0

Women
- 4.1
- 4.3
- 4.4

Prime-age workers (ages 25-54)
- 7.6
- 7.3
- 6.3

Workers ages 55-64
- 6.8
- 7.1
- 6.9

Older workers (ages 65+)
- 3.2
- 4.4
- 4.6

High wage
- 9.4
- 9.1
- 6.2

Middle wage
- 6.5
- 6.3
- 6.1

Low wage
- 5.0
- 4.2
- 4.7

Estimated percentage of workers

(x-axis: 0, 2, 4, 6, 8, 10, 12)

Legend:
- 2003
- 2013
- 2023

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. Percentages are rounded to the nearest tenth. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers

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as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers. All estimates in this figure are annual averages and have a margin of error no greater than plus or minus 0.4 percentage points at the 95 percent level of confidence. Differences between the percentages of workers who usually worked very long hours in 2003 and 2023 were statistically significant at the 95 percent confidence level for all groups except workers ages 55-64 and low-wage workers.

Individuals Who Worked Very Long Hours in Recent Years Differed from Standard Full-Time Workers on Characteristics including Gender, Education, and Number of Jobs

Individuals Who Worked Very Long Hours Were More Likely than Standard Full-Time Workers to Be Male, White, and Highly Educated, among Other Demographic Differences

We estimated that more than 8 million wage and salary workers ages 25 and over usually worked very long hours (55 or more hours per week), on average from 2018 through 2023, based on our analysis of CPS data. These individuals, on average, worked about 59 hours per week. We examined how these individuals were similar to or different from those who usually worked standard full-time hours (35 to 40 hours per week). Specifically, we compared the demographic and employment characteristics of these two groups of workers.

We found that individuals who usually worked very long hours differed from those who usually worked standard full-time hours on characteristics including gender, race and ethnicity, and education level. As shown in figure 7, on average from 2018 through 2023, individuals who usually worked very long hours were more likely to be:

- **Male.** Men comprised 67.8 percent of individuals who usually worked very long hours, compared to 51.9 percent of those who worked standard full-time hours.[26]

- **White (non-Hispanic).** White (non-Hispanic) workers comprised 67.5 percent of individuals who usually worked very long hours, compared to 57.6 percent of those who worked standard full-time hours.[27]

- **Highly educated.** Workers with a bachelor's degree or higher comprised 48.9 percent of those who usually worked very long hours, compared to 42.7 percent of those who worked standard full-time hours.[28]

Additionally, individuals who usually worked very long hours were more likely to be veterans and more likely to be born in the United States, compared to those who worked standard full-time hours.[29]

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[26]Men comprised 52.2 percent of all wage and salary workers ages 25 and over, on average from 2018 to 2023, with a 95 percent confidence interval of (52.0, 52.3).

[27]White (non-Hispanic) workers comprised 61.2 percent of all wage and salary workers ages 25 and over, on average from 2018 to 2023, with a 95 percent confidence interval of (61.0, 61.4).

[28]Workers with a bachelor's degree or higher comprised 43.4 percent of all wage and salary workers ages 25 and over, on average from 2018 to 2023, with a 95 percent confidence interval of (43.2, 43.5). We also examined differences by detailed education level and found that individuals who usually worked very long hours were more likely than those who worked standard full-time hours to have an advanced degree (23.3 and 15.6 percent, respectively) or some college but no degree (14.6 and 14.2 percent, respectively). However, they were less likely than those who worked standard full-time hours to have a high school diploma or the equivalent (21.5 and 25.6 percent, respectively), less than a high school diploma (4.6 and 6.4 percent, respectively), a bachelor's degree only (25.6 and 27.0 percent, respectively), or an associate's degree (10.4 and 11.1 percent, respectively). All estimates have a margin of error no greater than plus or minus 0.4 percentage points at the 95 percent level of confidence.

[29]Specifically, veterans comprised 8.1 percent of individuals who usually worked very long hours, compared to 6.0 percent of those who worked standard full-time hours, with 95 percent confidence intervals of (7.9, 8.4) and (5.9, 6.1), respectively. Individuals born in the U.S. comprised 85.1 percent of those who usually worked very long hours, compared to 79.6 percent of those who worked standard full-time hours, with 95 percent confidence intervals of (84.7, 85.4) and (79.4, 79.8). With regard to age, the differences were smaller between individuals who usually worked very long hours and those who usually worked standard full-time hours. For example, prime-age workers (ages 25-54) comprised an estimated 75.5 percent of individuals who usually worked very long hours, compared to 76.8 percent of those who usually worked a standard full-time schedule, with 95 percent confidence intervals of (75.1, 75.9) and (76.6, 77.0), respectively. For the percentage of individuals who usually worked very long hours and the percentage who usually worked standard full-time hours by each demographic characteristic, see appendix III.

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Figure 7: Comparison of Individuals Who Usually Worked Very Long Hours and Those Who Worked Standard Full-Time Hours, by Selected Demographic Characteristics, on Average from 2018 through 2023
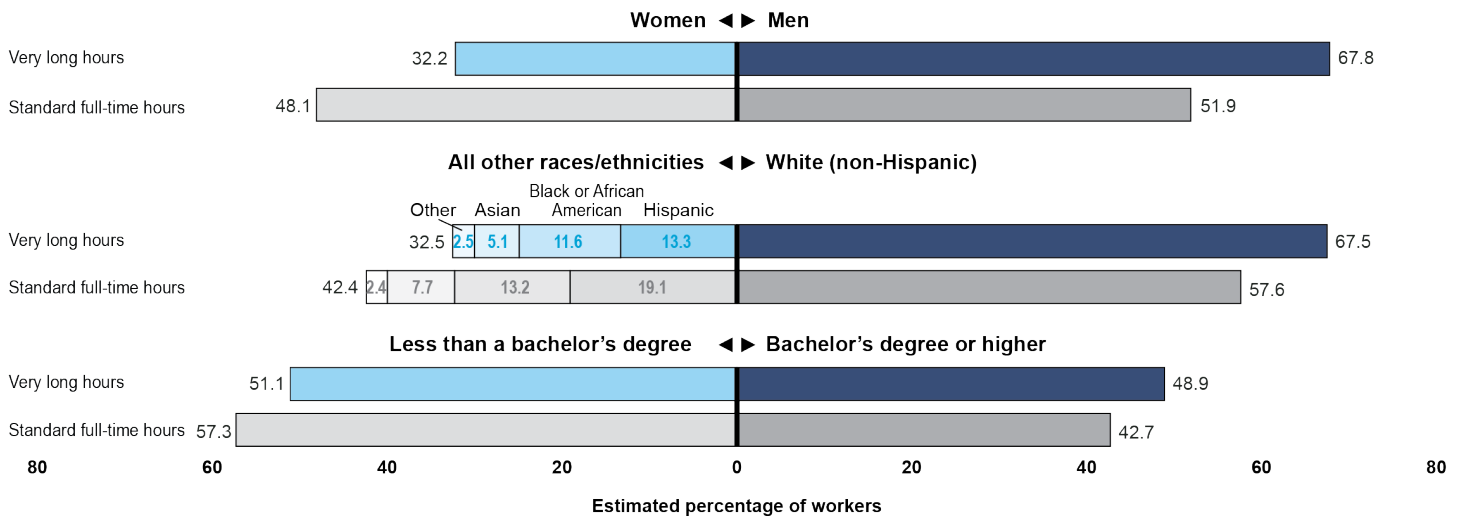
Women ◄ ► Men

	Women	Men
Very long hours	32.2	67.8
Standard full-time hours	48.1	51.9

All other races/ethnicities ◄ ► White (non-Hispanic)

Other Asian Black or African American Hispanic

	Other	Asian	Black or African American	Hispanic	White (non-Hispanic)
Very long hours	32.5 (2.5)	5.1	11.6	13.3	67.5
Standard full-time hours	42.4 (2.4)	7.7	13.2	19.1	57.6

Less than a bachelor's degree ◄ ► Bachelor's degree or higher

	Less than a bachelor's degree	Bachelor's degree or higher
Very long hours	51.1	48.9
Standard full-time hours	57.3	42.7

80   60   40   20   0   20   40   60   80

Estimated percentage of workers

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. For the purposes of this report, we define very long hours as 55 or more hours per week and standard full-time hours as 35-40 hours per week. The Asian, Black or African American, Other, and White categories include only non-Hispanic respondents. The Hispanic category includes Hispanic or Latino respondents of any race. The Other category includes the following groups, which we combined due to small sample sizes: American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and Multiracial. All estimates in this figure have a margin of error no greater than plus or minus 0.5 percentage points at the 95 percent level of confidence. Differences between the percentage of workers who usually worked very long hours and the percentage who worked standard full-time hours were statistically significant at the 95 percent confidence level for all groups except for the Other category.

We found that individuals who usually worked very long hours differed from those who usually worked standard full-time hours with respect to their marital status, with additional differences by gender (see fig. 8). We also found differences between these two groups of workers by parental status and gender.

- **Marital status.** Overall, individuals who were married comprised 62.0 percent of those who usually worked very long hours, compared to 58.5 percent of those who worked standard full-time hours. Married men made up a larger percentage of individuals who worked very long hours than of those who worked standard full-time hours. In contrast, married women made up a smaller percentage of individuals who worked very long hours than of those who worked standard full-time hours.

- **Parental status.** Overall, individuals who had at least one child under age 18 in the household comprised 36.3 percent of those who usually worked very long hours, compared to 35.8 percent of those who worked standard full-time hours. Fathers made up a larger percentage of individuals who worked very long hours than of those who worked standard full-time hours. In contrast, mothers made up a smaller percentage of individuals who worked very long hours than of those who worked standard full-time hours.

Figure 8: Comparison of Individuals Who Usually Worked Very Long Hours and Those Who Worked Standard Full-Time Hours, by Marital and Parental Status, and Gender, on Average from 2018 through 2023
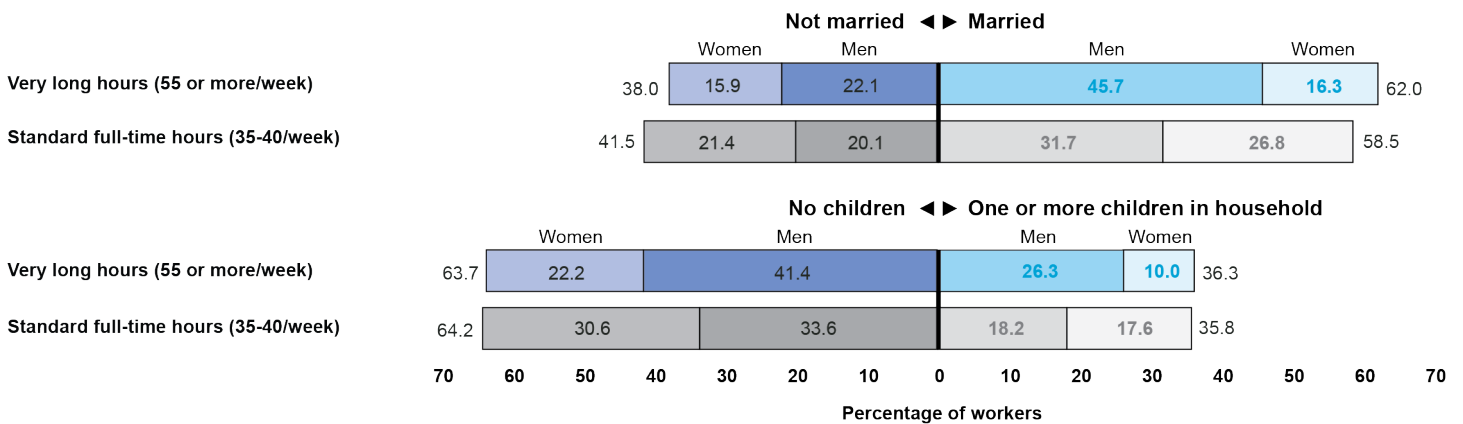
Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. Individual percentages may not sum to totals due to rounding. All estimates in this figure have a margin of error no greater than plus or minus 0.5 percentage points at the 95 percent level of confidence. Differences between the percentage of workers who usually worked very long hours and the percentage who worked standard full-time hours were statistically significant at the 95 percent confidence level for all groups in this figure.

Individuals Who Worked Very Long Hours Were More Likely than Standard Full-Time Workers to Earn High Wages, Work in Certain Industries and Occupations, and Have Multiple Jobs

We found that, in recent years, individuals who usually worked very long hours also differed from those who worked standard full-time hours across various employment characteristics. Specifically, they were more likely to earn high wages, work in certain industries and occupations, and have multiple jobs.[30]

Wage group. From 2018 through 2023, on average, high-wage workers comprised 26.1 percent of individuals who usually worked very long hours, compared to 22.4 percent of those who worked standard full-time hours (see fig. 9).

