Prevalence of the Metabolic Syndrome Among U.S. Workers

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OBJECTIVE — Differences in the prevalence of cardiovascular disease (CVD) and its risk factors among occupational groups have been found in several studies. Certain types of workers (such as shift workers) may have a greater risk for metabolic syndrome, a precursor of CVD. The objective of this study was to assess the differences in prevalence and risk of metabolic syndrome among occupational groups using nationally representative data of U.S. workers.

RESEARCH DESIGN AND METHODS — Data from 8,457 employed participants (representing 131 million U.S. adults) of the 1999–2004 National Health and Nutrition Examination Survey were used. Unadjusted and age-adjusted prevalence and simple and multiple logistic regression analyses were conducted, adjusting for several potential confounders (BMI, alcohol drinking, smoking, physical activity, and sociodemographic characteristics) and survey design.

RESULTS — Of the workers, 20% met the criteria for the metabolic syndrome, with “miscellaneous food preparation and food service workers” and “farm operators, managers, and supervisors” having the greatest age-adjusted prevalence (29.6–31.1%) and “writers, artists, entertainers, and athletes,” and “engineers, architects, scientists” the lowest (8.5–9.2%). In logistic regression analyses “transportation/material moving” workers had significantly greater odds of meeting the criteria for metabolic syndrome relative to “executive, administrative, managerial” professionals (odds ratio 1.70 [95% CI 1.49–2.52]).

CONCLUSIONS — There is variability in the prevalence of metabolic syndrome by occupational status, with “transportation/material moving” workers at greatest risk for metabolic syndrome. Workplace health promotion programs addressing risk factors for metabolic syndrome that target workers in occupations with the greatest odds may be an efficient way to reach at-risk populations.

According to the Centers for Disease Control and Prevention, approximately one-third of Americans met the criteria for metabolic syndrome from 2003 to 2006 (1). Metabolic syndrome is a condition defined by the clustering of risk factors associated with obesity that raise the risk of cardiovascular disease and type 2 diabetes (2). Specifically, these risk factors are a large waist circumference (i.e., central adiposity), high level of triglycerides, low level of HDL cholesterol, high blood pressure, and high fasting blood glucose levels (2).

Research suggests that there may be differences in the prevalence of metabolic syndrome by occupational type. For example, studies have shown a high prevalence of metabolic risk factors among shift workers (3). Differences in the prevalence of metabolic syndrome among occupational groups have also been observed among workers in Spain (4). We have found a high prevalence of obesity among certain occupations such as “farming, forestry, fishing” and “transportation/material moving” occupations in the U.S. (5). However, the prevalence of the metabolic syndrome by occupation in the U.S. population is unknown. To address this gap, in the current study we examined the prevalence of the metabolic syndrome in 40 major U.S. occupational groups using nationally representative data.

RESEARCH DESIGN AND METHODS — Data from the 1999–2004 National Health and Nutrition Examination Survey (NHANES), a multi-stage stratified complex design survey of a representative sample of the entire U.S. civilian population conducted by the National Center for Health Statistics (NCHS), was analyzed. In brief, trained interviewers and laboratory technicians conducted in-person interviews, performed physical examinations, and collected urine and blood samples either at mobile examination centers or at home (6). The response rates for participants interviewed in the NHANES surveys ranged from 79 to 84%, whereas the response rates for the participants examined ranged from 76 to 80% (6). Individuals who reported being employed and who had occupational group data, were ≥20 years, and were not pregnant were included in the analyses (n = 8,498).

Main variables

The presence of the metabolic syndrome was based on the modified version of the definition recommended in 2001 by the Third Report of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (7,8). Metabolic syndrome was a dichotomous variable defined to be present or not based on having at least three of the following five criteria: 1) blood pressure ≥130/85 mmHg or receiving treatment for hypertension, 2) HDL cholesterol <50 mg/dl if a woman and <40 mg/dl if a man, 3) triglyceride level of ≥150 mg/
Employment status was based on the question “Did you work last week?” Occupational classifications were based on the 40 NCHS occupational codes (10) that appear in the NHANES data file. These variables were collapsed into 13 NCHS occupational groups. The collapsing of the 40 occupational groups into 13 occupational groups is the method used in all NCHS surveys, including the National Health Interview Survey with the occupational groups originally based on the more detailed U.S. Census Standard Occupation Classification System occupational groups (10,11). Table 2 shows where each of the 40 occupational groups falls within the 13 broader occupational groups.