Figure 9: Comparison of Individuals Who Usually Worked Very Long Hours and Those Who Worked Standard Full-Time Hours, by Wage Group, on Average from 2018 through 2023

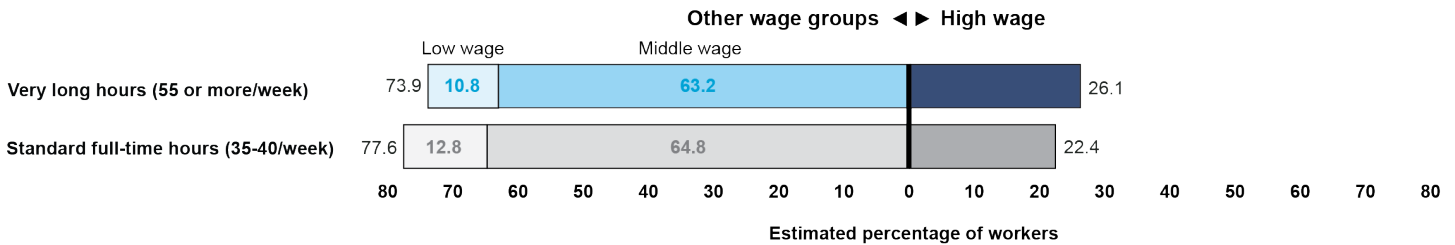Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. Individual percentages may not sum to totals due to rounding. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers. All estimates in this figure have a margin of error no greater than plus or minus 0.5 percentage points at the 95 percent level of confidence. Differences between the percentage of workers who usually worked very long hours and the percentage who worked standard full-time hours were statistically significant at the 95 percent confidence level for all wage groups.

Industry. From 2020 through 2023, on average, individuals who usually worked very long hours were more likely to be in certain industries, compared to those who worked standard full-time hours (see fig. 10).[31] For example, workers in the Transportation and Utilities industry

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[30]For the percentage of individuals who usually worked very long hours and the percentage who worked standard full-time hours by each employment characteristic, see appendix III.

[31]We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. In the CPS, the industry classification reflects the business activity of the employer or company where an individual is employed, while the occupational classification reflects the type of job or work that the person does.

comprised 9.6 percent of individuals who usually worked very long hours, compared to 6.0 percent of those who worked standard full-time hours.

Figure 10: Comparison of Individuals Who Usually Worked Very Long Hours and Those Who Worked Standard Full-Time Hours, by Industry, on Average from 2020 through 2023

Estimated percentage of very long hours/standard full-time workers

- Very long hours (55 or more/week)
- Standard full-time hours (35-40/week)

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. All estimates in this figure have a margin of error no greater than plus or minus 0.4 percentage points at the 95 percent level of confidence. Differences between the percentage of workers who usually worked very long hours and the percentage who usually worked standard full-time hours were statistically significant at the 95 percent confidence level for all industries except Manufacturing, Educational Services, Leisure and Hospitality, Other Services, and Information.

Occupation. From 2020 through 2023, on average, individuals who usually worked very long hours were also more likely to be in certain occupations, compared to those who worked standard full-time hours (see fig. 11). For example, workers in Management, Business, and Financial occupations comprised 25.9 percent of individuals who usually worked very long hours, compared to 18.2 percent of those who worked standard full-time hours.

Figure 11: Comparison of Individuals Who Usually Worked Very Long Hours and Those Who Worked Standard Full-Time Hours, by Occupation, on Average from 2020 through 2023

Occupation	Very long hours (55 or more/week)	Standard full-time hours (35-40/week)
Management, business, and financial	25.9	18.2
Professional and related	25.7	27.7
Service	11.3	12.6
Transportation and material moving	9.9	6.6
Sales and related	8.1	7.3
Office and administrative support	5.9	12.0
Production	4.9	6.2
Construction and extraction	4.3	5.3
Installation, maintenance, and repair	3.1	3.5
Farming, fishing, and forestry	1.0	0.6

Estimated percentage of very long hours/standard full-time workers

Very long hours (55 or more/week)

Standard full-time hours (35-40/week)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. All estimates in this figure have a margin of error no greater than plus or minus 0.5 percentage points at the 95 percent level of confidence. Differences between the percentage of workers who usually worked very long hours and the percentage who worked standard full-time hours were statistically significant at the 95 percent confidence level for all occupations.
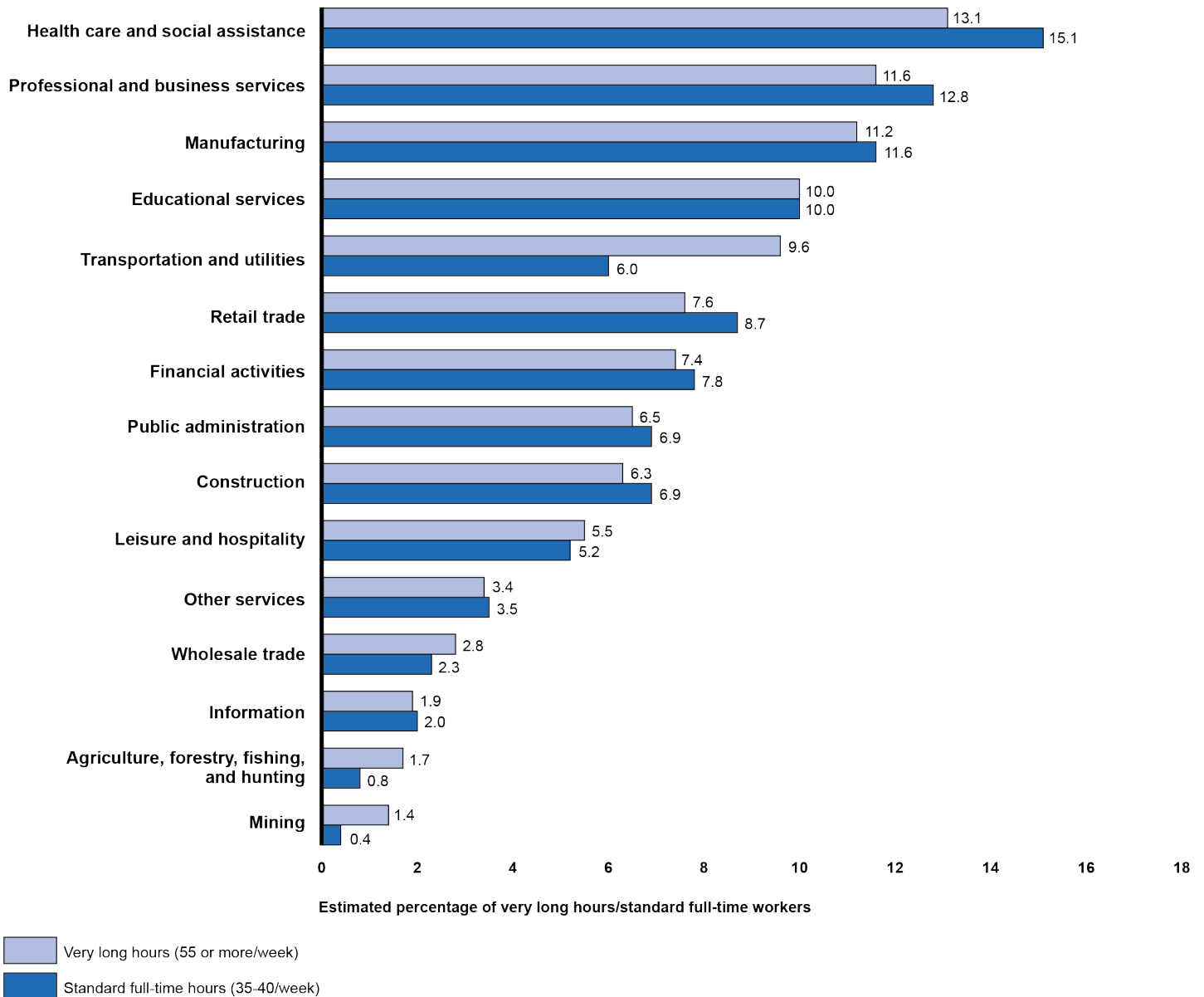
Number of jobs. From 2018 through 2023, on average, individuals with multiple jobs comprised about 28 percent of those working very long hours, compared to less than 1 percent of standard full-time workers.[32]

Among Individuals Who Worked Very Long Hours, Those with Multiple Jobs Were More Likely than Those with One Job to Be Female, Black or Hispanic, and Lower-Earning

Among individuals who usually worked very long hours in recent years, those with multiple jobs differed from those with one job across various demographic and employment characteristics. As shown in figure 12, we estimated that on average from 2018 through 2023, those with multiple jobs were more likely to:

- **Be female.** Among individuals who usually worked very long hours, women comprised 42.8 percent of those with multiple jobs, compared to 28.1 percent of those with one job.

- **Be Black or Hispanic.** Among individuals who usually worked very long hours, Black or African American (non-Hispanic) workers comprised 18.8 percent of those with multiple jobs, compared to 8.8 percent of workers with one job. In addition, Hispanic or Latino workers comprised 14.6 percent of those with multiple jobs, compared to 12.9 percent of those with one job.[33]

- **Be prime-age workers.** Among individuals who usually worked very long hours, prime-age workers (ages 25-54) comprised 78.9 percent of those with multiple jobs, compared to 74.3 percent of those with one job.

- **Have less than a bachelor's degree.** Among individuals who usually worked very long hours, workers with less than a bachelor's degree

[32]The CPS measures whether a worker holds multiple jobs based on the number of jobs or businesses the individual reported having during the week preceding the survey. We previously reported that some studies found that this measure may undercount multiple jobs from nonstandard work arrangements, such as gig or informal work. See GAO, *Work Arrangements: Improved Collaboration Could Enhance Labor Force Data*, GAO-24-105651 (Washington, D.C.: December 12, 2023). Also see Mary Dorinda Allard and Anne E. Polivka, "Measuring labor market activity today: are the words work and job too limiting for surveys?" *Monthly Labor Review* (November 2018).

[33]CPS respondents who identify as Hispanic or Latino can be of any race. Additionally, among individuals who usually worked very long hours, workers who were American Indian or Alaska Native (non-Hispanic), Native Hawaiian or Other Pacific Islander (non-Hispanic), and Multiracial (non-Hispanic) comprised a combined 3.1 percent of those with multiple jobs, compared to 2.3 percent of those with one job.

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comprised 54.3 percent of those with multiple jobs, compared to 49.9 percent of those with one job.[34]

- **Earn low or middle wages.** Among individuals who usually worked very long hours, those with multiple jobs were more likely than those with one job to earn low wages (13.1 and 9.9 percent, respectively) or middle wages (66.0 and 62.1 percent, respectively).[35]

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[34]Within these overall categories, those with multiple jobs were more likely than those with one job to have an associate's degree (13.7 and 9.1 percent, respectively) or some college but no degree (16.7 and 13.7 percent, respectively). However, they were less likely than those with one job to have an advanced degree (19.8 and 24.7 percent, respectively), a high school diploma or the equivalent (19.9 and 22.1 percent, respectively), or less than a high school diploma (3.9 and 4.9 percent, respectively). All estimates have a margin of error no greater than plus or minus 0.7 percentage points at the 95 percent level of confidence.

[35]For workers with multiple jobs, we measured their wages based on the job in which they usually worked the greatest number of hours.

Figure 12: Individuals Who Usually Worked Very Long Hours, by Number of Jobs and Selected Characteristics, on Average from 2018 through 2023
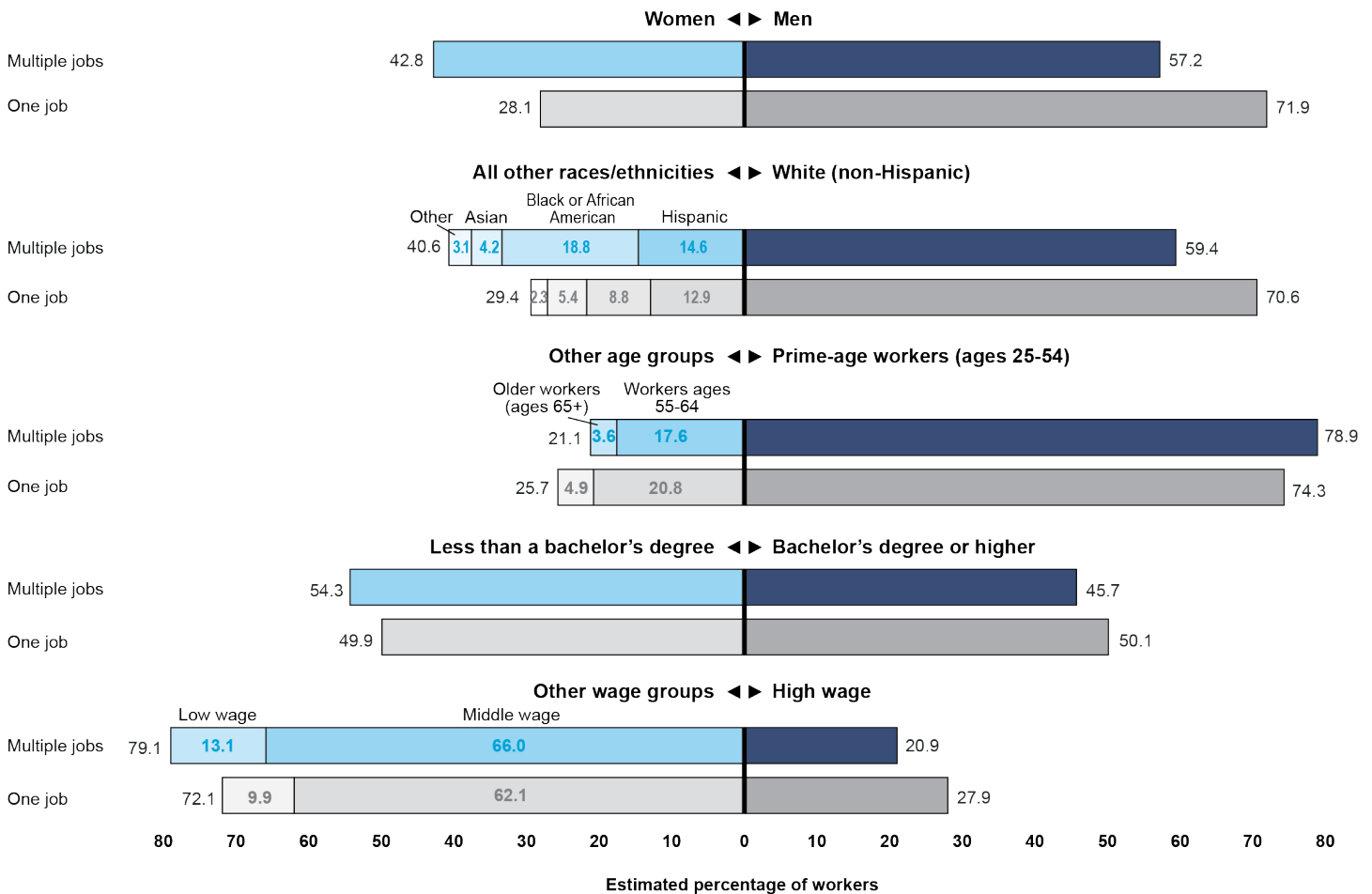
Women ◄ ► Men

Multiple jobs	42.8	57.2
One job	28.1	71.9

All other races/ethnicities ◄ ► White (non-Hispanic)

Other | Asian | Black or African American | Hispanic

Multiple jobs	40.6 3.1 4.2 18.8 14.6	59.4
One job	29.4 2.3 5.4 8.8 12.9	70.6

Other age groups ◄ ► Prime-age workers (ages 25-54)

Older workers (ages 65+) | Workers ages 55-64

Multiple jobs	21.1 3.6 17.6	78.9
One job	25.7 4.9 20.8	74.3

Less than a bachelor's degree ◄ ► Bachelor's degree or higher

Multiple jobs	54.3	45.7
One job	49.9	50.1

Other wage groups ◄ ► High wage

Low wage | Middle wage

Multiple jobs	79.1 13.1 66.0	20.9
One job	72.1 9.9 62.1	27.9

80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80

Estimated percentage of workers

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. Individual percentages may not sum to totals due to rounding. The Asian, Black or African American, Other, and White categories include only non-Hispanic respondents. The Hispanic category includes Hispanic or Latino respondents of any race. The Other category includes the following groups, which we combined due to small sample sizes: American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, and Multiracial. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers. For workers with multiple jobs, we measured their wages based on the job in which they usually worked the greatest number of hours. All estimates in this figure have a margin of error no greater than plus or minus 1.0 percentage point at the 95 percent level of confidence. Differences between the percentage of workers who had multiple jobs and the percentage who had one job were statistically significant at the 95 percent confidence level for all groups in this figure.

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Industry. Among individuals who usually worked very long hours in recent years, those with multiple jobs were more likely than those with one job to work in certain industries.[36] For example, on average from 2020 through 2023, those with multiple jobs were more likely than those with one job to work in the Health Care and Social Assistance industry (17.6 and 11.3 percent, respectively) and Educational Services industry (14.4 and 8.2 percent, respectively). See figure 13.

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[36]For workers with multiple jobs, we measured their industry based on the job in which they usually worked the greatest number of hours.

Figure 13: Individuals Who Usually Worked Very Long Hours, by Number of Jobs and Industry, on Average from 2020 through 2023

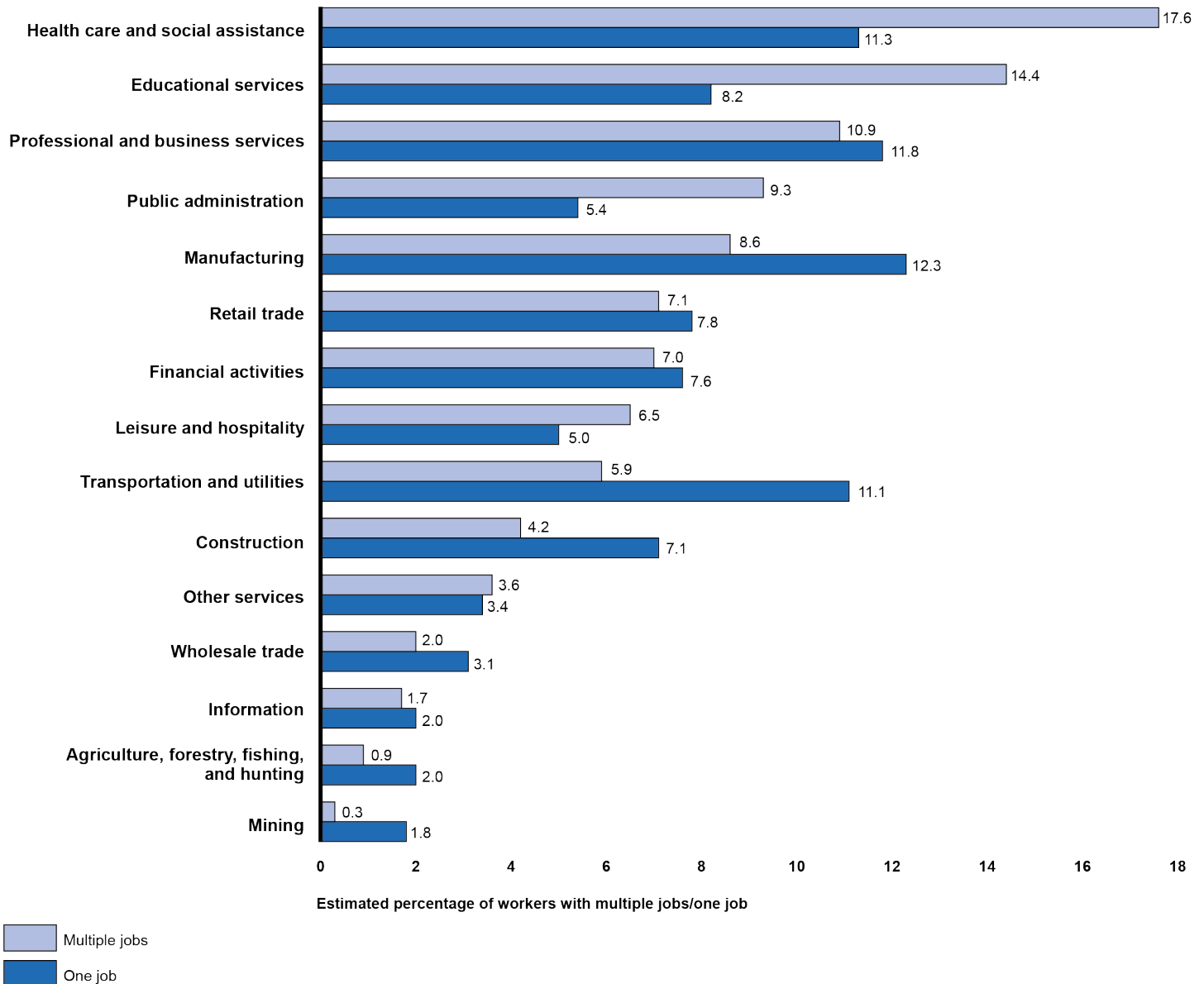Estimated percentage of workers with multiple jobs/one job

Multiple jobs

One job

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. For workers with multiple jobs, we measured their industry based on the job in which they usually worked the greatest number of hours. All estimates in this figure have a margin of error within plus or minus 0.8 percentage points at the 95 percent confidence level. Differences between the percentage of workers
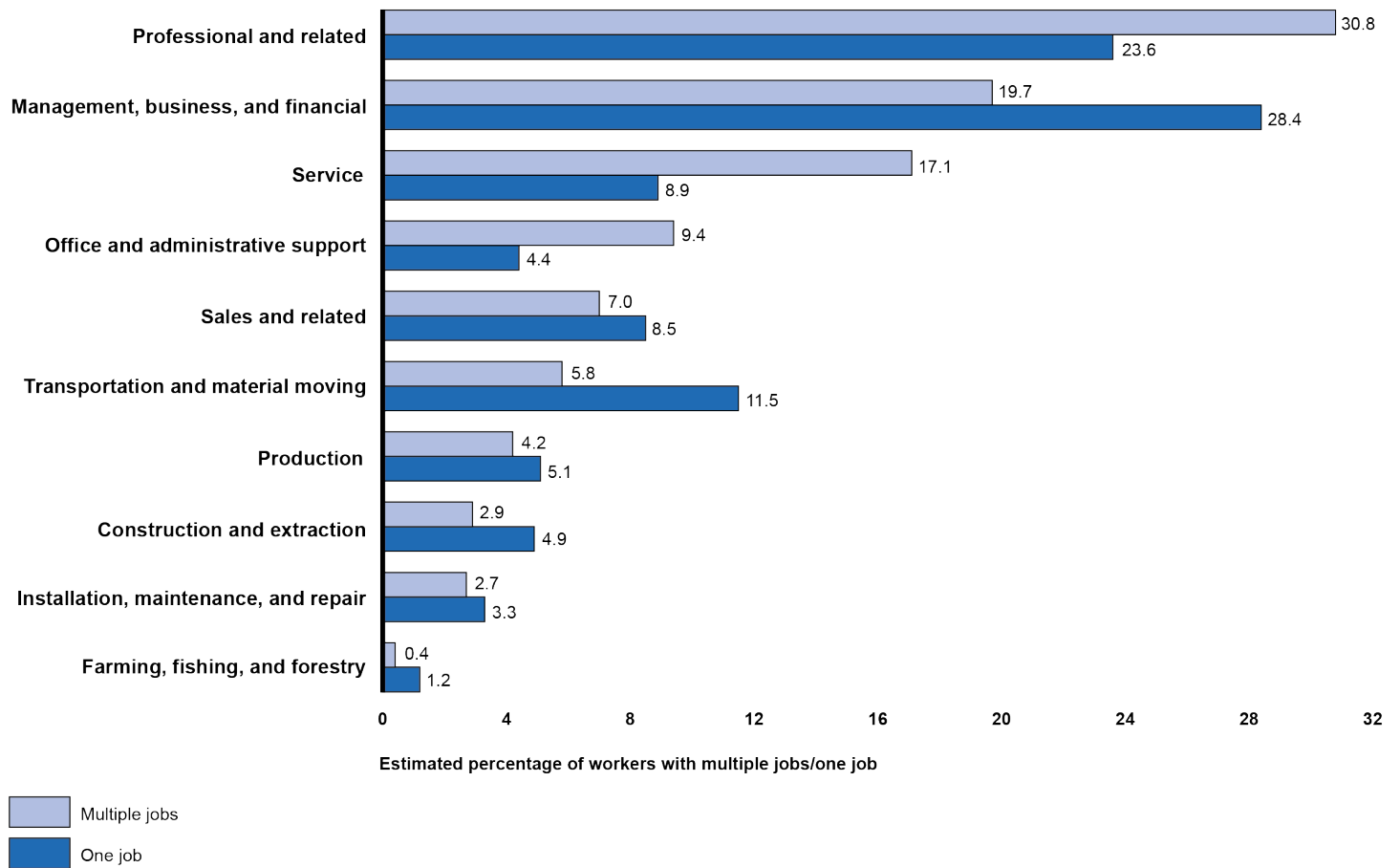
who had multiple jobs and the percentage who had one job were statistically significant at the 95 percent confidence level for all industries except Financial Activities, Other Services, and Information.

Occupation. Among individuals who usually worked very long hours in recent years, those with multiple jobs were more likely than those with one job to work in certain occupations.[37] For example, on average from 2020 through 2023, those with multiple jobs were more likely than those with one job to work in Professional and Related occupations (30.8 and 23.6 percent, respectively), Service occupations (17.1 and 8.9 percent, respectively), and Office and Administrative Support occupations (9.4 and 4.4 percent, respectively).[38] See figure 14.

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[37]For workers with multiple jobs, we measured their occupation based on the job in which they usually worked the greatest number of hours.

[38]Professional and Related includes a broad range of occupations, including software developers and network administrators, architects and engineers, scientists and science technicians, therapists and social workers, lawyers and paralegals, teachers and teacher assistants, editors and journalists, and dentists and dental hygienists. Regarding Service occupations, individuals who usually worked very long hours and had multiple jobs were more likely than those with one job to work in the following types of Service occupations: Protective Service (4.4 and 3.3 percent, respectively), Healthcare Support (4.4 and 1.9 percent, respectively), Food Preparation and Serving Related (4.0 and 1.7 percent, respectively), Building and Grounds Cleaning and Maintenance (3.1 and 1.2 percent, respectively), and Personal Care and Service (1.2 and 0.9 percent, respectively). All estimates have a margin of error within plus or minus 0.5 percentage points at the 95 percent confidence level.