### Statistical analyses
Analyses were completed using SUDAAN (version 8.0) to take into account sample weights and design effects (12). The unadjusted and age-adjusted prevalence estimates for meeting the criteria for the metabolic syndrome were determined among workers aged ≥20 years. For unadjusted and age-adjusted prevalence estimates, all 40 occupational groups available in the NHANES data file were used. However, given the small sample size of workers in certain occupational groups, only 13 occupational groups were used for the logistic regression analyses. Occupation-specific prevalence estimates of metabolic syndrome were considered significantly “higher” than the “overall” sample prevalence rate if the occupation-specific prevalence was above the upper bound of the 95% CI for the overall sample. This is a variation on the method of testing a one-sample difference in proportions considering the overall sample as the population proportion (13).

Simple and multiple logistic regression analyses were then conducted with meeting criteria for the metabolic syndrome as the dependent variable (yes vs. no). Multiple logistic regression analyses adjusted for sex (male vs. female), age (in years), race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other), education (less than high school, high school education or equivalent, and greater than high school), health insurance (none vs. insured), BMI (underweight/normal, overweight, and obese), smoking status (nonsmoker, former smoker, and current smoker), alcohol drinking status (abstainer vs. drinker), and physical activity (none, moderate, and vigorous). An α level of 0.05 was used to determine statistical significance. This study was approved by the University of Miami Human Subjects Committee.

### RESULTS
The prevalence of metabolic syndrome stratified by worker sample characteristics is shown in Table 1 (n = 8,498). The overall unadjusted prevalence estimate for all workers was 18.7% (95% CI [17.4–20.0%]), whereas the age-adjusted estimate was 20.6% [18.9–22.3%]. Occupations with the highest unadjusted prevalence for meeting criteria for the metabolic syndrome (all significantly higher than the prevalence for the overall sample) were “other transportation and material occupations” (33.1% [23.1–45.0%]), followed by “farm operators, managers, and supervisors” (27.4% [15.7–43.3%]), and “motor vehicle operators” (26.4% [21.2–32.2%]). The lowest unadjusted prevalence for meeting criteria for the metabolic syndrome was found among “writers, artists, entertainers, and athletes” (6.9% [3.6–12.8%]), followed

### Table 1—Sample characteristics of U.S. workers by presence of the metabolic syndrome, NHANES, 1999–2004

| Demographics | Sample* | Total estimated U.S. workers | Metabolic syndrome prevalence (95% CI) |
|--------------|---------|-----------------------------|---------------------------------------|
| Sex          |         |                             |                                       |
| Male         | 4,523   | 71,430,841                  | 20.2 (18.1–22.3)                      |
| Female       | 3,934   | 60,275,573                  | 21.4 (19.5–23.5)                      |
| Age-group    |         |                             |                                       |
| 20–44 years  | 5,485   | 82,268,270                  | 14.0 (12.7–15.5)                      |
| 45–64 years  | 2,507   | 44,652,673                  | 25.5 (23.3–27.8)                      |
| ≥65 years    | 465     | 4,536,988                   | 32.1 (26.2–38.6)                      |
| Race/ethnicity |      |                             |                                       |
| Non-Hispanic white | 3,990   | 94,142,211                  | 21.0 (19.0–23.1)                      |
| Non-Hispanic black | 1,728   | 13,875,980                  | 17.7 (15.0–20.7)                      |
| Hispanic     | 2,476   | 18,066,872                  | 21.9 (17.9–26.6)                      |
| Other        | 263     | 5,373,350                   | 12.9 (9.3–17.7)                       |
| Education    |         |                             |                                       |
| <High school | 2,179   | 20,451,484                  | 23.0 (19.8–26.5)                      |
| High school  | 2,123   | 33,287,060                  | 23.8 (20.7–27.1)                      |
| >High school | 4,150   | 77,659,837                  | 18.4 (16.4–20.6)                      |
| Health insurance |     |                             |                                       |
| None         | 2,004   | 23,937,496                  | 17.8 (15.3–20.5)                      |
| Insured      | 6,322   | 105,707,056                 | 20.2 (18.4–22.2)                      |
| Alcohol consumer |     |                             |                                       |
| Abstainer    | 1,818   | 27,122,688                  | 24.1 (21.7–26.7)                      |
| Drinker      | 5,137   | 91,101,707                  | 19.4 (17.5–21.5)                      |
| Smoking status |       |                             |                                       |
| Nonsmoker    | 2,191   | 38,269,927                  | 20.6 (17.7–23.8)                      |
| Former smoker| 4,163   | 62,277,607                  | 20.9 (18.9–23.0)                      |
| Current smoker | 1,686  | 25,929,516                  | 18.2 (15.8–20.9)                      |
| Physical activity level |    |                             |                                       |
| None         | 3,087   | 40,822,293                  | 24.4 (22.0–27.1)                      |
| Moderate     | 2,156   | 36,429,138                  | 23.3 (21.0–25.8)                      |
| Vigorous     | 3,214   | 54,166,982                  | 13.8 (11.7–16.4)                      |
| BMI category |         |                             |                                       |
| Underweight  | 157     | 2,379,708                   | 2.2 (0.3–13.5)                        |
| Normal       | 2,717   | 42,612,147                  | 4.6 (3.3–6.5)                         |
| Overweight   | 2,884   | 45,068,224                  | 15.8 (13.8–18.0)                      |
| Obese        | 2,481   | 38,248,387                  | 42.5 (39.5–45.6)                      |