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Figure 14: Individuals Who Usually Worked Very Long Hours, by Number of Jobs and Occupation, on Average from 2020 through 2023

Estimated percentage of workers with multiple jobs/one job

Legend:
- Multiple jobs
- One job

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. For workers with multiple jobs, we measured their occupation based on the job in which they usually worked the greatest number of hours. All estimates in this figure have a margin of error within plus or minus 1.0 percentage point at the 95 percent confidence level. Differences between the percentage of workers who had multiple jobs and the percentage who had one job were statistically significant at the 95 percent confidence level for all occupations.

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Selected Reviews Found Very Long Work Hours May Modestly Increase the Risk of Certain Health Outcomes, and Experts Said More Studies Are Needed

Selected Reviews Found Very Long Work Hours Are Associated with and May Contribute to an Increased Risk of Stroke and Heart Disease

The systematic reviews we selected found that working very long hours (55 or more hours per week) is associated with higher risks of stroke and ischemic heart disease (coronary heart disease), relative to working standard full-time hours (35 to 40 hours per week).[39] The authors concluded that very long work hours may have caused these increased health risks.[40] The authors' conclusions were based on a rigorous research process developed by the World Health Organization and International Labor Organization (WHO/ILO research process).[41] As part of this process, the authors used peer-reviewed protocols, including criteria and methods to formally assess the quality and strength of the evidence from multiple observational studies.[42]

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[39]To examine these relationships, the systematic reviews each conducted a meta-analysis, which is a statistical method for combining the results of multiple individual studies.

[40]It is more difficult for researchers to establish causal relationships in non-experimental studies. Establishing causal relationships ideally involves conducting randomized controlled trials, which are not always feasible or ethical. However, researchers can use well-designed observational studies to examine potential causal relationships when they evaluate those studies as part of a body of research using established criteria. For more information on the research designs of the studies included in our selected systematic reviews, see appendix IV.

[41]Four of the six systematic reviews we selected were conducted as part of an effort by the WHO and ILO to estimate the global burden of poor health outcomes attributable to long work hours.

[42]The protocols were published before the systematic reviews were conducted. The authors reviewed multiple well-designed observational studies that all controlled for age, sex, and socioeconomic status; some studies controlled for additional factors. For more information on the WHO/ILO research process, including how the authors assessed the quality and strength of the evidence, see appendix IV.

Stroke. The systematic review we selected estimated that working very long hours is associated with a 35 percent increase in the risk of experiencing a stroke, relative to working standard full-time hours (see table 2).[43] The authors described the size of this increased risk as modest, but noted that it potentially affects a large population of workers.[44] When they examined other levels of long work hours (41 to 54 hours per week), they did not find sufficient evidence of an increased risk of experiencing a stroke.[45] In addition, the authors did not find evidence of an association between any level of long work hours and an increased risk of dying from a stroke.

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[43]Alexis Descatha, Grace Sembajwe, Frank Pega, Yuka Ujita, Michael Baer, Fabio Boccuni, Cristina Di Tecco et al, "The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the World Health Organization/International Labor Organization (WHO/ILO) Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105746. See appendix IV for the characteristics of the included studies and detailed results.

[44]As previously noted, based on our analysis of CPS data, we estimated that in the United States, on average from 2018 to 2023, more than 8 million wage and salary workers ages 25 and over usually worked very long hours.

[45]The authors examined the potential effects of working 41 to 48 hours per week and 49 to 54 hours per week.

Table 2: Systematic Review Results on Increased Risk of Stroke and Heart Disease Associated with Very Long Work Hours

Health outcome	Estimated increased risk associated with working 55+ hours per week (95% confidence interval)[a]	Number of individual studies used to estimate risk and total number of study participants[b]
Experiencing a stroke[c]	35% (13, 61)	7 studies (162,644 participants)
Developing ischemic heart disease (coronary heart disease)[d]	13% (2, 26)	22 studies (339,680 participants)
Dying from ischemic heart disease (coronary heart disease)[d]	17% (5, 31)	16 studies (726,803 participants)

Source: GAO review of selected systematic reviews. | GAO-24-106772

Notes: These systematic reviews developed these estimates using meta-analysis, which is a statistical method for combining the results of multiple individual studies. The increase in estimated risk is relative to working 35-40 hours per week and is based on risk ratios. For example, a 35 percent increase in risk is based on a risk ratio of 1.35. All estimates are adjusted for age, sex, and socioeconomic status and are statistically significant at the 95 percent confidence level. Because the increase in risk of dying from a stroke is not statistically significant, it is not included in this table.

[a]The confidence interval provides the range that is likely to contain the actual increase in risk at the 95 percent level of confidence.

[b]Each systematic review we selected included multiple individual studies. A subset of these individual studies examined the relationship between working 55 or more hours per week and the health outcome. For example, seven of the 22 individual studies included in the systematic review on stroke examined this relationship.

[c]Alexis Descatha, Grace Sembajwe, Frank Pega, Yuka Ujita, Michael Baer, Fabio Boccuni, Cristina Di Tecco et al, "The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the World Health Organization/International Labor Organization (WHO/ILO) Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105746.

[d]Jian Li, Frank Pega, Yuka Ujita, Chantal Brisson, Els Clays, Alexis Descatha, Marco M. Ferrario et al, "The effect of exposure to long working hours on ischaemic heart disease: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105739.

Ischemic heart disease (coronary heart disease). The systematic review we selected estimated that working very long hours is associated with a 13 percent increase in the risk of developing ischemic heart disease and a 17 percent increase in the risk of dying from ischemic heart disease, relative to working standard full-time hours (see table 2).[46] The authors described the size of these increased risks as modest, but noted that they could affect a large population of workers. They also found that, among individuals who work very long hours, these risks may be higher

[46]Jian Li, Frank Pega, Yuka Ujita, Chantal Brisson, Els Clays, Alexis Descatha, Marco M. Ferrario et al, "The effect of exposure to long working hours on ischaemic heart disease: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105739. See appendix IV for the characteristics of the included studies and detailed results.

for those with low socioeconomic status than for those with intermediate or high socioeconomic status.[47] However, the authors did not find evidence of an association between other levels of long work hours (41 to 54 hours per week) and an increased risk of developing or dying from ischemic heart disease.[48]

Selected Reviews Found Long Work Hours Are Associated with Other Increased Health Risks, but Did Not Conclude Long Hours Contributed to These Risks

The systematic reviews we selected found associations between long work hours and increased risks of type 2 diabetes, negative weight-related outcomes, and increased alcohol use, but they identified limitations of the included studies and did not draw conclusions about whether long work hours caused these increased risks.[49] In addition, the authors found no evidence of an association between long work hours and the risk of depression but characterized the existing body of research as low quality.

Type 2 diabetes. While the systematic review we selected found that very long work hours are associated with an increased risk of type 2 diabetes for individuals with low socioeconomic status, the authors were unable to rule out other explanations for the results. Specifically, the systematic review found that individuals with low socioeconomic status who work very long hours have an increased risk of developing type 2

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[47]Socioeconomic status is commonly defined as a combination of social and economic factors, such as education, income, and type of job.

[48]The authors examined the potential effects of working 41 to 48 hours per week and 49 to 54 hours per week. After this systematic review was published, another set of researchers published an article that said the existing evidence should be interpreted more cautiously, although they did not disagree with the size of the effect estimates. The authors of the original systematic review stated in a subsequent article that they stood by their conclusions and provided their rationale. See Mika Kivimäki, Marianna Virtanen, Solja T. Nyberg, and G. David Batty, "The WHO/ILO report on long working hours and ischaemic heart disease–Conclusions are not supported by the evidence," *Environment International,* vol. 144 (2020): 106048. Also see Jian Li, Reiner Rugulies, Rebecca L. Morgan, Tracey Woodruff, and Johannes Siegrist, "Systematic review and meta-analysis on exposure to long working hours and risk of ischaemic heart disease–Conclusions are supported by the evidence," *Environment International,* vol. 144 (2020): 106118. We did not evaluate this discussion as part of our review. All of the systematic reviews included in this report, including the systematic review on ischemic heart disease, met our methodological quality standards. For more information on our literature review selection process, see appendix I.

[49]The systematic review we selected defined negative weight-related outcomes as weight gain, increase in body mass index, overweight, and obesity.

diabetes, relative to the risk for those who work standard full-time hours.[50] The authors found the same results when they controlled for age, sex, obesity, and physical activity, and when they excluded shift workers. However, they were unable to rule out other explanations for the results with reasonable confidence. For example, the authors noted that workers with low socioeconomic status may experience other personal hardships, such as low pay and financial constraints, which were not measured in the systematic review but may help explain the results. In addition, the authors did not find evidence of an association between very long work hours and an increased risk of developing type 2 diabetes for individuals with intermediate or high socioeconomic status.

Negative weight-related outcomes. While the systematic review we selected found that long work hours are associated with greater odds of experiencing negative weight-related outcomes, the authors noted limitations that hindered their ability to determine whether long work hours may have led to these outcomes.[51] Specifically, the systematic review found that the odds of experiencing negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity) are greater for individuals who work more than 40 hours per week, relative to those who work standard full-time hours.[52] However, the authors noted

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[50]The risk ratio was 1.29, with a 95 percent confidence interval of 1.06 to 1.57. See Mika Kivimäki, Marianna Virtanen, Ichiro Kawachi, Solja T. Nyberg, Lars Alfredsson, G. David Batty, Jakob B. Bjorner et al, "Long working hours, socioeconomic status, and the risk of incident type 2 diabetes: a meta-analysis of published and unpublished data from 222,120 individuals," *The Lancet Diabetes & Endocrinology*, vol. 3 (2015): 27-34. The primary author told us that this systematic review defined socioeconomic status based on the type of work (for example, workers with low socioeconomic status included those whose work involved manual labor). The definition of long work hours varied among the studies included in the systematic review, from more than 53 hours per week to more than 60 hours per week. Also see appendix IV for the characteristics of the included studies and detailed results.

[51]While the other systematic reviews we selected primarily used risk ratios to quantify increased risk, this systematic review used an odds ratio. The odds ratio is the ratio of the odds of an event occurring (in this case, experiencing negative weight-related outcomes) for a group that has been exposed to certain conditions (in this case, individuals who worked long hours) compared to the odds of the same event occurring for a group that has not been exposed to those conditions (in this case, individuals who worked standard full-time hours).

[52]The odds ratio for this group of weight-related outcomes was 1.13, with a 95 percent confidence interval of 1.07 to 1.19. See Yi Zhu, Jianxin Liu, Heng Jiang, Tracey J. Brown, Qingfeng Tian, Yudi Yang, Chao Wang et al, "Are long working hours associated with weight-related outcomes? A meta-analysis of observational studies," *Obesity Reviews*, vol. 21 (2020): e12977. Also see appendix IV for the characteristics of the included studies and detailed results.

that the design of the studies they reviewed limited their ability to determine whether long work hours may have led to these outcomes.[53]

Increased alcohol use. While the systematic review we selected found that long work hours are associated with increased alcohol use, the authors concluded that the results were based on low-quality evidence. Specifically, the systematic review, which followed the WHO/ILO research process, found that working between 41 and 54 hours per week is associated with increased alcohol use, relative to working standard full-time hours.[54] However, the authors concluded that this association was based on low-quality evidence. For example, the studies they reviewed had inconsistent results, and many studies relied on individuals to self-report how much alcohol they consumed, which may have introduced bias. In addition, the authors did not find an association between long work hours and risky drinking, which they defined as more than 14 drinks a week for women and more than 21 drinks a week for men.[55]

Depression. The systematic review we selected, which followed the WHO/ILO research process, found no evidence of a relationship between long work hours and the risk of experiencing depression, but the authors concluded that the body of research was of low quality.[56] While the

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[53]Specifically, the authors noted that most of the studies they reviewed were cross-sectional in design, and more studies with prospective cohort designs and larger samples would be beneficial to future research. Cross-sectional designs measure outcomes and exposures for individuals at one point in time, while prospective cohort designs follow individuals over time, reassessing exposure to potential risk factors and the development of outcomes.

[54]Daniela V. Pachito, Frank Pega, Jelena Bakusic, Emma Boonen, Els Clays, Alexis Descatha, Ellen Delvaux et al, "The effect of exposure to long working hours on alcohol consumption, risky drinking and alcohol use disorder: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 146 (2021): 106205. See appendix IV for the characteristics of the included studies and detailed results.

[55]Although the authors identified studies on the relationship between long work hours and increased alcohol use, as well as studies on the relationship between long work hours and risky drinking, they were unable to identify any studies on the relationship between long work hours and alcohol use disorder for which they could obtain permission to analyze and report data.

[56]The authors noted that because the body of research was of low quality, future research may have different results. See Reiner Rugulies, Kathrine Sørensen, Cristina Di Tecco, Michela Bonafede, Bruna M. Rondinone, Seoyeon Ahn, Emiko Ando et al, "The effect of exposure to long working hours on depression: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 155 (2021): 106629. See appendix IV for the characteristics of the included studies and detailed results.

authors identified many relevant studies, they found that these studies had considerable limitations that could have introduced bias. For example, because most of the studies did not continuously monitor individuals for depression over time, they may have missed some cases. In addition, because most of the studies did not assess whether individuals had experienced depression before the study, they could not differentiate between initial and recurrent episodes of depression.

Experts Said More Studies Are Needed to Better Understand the Relationships Between Long Work Hours and Health Outcomes and Behaviors

The four systematic review authors we interviewed, who are experts in their fields, said that further research is needed to better understand the relationships between long work hours and poor health outcomes and behaviors. For example, one expert said there is a need for studies that use stronger research designs to examine the relationship between long work hours and depression. In addition, experts said that more research is needed on the following topics:

- The behavioral and physical pathways through which long work hours could lead to poor health outcomes, including the physical effects of stress;

- How the length of time spent working long hours (for example, the number of years) may be related to the potential increase in certain health risks;

- How the potential health risks of long work hours may differ based on the type of work and working conditions, including the availability of telework and flexible schedules; and

- How the potential health risks of long work hours may differ based on factors including the worker's age, initial health (before working long hours), and income.[57]

Experts also said that more research is needed on whether there is a causal relationship between long work hours and poor health outcomes and behaviors, including stroke and ischemic heart disease. However, they said it would be very difficult to conduct randomized controlled trials, which could involve changing workers' schedules and requiring some workers to work long hours for an extended period. Given these challenges, two experts said that a more practical approach for determining a causal relationship would be to conduct intervention studies, which measure whether reductions in work hours are associated

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[57]Several experts noted that higher income may counteract potential health risks because working longer hours may increase income, and higher income is generally associated with improved health outcomes.
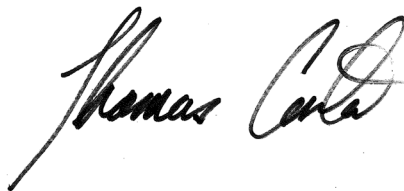
with improvements in health outcomes or behaviors. For example, one expert said that several European countries are conducting pilot programs that reduce the work week from five to four days, and early studies have found that these reductions in work hours have led to improvements in sleep, depression, burnout, and other health outcomes.

Agency Comments

We provided a draft of this report to the U.S. Department of Labor (DOL) and the U.S. Department of Health and Human Services (HHS) for review and comment. Neither DOL nor HHS had any comments on the report.

We are sending copies of this report to the appropriate congressional committees. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-4769 or costat@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix V.

Thomas Costa, Director
Education, Workforce, and Income Security

Appendix I: Objectives, Scope, and Methodology

The objectives of this review were to examine (1) how work hours for U.S. workers have changed over time, (2) how the characteristics of individuals who worked very long hours in recent years compare to the characteristics of those who worked standard full-time hours, and (3) research on the relationships between long work hours and health outcomes and behaviors.

To address our first and second objectives, we analyzed basic monthly data from the Current Population Survey (CPS) from January 2003 to December 2023, which were the most recent data available at the time of our analysis. The CPS is a monthly survey sponsored jointly by the U.S. Bureau of Labor Statistics (BLS) and the U.S. Census Bureau, and is designed to represent the civilian, noninstitutionalized population of the United States.[1] We selected the CPS because it allowed us to measure actual and usual weekly hours by worker and examine the demographic and employment characteristics of workers.[2]

For the third objective, we conducted a comprehensive literature search for systematic reviews that examined the relationship between long work hours and health outcomes and behaviors. From an initial pool of 82 systematic reviews, we selected six. Specifically, we excluded systematic reviews that did not meet our methodological standards, were duplicative, or did not examine health outcomes and behaviors that are common

[1]The survey, which is administered through in-person and telephone interviews, collects data on employment, hours worked, wages, and demographic information, among other things. The CPS sample is a probability sample of 70,000 assigned households each month. After excluding addresses that are destroyed, vacant, not being used as a primary residence, or otherwise ineligible, approximately 60,000 households are eligible for interviews. Interviews are completed for households that are available and willing to participate, which is typically around 42,000 households each month, accounting for approximately 82,000 people 16 years old or older. The full monthly sample is divided into eight rotation groups that are representative of the U.S. population and are interviewed for a total of 8 months. Households in the CPS are interviewed for 4 months, not interviewed for 8 months, and then interviewed again for 4 more months. The CPS collects information on wages only from households in the outgoing rotation groups (households in the fourth month of interviews and the final month of interviews).

[2]While the CPS was the most appropriate data source for our purposes, BLS has multiple data sources and methods for estimating work hours that can produce different results. For example, in April 2024, BLS published an analysis of average work hours that had several key differences from our analysis. For example, BLS used a different dataset that measured work hours by job rather than by worker and used a narrower employment definition that excluded public sector and agricultural workers. See U.S. Bureau of Labor Statistics, "Why are average weekly hours worked declining?" (Washington, D.C.: Apr. 2024), https://www.bls.gov/opub/btn/volume-13/why-are-average-weekly-hours-worked-declining.htm. We did not evaluate this analysis as part of our review.

among adults in the U.S.[3] The six systematic reviews we selected
examined the relationships between long work hours and the following
health outcomes and behaviors: (1) stroke, (2) ischemic heart disease
(coronary heart disease), (3) type 2 diabetes, (4) negative weight-related
outcomes (weight gain, increase in body mass index, overweight, and
obesity), (5) alcohol use, and (6) depression. Each systematic review we
selected conducted a meta-analysis, which is a statistical method for
combining the results of multiple individual studies. To provide context
and further assess the results, we also interviewed the primary authors of
four of the six selected systematic reviews.

Analysis of Current Population Survey Data

We used CPS basic monthly data from January 2003 to December 2023
to analyze actual and usual work hours, as well as demographic and
employment characteristics, for U.S. workers. We focused our analysis on
wage and salary workers ages 25 and over who—during the week
preceding the survey—were (1) employed and at work or (2) employed
but absent from work.[4] Our analysis of CPS data is descriptive, and we
did not control for any variables.[5]

For our first objective, which examines how work hours for U.S. workers
have changed over time, we used CPS basic monthly data from January
2003 to December 2023 to examine trends in average actual work hours
and usual work schedules. Specifically, we used basic monthly data to
calculate annual averages and other statistics. We analyzed overall
trends in (1) average actual work hours and (2) the percentage of workers
who usually worked part-time hours, standard full-time hours, full-time
hours that varied, long hours, and very long hours (see below for

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[3]We excluded systematic reviews that focused on work-related injuries or chemical
exposures, work-related fatigue or sleep disturbances, shift work, and health outcomes
that only affect specific populations.

[4]In 2023, these workers comprised an estimated 77 percent of the overall workforce, or
about 125 million workers, according to published BLS data. We excluded younger
workers from our analysis to focus on workers who are more likely to be financially
independent and finished with their schooling. Workers report their work hours for the
week preceding the survey. For workers who were employed but absent from work, we
counted their actual weekly work hours as zero. From 2003 to 2023, on average, 3.5
percent of wage and salary workers were employed but absent from work during the week
preceding the survey, according to our analysis. We excluded self-employed workers
because they generally have greater control over their work hours than workers with a
traditional employer-employee relationship.

[5]Because we did not control for factors that could influence work hours, we were not able
to isolate potential causes of changes in work hours over time or differences in work hours
between different groups.

definitions). We also analyzed these trends by gender, age, and wage
group.

For our second objective, which examines how the characteristics of
individuals who worked very long hours (55 or more hours per week) in
recent years compared to the characteristics of standard full-time workers
(who worked 35 to 40 hours per week), we used CPS basic monthly data
on usual hours worked from January 2018 through December 2023 to
compare the demographic and employment characteristics of these two
groups of workers.[6] We analyzed demographic characteristics including
gender, age, race and ethnicity, education level, marital status, and
parental status. We also analyzed employment characteristics including
wage group, industry, occupation, and number of jobs. We analyzed
industry and occupation data beginning in January 2020 due to changes
in CPS occupational classifications that affected comparability with data
from earlier years. Additionally, for individuals who usually worked very
long hours over this time period, we compared the demographic and
employment characteristics of those with one job to the characteristics of
those with multiple jobs.

Because the CPS is based on a probability sample, estimates produced
from these data are subject to sampling error. We express our confidence
in the precision of our results as a 95 percent confidence interval. This is
the interval that would contain the actual population value for 95 percent
of the samples that could have been drawn. We followed guidance from
the Census Bureau and BLS and weighted observations appropriately
using weights provided in the CPS. Due to data limitations, we
constructed confidence intervals using approximate standard errors that
we generated under the assumption that the data were sampled with
replacement, using state as a stratification variable and clustering by
household.[7] We used this procedure because the public data do not
provide the information needed to fully account for the survey's complex

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[6]We defined recent years as 2018 through 2023 to include multiple years prior to the
COVID-19 pandemic, given that work schedules may have temporarily shifted during the
pandemic. To estimate the average number of individuals who worked very long hours
and standard full-time hours, we totaled the population weights over all months from
January 2018 through December 2023 and divided by 72 months.

[7]Specifically, we stratified the U.S. into 53 state-based areas, including each U.S. state
and the District of Columbia, and we further divided California and New York State into
two substate areas: 1) Los Angeles County and the rest of California, and 2) New York
City and the rest of New York State. We adopted this stratification approach because the
CPS from 2003 through 2023 consisted of independent samples from each of these 53
geographic areas.

design. While this procedure is subject to unknown error, it is an
appropriate approximating technique, and our tests suggest it is a
relatively conservative approach.[8] All of the differences that we discuss
from our CPS analysis are significant at the 95 percent confidence level,
unless otherwise noted.

Data Used for Analysis

We used the following variables from the CPS in our analysis:

- **Age.** We grouped workers into the following categories: (1) prime-age
  workers (ages 25-54), (2) workers ages 55-64, and (3) older workers
  (ages 65 and over).[9]

- **Country of birth.** We grouped workers into the following categories:
  (1) born in the United States and (2) born in a foreign country.[10]

- **Education.** We generally grouped workers into the following
  categories: (1) less than a bachelor's degree and (2) bachelor's
  degree or higher. We also analyzed the following detailed categories:
  (1) less than a high school diploma, (2) high school graduate or
  equivalent, (3) some college, no degree, (4) associate's degree, (5)
  bachelor's degree, and (6) advanced degree.

- **Gender.** The CPS asks survey respondents to identify their sex (male
  or female). In this report, we use the term "gender" to refer to these
  data, and we generally use the terms "men" and "women" to refer to

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[8]BLS provides researchers formulas they can use to construct standard errors for
statistics presented in the Employment Situation report it publishes each month. We were
unable to use this approach because BLS does not provide formulas for the statistics that
we analyzed, such as average hours or the percentage of workers who usually work 55 or
more hours per week. However, in consultation with BLS officials, we performed a
benchmarking exercise using a different set of statistics for which BLS's formulas are
available to identify potential limitations. We found our procedure yielded standard errors
that were either close to or larger than those computed using BLS's formulas. This
suggests that the 95 percent confidence intervals we generated for our analysis may be
wider than those we would have obtained using BLS's approach. This also suggests that
our approach is relatively conservative because there is a lower likelihood of identifying
statistically significant differences when confidence intervals are wider.

[9]BLS describes workers ages 25-54 as "prime-age" workers, but does not otherwise
define this term. Other researchers note that these workers have for the most part finished
their schooling and are not on the verge of retirement. We defined older workers as ages
65 and over because these workers are at or near retirement age.

[10]The "born in the United States" category comprises those who were born in the United
States, born in U.S. territories or outlying areas, or born abroad to an American parent or
parents. The "born in a foreign country" category comprises those who were born in a
foreign country and became U.S. citizens through naturalization or who are not U.S.
citizens.

individuals who identified their sex as male or female, respectively.
However, when referring to the characteristics of workers, we use the
terms "male" and "female." The CPS does not ask about respondents'
gender identity. In some cases, a respondent's gender identity may
not align with the sex they identified in the CPS.

- **Industry.** We grouped workers into the following industries:
  "Agriculture, Forestry, Fishing, and Hunting"; "Construction";
  "Educational Services"; "Financial Activities"; "Health Care and Social
  Assistance"; "Information"; "Leisure and Hospitality"; "Manufacturing";
  "Mining"'; "Other Services"; "Professional and Business Services;"
  "Public Administration"; "Retail Trade"; "Transportation and Utilities";
  and "Wholesale Trade."[11]

- **Marital status.** We grouped workers into the following categories: (1)
  married and (2) not married.

- **Number of jobs.** We grouped workers into the following categories:
  (1) one job and (2) multiple jobs.[12]

- **Occupation.** We grouped workers into the following occupations:
  "Construction and Extraction"; "Farming, Fishing, and Forestry";
  "Installation, Maintenance, and Repair"; "Management, Business, and
  Financial"; "Office and Administrative Support"; "Professional and
  Related"; "Production;" "Sales and Related"; "Service" (including
  subgroups of "Building and Grounds Cleaning and Maintenance";
  "Food Preparation and Serving Related"; "Healthcare Support";

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[11]The industries we analyzed generally align with the 2020 Census Major Industry
classifications. However, we separated "Wholesale and Retail Trade" into two groups
("Wholesale Trade" and "Retail Trade") and separated "Educational and Health Services"
into two groups ("Educational Services" and "Health Care and Social Assistance") to
examine potential differences within these broad industry categories, and because the
data allowed for this more detailed analysis. For workers with multiple jobs, we measured
their industry based on the job in which they usually worked the greatest number of hours.