Data are n (%) or n unless otherwise indicated. n = 8,498. *Sample varies due to item non-response.
# Table 2—Unadjusted and age-adjusted prevalence of metabolic syndrome by 40 occupational groups: NHANES, 1999–2004

| Detailed 40 of 13 occupational groups | Sample n | Total estimated U.S. workers | Unadjusted metabolic syndrome (95% CI) | Age-adjusted metabolic syndrome (95% CI) |
|--------------------------------------|----------|-----------------------------|---------------------------------------|----------------------------------------|
| Overall                              | 8,498    | 132,126,344                 | 18.7 (17.4–20.0)                      | 20.6 (18.9–22.3)                       |
| Executive, administrative, managerial|          |                             |                                       |                                        |
| Executive, administrators and managers| 624      | 12,452,093                  | 19.0 (15.5–23.0)                      | 20.2 (15.8–25.4)                       |
| Management-related occupations        | 236      | 4,545,506                   | 16.4 (10.8–24.1)                      | 18.9 (12.6–27.4)                       |
| Professional specialty                |          |                             |                                       |                                        |
| Engineers, architects, scientists     | 239      | 5,099,103                   | 11.6 (7.6–17.1)                       | 9.2 (6.2–13.6)                         |
| Health diagnosing, assessing, and treating | 200    | 4,245,052                   | 13.1 (9.0–18.6)                       | 11.8 (7.2–18.7)                        |
| Teachers                             | 322      | 5,999,397                   | 17.6 (13.0–23.4)                      | 16.2 (11.7–22.1)                       |
| Writers, artists, entertainers, and athletes | 147    | 2,756,259                   | 6.9 (3.6–12.8)                        | 8.5 (4.5–15.4)                        |
| Other professional specialty occupations | 226    | 4,230,656                   | 19.9 (13.6–27.6)                      | 19.0 (13.5–26.0)                       |
| Technicians/relative support          |          |                             |                                       |                                        |
| Technicians and related support occupations | 235  | 4,328,669                   | 17.3 (12.0–24.3)                      | 21.9 (15.1–30.6)                       |
| Sales                                |          |                             |                                       |                                        |
| Supervisors and proprietors, sales occupations | 183  | 3,475,855                   | 19.0 (13.0–27.0)                      | 21.2 (14.2–30.3)                       |
| Sales representatives, finance, business, commodities | 213  | 4,417,352                   | 19.0 (14.1–25.0)                      | 20.2 (14.4–27.5)                       |
| Sales workers, retail and personal services | 515  | 6,254,494                   | 19.1 (14.9–24.1)                      | 21.4 (16.5–27.2)                       |
| Administrative support, including clerical |        |                             |                                       |                                        |
| Secretaries, stenographers, and typists | 123  | 2,077,302                   | 24.7 (16.6–35.1)                      | 25.2 (17.0–35.7)                       |
| Information clerks                   | 141      | 2,260,229                   | 20.8 (13.2–31.3)                      | 25.5 (18.5–38.5)                       |
| Records processing occupations       | 229      | 3,877,767                   | 19.2 (14.3–25.1)                      | 22.6 (15.5–31.7)                       |
| Material recording, scheduling, and distribution clerks | 149  | 2,272,419                   | 22.0 (14.2–32.3)                      | 17.9 (11.5–26.9)                       |
| Miscellaneous occupations administrative support | 538  | 8,437,284                   | 20.8 (16.3–26.2)                      | 21.8 (16.4–28.4)                       |
| Private household                    |          |                             |                                       |                                        |
| Private service occupations          | 95       | 1,173,516                   | 16.3 (9.3–26.9)                       | 18.0 (9.1–32.5)                        |
| Protective service                   |          |                             |                                       |                                        |
| Protective service occupations       | 146      | 2,174,960                   | 23.6 (16.3–33.1)                      | 26.1 (17.8–36.5)                       |
| Service except protective and household |        |                             |                                       |                                        |