[12]The CPS measures whether a worker holds multiple jobs based on the number of jobs
or businesses the individual reported having during the survey reference week. We
previously reported that some studies found that this measure may undercount multiple
jobs from nonstandard work arrangements, such as gig or informal work. See GAO, *Work
Arrangements: Improved Collaboration Could Enhance Labor Force Data*,
GAO-24-105651 (Washington, D.C.: December 12, 2023). Also see Mary Dorinda Allard
and Anne E. Polivka, "Measuring labor market activity today: are the words work and job
too limiting for surveys?" *Monthly Labor Review* (November 2018).

"Personal Care and Service"; and "Protective Service"); and "Transportation and Material Moving."[13]

- **Presence of own children in household.** We grouped workers into the following categories: (1) with at least one own child under age 18 in the household and (2) with no own children under age 18 in the household.[14]

- **Race and ethnicity.** In the CPS, individuals are first asked about their ethnicity (Hispanic or non-Hispanic), and then asked about their race. We combined the race and ethnicity categories into a single variable with the following categories: (1) Asian (non-Hispanic), (2) Black or African American (non-Hispanic), (3) Hispanic or Latino (any race), (4) White (non-Hispanic), and (5) Other (non-Hispanic).[15]

- **Veteran status.** We grouped workers into the following categories: (1) veteran and (2) not a veteran.

- **Wages.** We grouped workers into the following categories based on their hourly wage: (1) low-wage, (2) middle-wage, and (3) high-wage. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars using the Consumer Price Index for All Urban Consumers. In 2023, hourly wages were less than $16.18 for low-

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[13]The occupations we analyzed generally align with the 2020 Census Major Occupation classifications. However, we also included five subgroups under the "Service" major occupation classification to examine potential differences within this broad occupational category, and because the data allowed for this more detailed analysis. For workers with multiple jobs, we measured their occupation based on the job in which they usually worked the greatest number of hours.

[14]We determined whether a worker's own children are present using CPS data that identify the parents of each child in the household. We included children under age 18 regardless of their marital status.

[15]Due to small sample sizes, we combined the following CPS categories into a new Other (non-Hispanic) category: (1) Native American and Alaska Native (non-Hispanic), (2) Native Hawaiian or Other Pacific Islander (non-Hispanic), and (3) Two or More Races (non-Hispanic), which we describe as Multiracial (non-Hispanic) for the purposes of this report.

wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers.[16]

- **Work hours.** We analyzed both actual and usual reported work hours. For usual work hours, we grouped workers into the following categories: (1) part time (less than 35 hours/week), (2) standard full time (35-40 hours/week), (3) full time with variable hours (at least 35 hours/week, but hours vary), (4) long hours (41 or more hours/week), and (5) very long hours (55 or more hours/week).[17]

Data Reliability

We assessed the reliability of the CPS data by reviewing documentation on the general design and methods of the CPS and on the specific elements of the data that we used in our analysis. We also completed our own electronic data testing to assess the accuracy and completeness of the data, and we interviewed knowledgeable BLS officials to confirm our understanding of the data. Because the definitions of occupational classifications changed over time, we limited the time period for our analysis of occupational data to 2020 to 2023 to ensure comparability across years.[18] Based on these efforts, we determined that data from 2003 to 2023 were sufficiently reliable for our purposes, with this limitation to the occupational data.

Literature Review

To address our third objective, which examines research on the relationships between long work hours and health outcomes and behaviors, we conducted a comprehensive literature search for

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[16]The CPS collects wage data at different intervals (e.g., hourly, weekly, annually) and converts the information into a usual weekly amount. For workers who reported their earnings at an hourly rate and did not report any overtime, tips, or commissions, we used their reported hourly wage. For other workers, we estimated the hourly wage using data on their weekly earnings and hours worked, following a methodology developed by BLS research staff. As noted earlier, the CPS collects wage information only from households in the outgoing rotation groups (households in the fourth month of interviews and the final month of interviews). For workers with multiple jobs, we measured their wage based on the job in which they usually worked the greatest number of hours.

[17]The very long hours category is a subset of the long hours category. We defined very long hours as 55 or more hours per week to align with the highest work hour category used in most of the research we reviewed for our third objective.

[18]For consistency, we also limited the time period for our analysis of industry data to 2020 to 2023.

systematic reviews.[19] Using the process described below, we selected six systematic reviews published in peer-reviewed journals on the relationships between long work hours and the following health outcomes and behaviors: (1) stroke, (2) ischemic heart disease (coronary heart disease), (3) type 2 diabetes, (4) negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity), (5) alcohol use, and (6) depression. Each of these systematic reviews included from 14 to 37 individual studies.

Search process. In July 2023, we conducted a comprehensive search of databases, such as Scopus, EBSCOhost, and ProQuest, to identify relevant systematic reviews that were published in the last 10 years (2013-2023), including both U.S. and international publications. We focused on systematic reviews because they provide a broad overview of individual studies on the potential health effects of long work hours. The search terms we used included variations of "work hours" combined with variations of "health" and variations of "systematic review." This search resulted in 82 systematic reviews.

Initial screening. Two analysts independently reviewed the abstracts of the 82 systematic reviews and reached agreement on which reviews to exclude because they were out of scope, did not report separately on the potential health effects of long work hours, were not systematic reviews, were published before 2013, were not in English, or focused on a specific rather than general population. We excluded systematic reviews that did not examine health outcomes and behaviors that are common among U.S. adults as out of scope. Specifically, we excluded systematic reviews focused on the following topics: work-related injuries or chemical exposures, work-related fatigue or sleep disturbances, shift work, and health outcomes for specific populations, such as workers who are pregnant.[20] This initial screening resulted in 22 systematic reviews that examined how long work hours affected the following seven health outcomes and behaviors: (1) stroke, (2) ischemic heart disease (coronary

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[19]A systematic review attempts to answer a specific research question by identifying, appraising, and synthesizing all the empirical evidence—such as published and unpublished studies by other researchers—that meets pre-specified eligibility criteria. Researchers conducting these reviews use explicit, systematic methods that aim to minimize bias and produce more reliable findings than individual studies.

[20]These topics were less relevant to the purpose of our third objective, which is to provide a broad overview of research on the potential effects of long work hours on the general population. Regarding studies on shift work, we excluded them if they did not separate the potential effects of working a shift schedule from the potential effects of working long hours.

heart disease), (3) type 2 diabetes, (4) negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity), (5) alcohol use, (6) depression, and (7) metabolic syndrome.

Preliminary article selection. We selected the systematic review for each of the seven health outcomes and behaviors that best satisfied our criteria.[21] We ranked systematic reviews on an additive scale (0-3) that assessed whether the authors (1) used established criteria to review the potential for bias of individual studies, (2) assessed heterogeneity (differences) in findings by research design, and (3) assessed heterogeneity in findings by different levels of exposure (work hours). If two systematic reviews were of the same methodological quality, we included the one with the most recent publication date. This preliminary selection resulted in seven systematic reviews.

Full methodological review. Two specialists independently reviewed the methodological quality of the seven systematic reviews to determine whether they met our methodological standards. We examined the systematic reviews on a variety of characteristics to determine whether they followed best practices for conducting these reviews.[22] Additionally, we assessed whether the systematic reviews were sufficiently reliable for the purposes of our reporting objectives, including whether the findings and conclusions were adequately supported. As a result of this process, we excluded one systematic review on metabolic syndrome that did not meet our criteria, and we selected six systematic reviews, all of which contained meta-analyses.[23] For the citations for the six selected systematic reviews, as well as information on their characteristics and results, see appendix IV.

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[21]During the initial screening, we identified multiple systematic reviews that cited some of the same individual studies. We addressed this issue by selecting a single systematic review to include for each health topic.

[22]We reviewed several accepted checklists of best practices to develop our review protocol. For example, the AMSTAR 2 tool is a checklist used to assess the methodological quality of systematic reviews that include randomized or non-randomized studies of healthcare intervention. Additionally, PRISMA provides a set of reporting guideline standards for how systematic reviews should report their processes and results.

[23]Meta-analysis is the statistical combination of results from two or more separate studies. For example, the meta-analysis on stroke combined the results from multiple individual studies to calculate an average estimate of how working long hours may affect the risk of stroke, relative to working standard full-time hours.

Interviews with Authors of Systematic Reviews

To provide context and further assess our literature review results, we invited the primary authors of the six selected systematic reviews—who are experts in their fields—to participate in interviews. In December 2023, we held virtual interviews with the four authors who responded to our request. In these interviews, we discussed the results of the selected systematic reviews, the current state of the research on the relationship between long work hours and poor health outcomes and behaviors, and areas for future research.

We conducted this performance audit from April 2023 to September 2024 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Estimated Percentages of Workers by State with Selected Work Schedules, on Average from 2018 - 2023

The table below shows the estimated percentages of workers in each state who usually worked standard full-time hours (35-40 hours/week) or very long hours (55 or more hours/week), on average from January 2018 through December 2023.[1]

Table 3: Estimated Percentages of Workers by State with Selected Work Schedules, on Average from 2018 through 2023

State	Percentage of workers who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Alabama	69.4	(68.6, 70.3)	7.0	(6.6, 7.4)
Alaska	63.6	(62.5, 64.7)	8.8	(8.2, 9.4)
Arizona	63.4	(62.4, 64.3)	7.5	(7.1, 8.0)
Arkansas	67.7	(66.8, 68.5)	5.5	(5.2, 5.9)
California	69.2	(68.8, 69.6)	5.6	(5.4, 5.8)
Colorado	58.2	(57.2, 59.3)	8.0	(7.5, 8.6)
Connecticut	58.5	(57.3, 59.7)	7.0	(6.5, 7.6)
Delaware	65.4	(64.4, 66.5)	5.0	(4.6, 5.4)
District of Columbia	62.2	(61.3, 63.1)	8.6	(8.2, 9.1)
Florida	68.8	(68.3, 69.3)	5.9	(5.6, 6.1)
Georgia	65.6	(64.8, 66.3)	7.0	(6.6, 7.3)
Hawaii	66.3	(65.3, 67.3)	6.0	(5.5, 6.4)
Idaho	59.2	(58.2, 60.1)	7.7	(7.3, 8.2)
Illinois	63.4	(62.7, 64.1)	6.8	(6.4, 7.1)
Indiana	59.6	(58.7, 60.6)	7.0	(6.5, 7.4)
Iowa	56.0	(54.9, 57.1)	8.5	(7.9, 9.1)
Kansas	59.7	(58.7, 60.8)	7.8	(7.3, 8.4)
Kentucky	60.4	(59.3, 61.5)	7.7	(7.2, 8.3)
Louisiana	65.1	(64.3, 65.9)	7.9	(7.5, 8.4)
Maine	55.1	(53.7, 56.4)	7.2	(6.5, 7.8)
Maryland	68.9	(67.9, 69.9)	6.7	(6.1, 7.2)
Massachusetts	60.8	(60.0, 61.6)	6.9	(6.5, 7.2)
Michigan	59.3	(58.5, 60.1)	6.7	(6.4, 7.1)
Minnesota	58.4	(57.3, 59.4)	6.5	(6.0, 7.0)
Mississippi	71.3	(70.5, 72.1)	6.6	(6.2, 7.0)
Missouri	65.1	(64.2, 66.1)	6.5	(6.1, 7.0)

[1]We highlight standard full-time and very long work hours because they are the work schedules we most frequently compare and analyze in this report.

Appendix II: Estimated Percentages of
Workers by State with Selected Work
Schedules, on Average from 2018 - 2023

State	Percentage of workers who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Montana	57.4	(56.4, 58.3)	6.0	(5.6, 6.4)
Nebraska	55.1	(54.1, 56.2)	7.9	(7.4, 8.4)
Nevada	68.4	(67.4, 69.3)	6.0	(5.6, 6.4)
New Hampshire	57.9	(56.9, 58.9)	6.7	(6.2, 7.1)
New Jersey	71.3	(70.5, 72.0)	5.5	(5.1, 5.9)
New Mexico	69.1	(68.2, 70.0)	6.0	(5.5, 6.4)
New York	66.8	(66.3, 67.4)	6.2	(5.9, 6.4)
North Carolina	63.0	(62.3, 63.8)	6.1	(5.8, 6.5)
North Dakota	60.2	(59.2, 61.1)	8.2	(7.8, 8.7)
Ohio	59.1	(58.3, 59.9)	6.9	(6.5, 7.2)
Oklahoma	65.6	(64.6, 66.5)	7.9	(7.4, 8.4)
Oregon	60.2	(59.2, 61.1)	5.6	(5.2, 6.0)
Pennsylvania	62.4	(61.7, 63.1)	7.0	(6.6, 7.3)
Rhode Island	60.4	(59.2, 61.6)	5.5	(5.0, 6.0)
South Carolina	65.9	(65.0, 66.9)	6.1	(5.7, 6.5)
South Dakota	58.6	(57.5, 59.8)	6.5	(6.0, 7.0)
Tennessee	64.6	(63.7, 65.4)	6.9	(6.5, 7.3)
Texas	64.4	(63.9, 64.9)	8.2	(7.9, 8.5)
Utah	62.2	(61.3, 63.2)	6.1	(5.7, 6.5)
Vermont	59.5	(58.4, 60.5)	7.0	(6.5, 7.5)
Virginia	64.9	(64.1, 65.8)	6.5	(6.1, 6.9)
Washington	64.0	(63.1, 64.8)	5.9	(5.5, 6.3)
West Virginia	65.6	(64.7, 66.4)	6.9	(6.5, 7.3)
Wisconsin	54.1	(53.1, 55.2)	7.7	(7.2, 8.2)
Wyoming	54.8	(53.8, 55.8)	9.9	(9.4, 10.4)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

Appendix III: Estimated Percentages of Workers by Selected Characteristics and Schedules, on Average from 2018 - 2023

The tables below show the estimated percentages of workers with selected demographic and employment characteristics who usually worked standard full-time hours (35-40 hours/week) or very long hours (55 or more hours/week), on average from January 2018 through December 2023.[1]

Table 4: Estimated Percentages of Workers by Selected Demographic Characteristics and Work Schedules, on Average from 2018 through 2023

Subgroup	Percentage of workers in subgroup who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers in subgroup who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Gender				
Men	64.0	(63.8, 64.1)	8.7	(8.6, 8.8)
Women	64.7	(64.5, 64.9)	4.5	(4.4, 4.6)
Age				
Prime age (ages 25-54)	66.0	(65.9, 66.2)	6.8	(6.7, 6.8)
Ages 55-64	62.8	(62.5, 63.1)	7.1	(6.9, 7.2)
Older workers (ages 65+)	48.9	(48.4, 49.3)	4.7	(4.6, 4.9)
Race/Ethnicity				
Asian (non-Hispanic)	72.7	(72.2, 73.2)	5.0	(4.8, 5.2)
Black or African American (non-Hispanic)	70.2	(69.8, 70.5)	6.4	(6.2, 6.6)
Hispanic or Latino (any race)	70.3	(70.0, 70.6)	5.1	(5.0, 5.2)
White (non-Hispanic)	60.5	(60.3, 60.7)	7.4	(7.3, 7.4)
Other (non-Hispanic)[b]	64.4	(63.6, 65.2)	7.0	(6.6, 7.4)
Education level				
Less than a bachelor's degree	65.1	(65.0, 65.3)	6.0	(6.0, 6.1)
Bachelor's degree or higher	63.3	(63.1, 63.5)	7.5	(7.4, 7.6)
Marital status				
Married	63.8	(63.6, 63.9)	7.0	(6.9, 7.1)
Men	63.3	(63.1, 63.5)	9.5	(9.3, 9.6)
Women	64.3	(64.1, 64.6)	4.1	(4.0, 4.2)

[1]We analyzed industry and occupation data beginning in January 2020 due to changes in CPS occupational classifications that affected comparability with data from earlier years. We highlight standard full-time and very long work hours because they are the work schedules we most frequently compare and analyze in this report.

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Appendix III: Estimated Percentages of
Workers by Selected Characteristics and
Schedules, on Average from 2018 - 2023

Subgroup	Percentage of workers in subgroup who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers in subgroup who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Not married	65.1	(64.9, 65.3)	6.2	(6.1, 6.3)
Men	65.0	(64.7, 65.3)	7.4	(7.3, 7.6)
Women	65.2	(65.0, 65.5)	5.0	(4.9, 5.2)
Presence of own children in household				
One or more own children in household	64.7	(64.5, 64.9)	6.8	(6.7, 6.9)
Men	64.5	(64.2, 64.8)	9.7	(9.5, 9.8)
Women	64.9	(64.6, 65.1)	3.8	(3.7, 3.9)
No own children in household	64.1	(64.0, 64.3)	6.6	(6.5, 6.7)
Men	63.7	(63.5, 63.9)	8.2	(8.0, 8.3)
Women	64.6	(64.4, 64.9)	4.9	(4.8, 5.0)
Veteran status				
Veteran	61.9	(61.4, 62.4)	8.8	(8.5, 9.1)
Not a veteran	64.5	(64.3, 64.6)	6.6	(6.5, 6.6)
Country of birth				
Born in the United States	63.0	(62.8, 63.1)	7.0	(6.9, 7.1)
Born in a foreign country	70.2	(70.0, 70.5)	5.4	(5.2, 5.5)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

[b]Other (non-Hispanic) comprises the following categories: (1) American Indian or Alaska Native (non-Hispanic), (2) Hawaiian or Other Pacific Islander (non-Hispanic), and (3) Multiracial (non-Hispanic).

Appendix III: Estimated Percentages of
Workers by Selected Characteristics and
Schedules, on Average from 2018 - 2023

Table 5: Estimated Percentages of Workers by Industry with Selected Work Schedules, on Average from 2020 through 2023

Industry	Percentage of workers in industry who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers in industry who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Agriculture, Forestry, Fishing, and Hunting	56.7	(55.2, 58.1)	11.9	(11.0, 12.9)
Construction	69.8	(69.3, 70.3)	6.3	(6.1, 6.6)
Educational Services	64.3	(63.8, 64.8)	6.3	(6.1, 6.6)
Financial Activities	69.8	(69.2, 70.3)	6.6	(6.3, 6.9)
Health Care and Social Assistance	65.5	(65.1, 65.9)	5.6	(5.4, 5.8)
Information	67.2	(66.1, 68.2)	6.4	(5.9, 6.9)
Leisure and Hospitality	55.0	(54.4, 55.6)	5.7	(5.4, 6.0)
Manufacturing	69.0	(68.6, 69.4)	6.6	(6.4, 6.8)
Mining	51.4	(49.4, 53.4)	19.5	(18.0, 21.0)
Other Services	56.0	(55.2, 56.7)	5.5	(5.1, 5.8)
Professional and Business Services	67.5	(67.0, 67.9)	6.0	(5.8, 6.2)
Public Administration	74.0	(73.5, 74.6)	7.0	(6.6, 7.3)
Retail Trade	60.8	(60.3, 61.3)	5.3	(5.1, 5.5)
Transportation & Utilities	61.6	(61.0, 62.2)	9.8	(9.5, 10.2)
Wholesale Trade	65.4	(64.5, 66.2)	7.9	(7.4, 8.3)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

Appendix III: Estimated Percentages of
Workers by Selected Characteristics and
Schedules, on Average from 2018 - 2023

Table 6: Estimated Percentages of Workers by Occupation with Selected Work Schedules, on Average from 2020 through 2023

Occupation	Percentage of workers in occupation who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers in occupation who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
Construction and Extraction	72.6	(72.0, 73.1)	5.8	(5.6, 6.1)
Farming, Fishing, and Forestry	58.8	(57.0, 60.6)	10.5	(9.3, 11.6)
Installation, Maintenance, and Repair	71.5	(70.8, 72.2)	6.3	(6.0, 6.7)
Management, Business, and Financial	63.5	(63.1, 63.8)	8.9	(8.7, 9.1)
Office and Administrative Support	71.8	(71.4, 72.2)	3.5	(3.3, 3.6)
Production	71.7	(71.2, 72.2)	5.6	(5.4, 5.9)
Professional and Related	67.0	(66.7, 67.2)	6.2	(6.0, 6.3)
Sales and Related	59.8	(59.2, 60.3)	6.6	(6.4, 6.8)
Service	59.0	(58.6, 59.4)	5.2	(5.1, 5.4)
Transportation and Material Moving	59.9	(59.3, 60.4)	8.9	(8.6, 9.2)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

Appendix III: Estimated Percentages of
Workers by Selected Characteristics and
Schedules, on Average from 2018 - 2023

Table 7: Estimated Percentages of Workers by Wage Group with Selected Work Schedules, on Average from 2018 through 2023

Wage group	Percentage of workers in wage group who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers in wage group who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
High wage	64.7	(64.4, 65.0)	7.2	(7.1, 7.4)
Middle wage	68.6	(68.4, 68.8)	6.4	(6.3, 6.5)
Low wage	55.3	(54.9, 54.7)	4.5	(4.3, 4.6)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Notes: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours. We defined low-wage workers as those in the bottom quintile (bottom 20 percent) of the annual hourly wage distribution, middle-wage workers as those in the second through fourth quintiles (20 percent through 80 percent), and high-wage workers as those in the top quintile (top 20 percent). We adjusted hourly wages for inflation to December 2023 dollars. In 2023, hourly wages were less than $16.18 for low-wage workers, between $16.18 and $43.86 for middle-wage workers, and greater than $43.86 for high-wage workers.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

Table 8: Estimated Percentages of Workers by Number of Jobs with Selected Work Schedules, on Average from 2018 through 2023

Number of jobs	Percentage of workers who usually work standard full-time hours (35-40 hours/week)	95 percent confidence interval[a]	Percentage of workers who usually work very long hours (55+ hours/week)	95 percent confidence interval[a]
One job	67.2	(67.1, 67.4)	5.1	(5.0, 5.1)
Multiple jobs	8.0	(7.8, 8.3)	37.9	(37.4, 38.4)

Source: GAO analysis of Current Population Survey (CPS) data. | GAO-24-106772

Note: We analyzed CPS data for wage and salary workers ages 25 and over at the time of the survey. The row percentages do not sum to 100 percent because the table does not include other work schedules such as part time (less than 35 hours per week), longer than full time but not very long hours (between 41 and 54 hours per week), and full time (at least 35 hours per week) with variable hours.

[a]The confidence interval is the range that would contain the actual population value for 95 percent of the samples that could have been drawn.

Appendix IV: Characteristics and Results of Selected Systematic Reviews

This appendix includes (1) the characteristics of the six systematic reviews we selected (see table 9), (2) a description of the World Health Organization/International Labor Organization (WHO/ILO) research process used by four of the systematic reviews, and (3) detailed results of the meta-analyses that were included in all six systematic reviews (see tables 11, 12, and 13).[1]

Table 9: Characteristics of Selected Systematic Reviews

Health outcome or health behavior	Citation	Study locations	Research designs[a]	Follow-up period	WHO/ILO study[b]
Stroke Stroke prevalence, incidence, and mortality[c]	Alexis Descatha, Grace Sembajwe, Frank Pega, Yuka Ujita, Michael Baer, Fabio Boccuni, Cristina Di Tecco et al, "The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the World Health Organization/International Labor Organization (WHO/ILO) Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105746.	Denmark, Finland, France, Japan, Korea, Sweden, United Kingdom, United States	20 cohort studies and 2 case-control studies	8-20 years	Yes
Ischemic heart disease (coronary heart disease) Ischemic heart disease prevalence, incidence, and mortality[c]	Jian Li, Frank Pega, Yuka Ujita, Chantal Brisson, Els Clays, Alexis Descatha, Marco M. Ferrario et al, "The effect of exposure to long working hours on ischaemic heart disease: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105739.	Australia, Belgium, China, China (Taiwan), Denmark, Finland, Germany, Israel, Japan, Korea, Netherlands, Sweden, United Kingdom, United States	26 cohort studies and 11 case-control studies	1-30 years	Yes

[1]A systematic review attempts to answer a specific research question by identifying, appraising, and synthesizing all the empirical evidence—such as published and unpublished studies by other researchers—that meets pre-specified eligibility criteria. Researchers conducting these reviews use explicit, systematic methods that aim to minimize bias and produce more reliable findings than individual studies. Each of the six systematic reviews we selected conducted a meta-analysis, which is a statistical method for combining the results of multiple individual studies.