| Waiters and waitresses               | 145      | 2,118,954                   | 7.6 (3.3–16.5)                        | 13.1 (6.1–26.0)                        |
| Cooks                                | 218      | 2,343,133                   | 22.5 (13.8–34.4)                      | 26.0 (17.2–37.2)                       |
| Miscellaneous food preparation and service occupations | 191  | 2,199,576                   | 25.2 (16.4–36.3)                      | 31.1 (19.6–45.4)                       |
| Health service occupations           | 263      | 3,139,282                   | 19.6 (13.9–26.9)                      | 26.6 (19.4–35.3)                       |
| Cleaning and building service occupations | 300  | 3,407,610                   | 21.7 (16.1–28.5)                      | 25.3 (18.7–33.2)                       |
| Personal service occupations         | 195      | 2,654,868                   | 15.7 (9.8–24.3)                       | 17.6 (11.0–27.0)                       |
| Farming, forestry, fishing           |          |                             |                                       |                                        |
| Farm operators, managers, and supervisors | 44   | 751,233                    | 27.4 (15.7–43.3)                      | 29.8 (13.8–52.9)                       |
| Farm and nursery workers             | 113      | 972,204                     | 18.7 (11.4–29.1)                      | 22.4 (13.2–35.3)                       |
| Related agricultural, forestry, and fishing occupations | 164  | 173,386                    | 16.0 (9.9–24.9)                       | 19.4 (11.5–30.8)                       |
| Precision, production, craft, repair |          |                             |                                       |                                        |
| Vehicle and equipment mechanics and mobile repairers | 110  | 1,693,265                   | 20.5 (11.1–34.8)                      | 17.7 (11.0–23.7)                       |
| Other mechanics and repairers        | 166      | 2,978,631                   | 23.0 (16.3–31.1)                      | 21.3 (14.8–29.7)                       |
| Construction trades                  | 470      | 7,303,001                   | 11.9 (8.4–16.6)                       | 14.8 (8.2–22.5)                        |
| Extractive and precision production occupations | 232  | 3,705,680                   | 21.3 (15.2–29.0)                      | 23.7 (17.1–32.0)                       |
| Textile, apparel, and furnishings machine operators | 79   | 879,662                    | 23.0 (13.3–36.7)                      | 24.2 (14.5–37.4)                       |
| Machine operators, assemblers        |          |                             |                                       |                                        |
| Machine operators, assorted materials | 212  | 2,858,367                   | 22.7 (16.4–30.7)                      | 19.2 (13.6–26.3)                       |
| Fabricators, assemblers, inspectors, and samplers | 191  | 2,864,688                   | 20.3 (14.7–27.4)                      | 21.3 (14.5–31.9)                       |
| Transportation/material moving       |          |                             |                                       |                                        |
| Motor vehicle operators              | 310      | 4,548,701                   | 26.4 (21.2–32.2)                      | 25.6 (20.4–31.6)                       |
| Other transportation and material occupations | 96   | 1,569,250                   | 33.1 (23.1–45.0)                      | 25.6 (18.4–34.6)                       |
| Handlers, equipment, cleaners, helpers, laborers |        |                             |                                       |                                        |
| Construction laborers                | 112      | 1,172,573                   | 20.0 (13.4–28.5)                      | 24.2 (17.0–33.1)                       |
| Laborers, except construction        | 43       | 584,216                     | 14.5 (4.6–37.5)                       | 16.4 (5.6–39.1)                        |
| Freight, stock, and material movers  | 154      | 1,886,241                   | 16.7 (9.5–27.9)                       | 17.4 (9.7–29.1)                        |
| Other helpers, equipment cleaners, hand packagers, and laborers | 129  | 1,284,122                   | 12.7 (7.4–21.1)                       | 14.9 (8.1–26.0)                        |

Data are n unless otherwise indicated. Prevalence estimates were considered significantly “higher” than the total sample prevalence estimate if the prevalence for that occupation was above the upper bound of the 95% CI for the total sample; these appear in bold (13).
by “waiters and waitresses” (7.6% [3.3–16.5%]) and “construction trades” workers (11.9% [8.4–16.6%]).