Health outcome or health behavior	Citation	Study locations	Research designs[a]	Follow-up period	WHO/ILO study[b]
Type 2 diabetes Type 2 diabetes incidence[c]	Mika Kivimäki, Marianna Virtanen, Ichiro Kawachi, Solja T. Nyberg, Lars Alfredsson, G. David Batty, Jakob B. Bjorner et al, "Long working hours, socioeconomic status, and the risk of incident type 2 diabetes: a meta-analysis of published and unpublished data from 222,120 individuals," *The Lancet Diabetes & Endocrinology*, vol. 3 (2015): 27-34.	Australia, Denmark, Finland, Japan, Sweden, United Kingdom, United States	23 cohort studies	2.9-25.5 years	No
Negative weight-related outcomes Weight gain, body mass index increase, overweight, and obesity	Yi Zhu, Jianxin Liu, Heng Jiang, Tracey J. Brown, Qingfeng Tian, Yudi Yang, Chao Wang et al, "Are long working hours associated with weight-related outcomes? A meta-analysis of observational studies," *Obesity Reviews*, vol. 21 (2020): e12977.	Australia, Brazil, Canada, Denmark, Finland, Italy, Japan, Saudi Arabia, Serbia, South Korea, Sweden United Kingdom, United States	8 cohort studies and 21 cross-sectional studies	Not readily available	No
Alcohol use Alcohol consumption (grams/week) Risky drinking (>14 drinks/week for women and >21 drinks/week for men) **Alcohol use disorder** (prevalence, incidence, and mortality)[c]	Daniela V. Pachito, Frank Pega, Jelena Bakusic, Emma Boonen, Els Clays, Alexis Descatha, Ellen Delvaux et al, "The effect of exposure to long working hours on alcohol consumption, risky drinking and alcohol use disorder: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 146 (2021): 106205.	Australia, Belgium, Finland, Germany, United Kingdom United States	14 cohort studies	8-62 years	Yes
Depression Depression prevalence, incidence, and mortality[c]	Reiner Rugulies, Kathrine Sørensen, Cristina Di Tecco, Michela Bonafede, Bruna M. Rondinone, Seoyeon Ahn, Emiko Ando et al, "The effect of exposure to long working hours on depression: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 155 (2021): 106629.	Australia, Canada, Israel, Japan, Korea, United Kingdom, United States, and many European countries	22 cohort studies	6 months-32 years	Yes

Source: GAO review of selected systematic reviews. | GAO-24-106772

Notes: Studies from the United States were not necessarily included for every specific health outcome. For example, no U.S. studies examined the association between long work hours and deaths from ischemic heart disease.

[a]Cohort studies follow a group of individuals over time to examine associations between exposures and outcomes. Cohort studies can be conducted either prospectively or retrospectively based on when an outcome occurs relative to when individuals are enrolled in the study. Cross-sectional studies measure outcomes and exposures at one point in time and often cannot establish whether the

health outcome followed the exposure. Case-control studies start with a group of individuals who have the outcome of interest, and then compare them to a second group of similar individuals who do not have the outcome of interest.

[b]Four of the six systematic reviews we selected (on stroke, ischemic heart disease, alcohol use, and depression) were conducted as part of an effort by the World Health Organization (WHO)/International Labor Organization (ILO) to estimate the global burden of poor health outcomes attributable to long work hours.

[c]Prevalence is the proportion of the population with a health condition during a certain time period (e.g., the proportion of individuals in 2024 who had ever been diagnosed with heart disease). Incidence is the number of new cases of a health condition in a certain time period (e.g., the number of individuals in 2024 who received a first diagnosis of heart disease). Mortality is death due to the specific health condition.

The WHO/ILO Research Process

Four of the six systematic reviews we selected (on stroke, ischemic heart disease, alcohol use, and depression) were conducted as part of an effort by the WHO and ILO to estimate the global burden of poor health outcomes attributable to long work hours. The authors followed a structured process to determine whether the quality and strength of the evidence were sufficient to conclude that long work hours may have caused an increased risk of the health outcome or behavior.[2] Specifically, the authors rated the quality of evidence as high, moderate, or low within five domains: (1) risk of bias, (2) inconsistency, (3) indirectness, (4) imprecision, and (5) publication bias. Within each of these domains, the authors followed a structured process to determine the rating.[3] In addition, the authors rated the strength of evidence as sufficient, limited, or inadequate by integrating the quality of evidence ratings described above with other elements that could bolster or undermine confidence in the data.[4] See Table 10 for definitions of the strength of evidence ratings.

[2]This research process was based on the Navigation Guide. See Tracey J. Woodruff and Patrice Sutton, "The Navigation Guide Systematic Review Methodology: A Rigorous and Transparent Method for Translating Environmental Health Science Into Better Health Outcomes," *Environmental Health Perspectives*, vol. 122, no. 10 (2014): 1007-1014.

[3]For example, the authors rated the risk of each of the following sources of bias for each individual study: selection bias, performance bias, detection bias (exposure assessment), detection bias (outcome assessment), confounding, selection bias (incomplete outcome data), reporting bias, and conflicts of interest.

[4]For example, the authors determined whether the direction of the effect was as expected (i.e., long work hours were associated with an increased likelihood of the poor health outcome).

Table 10: Strength of Evidence Ratings Used in World Health Organization/International Labor Organization (WHO/ILO) Systematic Reviews

Evidence rating	Definition
Sufficient evidence of harmfulness	A positive relationship is observed between exposure and outcome where chance, bias, and confounding can be ruled out with reasonable confidence. The available evidence includes results from one or more well-designed, well conducted studies and the conclusion is unlikely to be strongly affected by the results of future studies.
Limited evidence of harmfulness	A positive relationship is observed between exposure and outcome where chance, bias, and confounding cannot be ruled out with reasonable confidence. Confidence in the relationship is constrained by such factors as the number, size, or quality of individual studies, or inconsistency of findings across individual studies. As more information becomes available, the observed effect could change, and this change may be large enough to alter the conclusion.
Inadequate evidence of harmfulness	The available evidence is insufficient to assess the effects of the exposure. Evidence is insufficient because of the limited number or size of the studies, low quality of individual studies, or inconsistency of findings across the individual studies.

Source: Alexis Descatha, Grace Sembajwe, Frank Pega, Yuka Ujita, Michael Baer, Fabio Boccuni, Cristina Di Tecco et al, "The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105746. | GAO-24-106772

Results of Meta-Analyses Included in Systematic Reviews

Table 11: Results from WHO/ILO Meta-Analyses on the Relationships Between Long Work Hours and Stroke, Ischemic Heart Disease, Increased Alcohol Use, and Depression

Health outcome or behavior	Category of hours worked per week	# of participants (studies)	Effect size - risk ratio, unless otherwise noted (95% confidence interval)	WHO/ILO rating: quality of evidence	WHO/ILO rating: strength of evidence
Experienced stroke (incidence)[a]	41-48	277,202 (18 studies)	1.04 (0.94, 1.14)	Low	Inadequate
	49-54	275,139 (17 studies)	1.13 (1.00, 1.28)	Moderate	Limited
	55+	162,644 (7 studies)	1.35* (1.13, 1.61)	Moderate	Sufficient
Died from stroke (mortality)[a]	41-48	265,937 (12 studies)	1.01 (0.91, 1.12)	Low	Inadequate
	49-54	256,129 (11 studies)	1.13 (0.99, 1.29)	Low	Inadequate
	55+	726,803 (10 studies)	1.08 (0.89, 1.31)	Low	Inadequate

Health outcome or behavior	Category of hours worked per week	# of participants (studies)	Effect size - risk ratio, unless otherwise noted (95% confidence interval)	WHO/ILO rating: quality of evidence	WHO/ILO rating: strength of evidence
Developed ischemic heart disease (coronary heart disease) (incidence)[b]	41-48	312,209 (20 studies)	0.98 (0.91, 1.07)	Low	Inadequate
	49-54	308,405 (18 studies)	1.05 (0.94, 1.17)	Low	Inadequate
	55+	339,680 (22 studies)	1.13* (1.02, 1.26)	Moderate	Sufficient
Died from ischemic heart disease (coronary heart disease) (mortality)[b]	41-48	288,278 (13 studies)	0.99 (0.88, 1.12)	Low	Inadequate
	49-54	284,474 (11 studies)	1.01 (0.82, 1.25)	Low	Inadequate
	55+	726,803 (16 studies)	1.17* (1.05, 1.31)	Moderate	Sufficient
Increased alcohol use (grams of alcohol consumed per week)[c]	41-48	25,904 (7 studies)	Mean Difference 10.4 g/week* (5.59, 15.20)	Low	Inadequate
	49-54	19,158 (7 studies)	Mean Difference 17.69 g/week* (9.16, 26.22)	Low	Inadequate
	55+	8,794 (4 studies)	Mean Difference 16.29 g/week* (7.93, 24.65)	Low	Inadequate
Engaged in risky drinking (consuming >14 drinks/week for women and >21 drinks/week for men)[c]	41-48	6,325 (12 studies)	1.08 (0.86, 1.36)	Low	Inadequate
	49-54	3,832 (12 studies)	1.12 (0.90, 1.39)	Moderate	Inadequate
	55+	4,525 (12 studies)	1.11 (0.95, 1.30)	Moderate	Inadequate
Experienced depression (incidence)[d]	41-48	49,392 (8 studies)	Odds Ratio 1.05 (0.86, 1.29)	Low	Inadequate
	49-54	49,392 (8 studies)	Odds Ratio 1.06 (0.93, 1.21)	Low	Inadequate
	55+	91,142 (17 studies)	Odds Ratio 1.08 (0.94, 1.24)	Low	Inadequate

Legend * = statistically significant at the 95 percent confidence level. WHO/ILO = World Health Organization/International Labor Organization.

Source: Systematic reviews cited in table notes below. | GAO-24-106772

GAO-24-106772 Work Hours and Health

Notes: Effect sizes are estimates and are relative to a 35-40 hour work week. There is 95 percent confidence that the true effect sizes are within the provided confidence intervals. Estimates are adjusted for age, sex, and socioeconomic status. Socioeconomic status is commonly defined as a combination of social and economic factors, such as education, income, and type of job. Definitions for the quality and strength of evidence are provided in the systematic reviews cited below. The authors conducted sensitivity and subgroup analyses which included, but were not limited to, region, sex, and socioeconomic status. The authors did not find statistically significant differences between subgroups, with three exceptions: (1) for individuals with low socioeconomic status, relative to working regular full-time hours, working 55 or more hours per week is associated with greater risks of developing and dying from ischemic heart disease than for individuals with intermediate or high socioeconomic status; (2) for younger adults (ages 15-29), there is no association between working long hours and increased alcohol consumption; and (3) for adults ages 30–34 years old, exposure to long working hours increased the risk of risky drinking (this finding was not observed among other age groups).

[a]Alexis Descatha, Grace Sembajwe, Frank Pega, Yuka Ujita, Michael Baer, Fabio Boccuni, Cristina Di Tecco et al, "The effect of exposure to long working hours on stroke: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105746. The authors searched for eligible studies on the relationship between long work hours and the prevalence of stroke but found none.

[b]Jian Li, Frank Pega, Yuka Ujita, Chantal Brisson, Els Clays, Alexis Descatha, Marco M. Ferrario et al, "The effect of exposure to long working hours on ischaemic heart disease: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 142 (2020): 105739. The authors searched for eligible studies on the relationship between long work hours and the prevalence of ischemic heart disease but found none.

[c]Daniela V. Pachito, Frank Pega, Jelena Bakusic, Emma Boonen, Els Clays, Alexis Descatha, Ellen Delvaux et al, "The effect of exposure to long working hours on alcohol consumption, risky drinking and alcohol use disorder: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 146 (2021): 106205. In the United States, a typical alcoholic drink (e.g. five ounces of wine) has about 14 grams of alcohol, according to the Centers for Disease Control and Prevention. The authors searched for eligible studies on the relationship between long work hours and the prevalence and incidence of alcohol use disorder, as well as mortality from alcohol use disorder, but found none.

[d]Reiner Rugulies, Kathrine Sørensen, Cristina Di Tecco, Michela Bonafede, Bruna M. Rondinone, Seoyeon Ahn, Emiko Ando et al, "The effect of exposure to long working hours on depression: A systematic review and meta-analysis from the WHO/ILO Joint Estimates of the Work-related Burden of Disease and Injury," *Environment International*, vol. 155 (2021): 106629. The authors searched for studies on the relationship between long work hours and the prevalence of depression, as well as mortality from depression, but found none.

Table 12: The Relationship Between Long Work Hours and Type 2 Diabetes by Socioeconomic Status

Health outcome or behavior	Population	Number of participants (studies)	Effect size - risk ratio (95% confidence interval)
Type 2 diabetes	**Total pooled results**	**222,120**	**1.07**
		(23 studies)	**(0.89, 1.27)**
	Low socioeconomic status	43,401	1.29*
		(19 studies)	(1.06, 1.57)
	Intermediate socioeconomic status	58,653	1.13
		(19 studies)	(0.88, 1.44)
	High socioeconomic status	47,492	1.00
		(19 studies)	(0.80, 1.25)

Legend: * = statistically significant at the 95 percent confidence level.

Note: The effect sizes are relative to a normal work week, which was defined as 35-40 hours/week in 19 studies and in varying ways in four studies. There is 95 percent confidence that the true effect sizes are within the provided confidence intervals. Estimates are adjusted for age and sex. Socioeconomic status is commonly defined as a combination of social and economic factors, such as education, income, and type of job. The definition of long work hours varied among the studies included in the systematic review, from more than 53 hours per week to more than 60 hours per week.

Table 13: The Relationship Between Long Work Hours and Negative Weight-Related Outcomes

Health outcome or behavior	Population	Number of participants (studies)	Effect size - odds ratio (95% confidence interval)
Negative weight-related outcomes (weight gain, increase in body mass index, overweight, and obesity)	Total pooled results	374,863	1.13*
		(29 studies)	(1.07, 1.19)

Legend: * = statistically significant at the 95 percent confidence level.

Note: The effect sizes are relative to a normal work week. The definition of normal work hours and long work hours varied among the included studies. There is 95 percent confidence that the true effect size is within the provided confidence interval. Of the 29 studies included in the systematic review, 24 adjusted for covariates, and five did not.

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact	Thomas Costa, (202) 512-4769, costat@gao.gov
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