There was not much difference in the prevalence of meeting criteria for the metabolic syndrome after adjustment for age. However, the order or ranking of occupations with the highest prevalence did differ to some degree. For example, “other transportation and material occupations” and “motor vehicle operators,” the two occupations falling within the group of “transportation/material moving” were no longer the occupational groups with the highest prevalence for meeting criteria for the metabolic syndrome. After adjustment for age, occupations with the highest prevalence of the metabolic syndrome (all significantly higher than the prevalence for the overall sample) now included “miscellaneous food preparation and service occupations” (31.1% [95% CI 19.6–45.4%]), followed by “farm operators, managers, and supervisors” (29.8% [13.8–52.9%]), and “health service occupations” (26.6% [19.4–35.3%]). The lowest age-adjusted prevalence of the metabolic syndrome was documented in “writers, artists, entertainers, and athletes” (8.5% [4.5–15.4%]), “engineers, architects, scientists” (9.2% [6.2–13.6%]), and “health diagnosing, assessing, and treating” workers (11.8% [7.2–18.7%]).

The logistic regression analyses adjusting for demographics and potential confounders showed that “transportation/material moving” workers relative to “executive, administrative, managerial” professionals were significantly more likely to meet the criteria for the metabolic syndrome (odds ratio 1.70 [95% CI 1.15–2.52]) (Table 3). Among all U.S. workers, other participant characteristics with significantly greater odds of meeting criteria for the metabolic syndrome included older age (1.03 [1.03–1.04]) and being overweight (5.63 [3.80–8.35]) or obese (25.94 [18.08–37.23]) relative to underweight or normal weight. Lower odds for metabolic syndrome included being non-Hispanic black (0.48 [0.36–0.65]) relative to non-Hispanic white, alcohol consumer relative to non–alcohol consumer (0.78 [0.64–0.97]), being a former smoker relative to a never smoker (0.81 [0.67–0.97], and doing vigorous physical activity relative to no physical activity (0.63 [0.53–0.73]).

CONCLUSIONS — This is the first nationally representative study of U.S. workers to estimate the prevalence of metabolic syndrome in various occupational groups. In both unadjusted and age-adjusted analyses, we found a threefold difference in the prevalence of metabolic syndrome across occupational groups, with the greatest unadjusted prevalence among “other transportation and material occupations” and age-adjusted prevalence among “food preparation and food service workers.”

Differences in the prevalence of metabolic syndrome by occupation are likely to be strongly influenced by differences in the prevalence of obesity (14). Interestingly, even after adjustment for potential confounders including obesity, older age, sex, race/ethnicity, education, physical activity, alcohol consumption, and smoking, “transportation and material moving workers” showed statistically significant

| Table 3—Multiple logistic regression to assess the relationship between occupation and criteria for the metabolic syndrome among adults aged ≥20 years: NHANES 1999–2004 |
|---------------------------------|-----------------|
| Age (years)                      | 1.03 (1.03–1.04) |
| Sex                             | 1.00            |
| Female                          | 1.10 (0.88–1.37) |
| Male                            | 1.00            |
| Race/ethnicity                  |                |
| Non-Hispanic white              | 0.49 (0.37–0.65) |
| Non-Hispanic black              | 0.95 (0.71–1.25) |
| Hispanic                        | 0.94 (0.57–1.55) |
| Other                           | 1.00            |
| Education                       |                |
| <High school                    | 0.99 (0.68–1.44) |
| High school                     | 0.93 (0.68–1.28) |
| >High school                    | 1.00            |
| Health insurance                |                |
| None                            | 1.00            |
| Insured                         | 0.78 (0.63–1.02) |
| Alcohol consumer                |                |
| Abstainer                       | 1.00            |
| Drinker                         | 0.79 (0.63–0.97) |
| BMI category                    |                |
| Underweight/normal              | 1.07 (1.05–1.09) |
| Overweight                      | 1.00            |
| Obese                           | 5.63 (3.80–8.35) |
| Smoking status                  |                |
| Nonsmoker                       | 1.00            |
| Former smoker                   | 0.81 (0.67–0.97) |
| Current smoker                  | 0.78 (0.58–1.04) |
| Physical activity level         |                |
| None                            | 1.00            |
| Moderate                        | 0.93 (0.77–1.13) |
| Vigorous                        | 0.63 (0.53–0.75) |
| Occupational group (13 groups)  |                |
| Executive, administrative managerial | 1.00            |
| Professional specialty          | 0.89 (0.66–1.23) |
| Technicians/relative support    | 0.96 (0.52–1.79) |
| Sales                           | 1.08 (0.69–1.67) |
| Administrative support, including clerical | 1.26 (0.90–1.78) |
| Private household               | 0.63 (0.27–1.44) |
| Protective service              | 1.23 (0.67–2.28) |
| Service except protective and household | 1.08 (0.71–1.65) |
| Farming, forestry, fishing      | 0.95 (0.63–1.44) |
| Precision, production, craft, repair | 0.97 (0.66–1.41) |
| Machine operators, assemblers   | 1.15 (0.73–1.81) |
| Transportation/material moving  | 1.70 (1.15–2.52) |
| Handlers, equipment, cleaners, helpers, laborers | 1.07 (0.63–1.83) |

*Statistically significant estimates at the 0.05 α level appear in bold.
greater odds for meeting the criteria for metabolic syndrome compared with other workers. This finding is consistent with several studies that have found transportation workers (such as truck drivers) to have a higher prevalence and incidence of cardiovascular disease, including heart disease and stroke (15,16). A potential explanation for the relationship between transportation work and meeting the criteria for the metabolic syndrome could be more irregular work schedules and shift work, sleep problems, and job stress, as these factors have been associated with metabolic syndrome (3–5,17,18); of note, each of these occupational factors is more prevalent among transportation workers relative to other occupational groups (16,19,20). Additional research is needed to understand the relative role that these occupational risk factors play in influencing metabolic syndrome prevalence rates across occupational groups, as well as occupation exposures, which may be unique among “transportation/material moving” workers.

The present study had several limitations, such as its cross-sectional design, which did not allow for causal inferences. Another limitation was the lack of fasting glucose values for determination of metabolic syndrome status among all NHANES study participants, which could have led to an underestimate of the prevalence of metabolic syndrome in this study. However, sensitivity analyses were performed in the subsample (one-third of the total NHANES sample) that did have the fasting blood glucose data needed for defining metabolic syndrome (i.e., with having a metabolic risk factor of having self-reported diabetes or a fasting blood glucose measurement of ≥100 mg/dl). Although not statistically significant, the results were similar in terms of direction of the estimates with use of the previous definition (i.e., self-report of diabetes only). Details about working conditions or work characteristics were not available in NHANES. Thus, we were unable to examine correlates of work schedule, sleep patterns and problems, and occupational stress on metabolic syndrome prevalence rates. Furthermore, data on type of occupation was only available in the continuous NHANES from 1999 to 2004, thereby limiting the sample size that would have been beneficial in looking at more specific occupational groups (i.e., 40 categories). Finally, given differences in survey design, it is not appropriate to merge NHANES III (1988–1994) data with data from the continuous NHANES (i.e., 1999 and forward).

In conclusion, our findings have implications for policy makers and employers. Given that studies have shown higher reports of missed work (21,22) and presenteeism (23) among US individuals with the metabolic syndrome compared with individuals without metabolic syndrome independent of obesity, it would seem beneficial for occupational health advocates and employers to be aware of the prevalence of metabolic syndrome among their employees and the associated consequences. To offset such work implications, employers and occupational health advocates should introduce metabolic syndrome awareness, management, and preventive programs at the workplace, particularly in occupational groups in which the overall prevalence of metabolic syndrome is high. Thus, according to our findings, metabolic syndrome-related interventions appear to be most needed for “transportation and material moving” workers as well as for “farm operators, managers, and supervisors” and “miscellaneous food preparation and service occupations.” Given the greater odds of metabolic syndrome among “transportation/material moving” workers even after adjustment for potential confounders, future occupational health research should examine factors that may explain the higher likelihood of metabolic syndrome in this occupational group. Finally, the high prevalence of the metabolic syndrome among older workers (24), combined with the growing numbers of older adults in the US workforce (25), may lead to an increasing number of workers with metabolic syndrome and co-occurring cardiovascular consequences unless effective prevention programs, particularly those implemented in worksites for higher prevalence occupations, are rapidly developed and implemented.

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