Chronic obstructive pulmonary disease (COPD) is a group of progressive respiratory conditions, including emphysema and chronic bronchitis, characterized by airflow obstruction and symptoms such as shortness of breath, chronic cough, and sputum production. COPD is an important contributor to mortality and disability in the United States (1,2). Healthy People 2020 has several COPD-related objectives,* including to reduce activity limitations among adults with COPD. To assess the state-level prevalence of COPD and the association of COPD with various activity limitations among U.S. adults, CDC analyzed data from the 2013 Behavioral Risk Factor Surveillance System (BRFSS). Among U.S. adults in all 50 states, the District of Columbia (DC), and two U.S. territories, 6.4% (an estimated 15.7 million adults) had been told by a physician or other health professional that they have COPD. Adults who reported having COPD were more likely to report being unable to work (24.3% versus 5.3%), having an activity limitation caused by health problems (49.6% versus 16.9%), having difficulty walking or climbing stairs (38.4% versus 11.3%), or using special equipment to manage health problems (22.1% versus 6.7%), compared with adults without COPD. Smokers who have been diagnosed with COPD are encouraged to quit smoking, which can slow the progression of the disease (3) and reduce mobility impairment (4). In addition, COPD patients should consider participation in a pulmonary rehabilitation program that combines patient education and exercise training to address barriers to physical activity, such as respiratory symptoms and muscle wasting (5).

Each year, the BRFSS survey is administered by state health departments in collaboration with CDC. BRFSS is a random-digit–dialed telephone survey (landline and cell phone) of noninstitutionalized civilian adults aged ≥18 years that includes various questions about respondents’ health and risk behaviors. Response rates for BRFSS are calculated using standards set by the American Association of Public Opinion Research Response Rate Formula #4.† The response rate is the number of respondents who completed the survey as a proportion of all eligible and likely eligible persons. The median survey response rate for all states, territories, and DC in 2013 was 46.4%, and ranged from 29.0% to 60.3%. Additional information is presented in the BRFSS 2013 Summary Data Quality Report.§

* Additional information available at http://www.healthypeople.gov/2020/topics-objectives/topic/respiratory-diseases/objectives?topicId=36.

† Available at http://www.aapor.org/AAPORKentico/AAPOR_Main/media/MainSiteFiles/StandardDefinitions2011_1.pdf.

§ Available at http://www.cdc.gov/brfss/annual_data/2013/pdf/2013_DQR.pdf.
Self-reported, physician-diagnosed COPD was defined as a positive response to the question, “Have you ever been told by a doctor or health professional that you have COPD, emphysema, or chronic bronchitis?” Several questions addressed activity limitations: “Are you limited in any way in any activities because of physical, mental, or emotional problems?”; “Do you have serious difficulty walking or climbing stairs?”; and “Do you now have any health problem that requires you to use special equipment, such as a cane, a wheelchair, a special bed, or a special telephone?” Being unable to work was defined for respondents who reported they were unable to work in response to the question, “Are you currently…? Employed for wages, self-employed, out of work for 1 year or more, out of work for less than 1 year, a homemaker, a student, retired, or unable to work.” Current smokers reported having smoked at least 100 cigarettes in their life and currently smoking cigarettes some days or every day. Former smokers reported having smoked at least 100 cigarettes in their life but were not current smokers. Respondents were categorized as engaging in physical activity if they answered “yes” to the question, “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?”

The age-adjusted prevalence of self-reported, physician-diagnosed COPD (with 95% confidence intervals) was calculated by state, selected demographic characteristics, smoking status, physical activity status, and activity limitation characteristics. Additionally, the age-adjusted prevalence of activity limitation measures was calculated by COPD status, current smoking status, and physical activity status. T-tests were used to compare prevalence between subgroups (significance at p<0.05). All indicated differences between subgroups are statistically significant. Data are weighted to state population estimates, and statistical software that took into account the complex sampling design was used.

Overall, 6.4% of U.S. adults (an estimated 15.7 million) were told by a physician or other health care provider that they have COPD (age-adjusted prevalence = 6.0%) (Table). Prevalence of COPD ranged from 2.6% among those aged 18–34 years to 12.3% among those aged ≥75 years. In age-adjusted comparisons by race/ethnicity, Asians were the least likely to report COPD (2.0%), whereas adults who identified themselves as multiracial or American Indian/Alaska Native reported the highest prevalence (10.7% and 10.2%, respectively). Women were more likely to report COPD than men (6.6% compared with 5.4%). COPD prevalence was lower among employed adults (3.6%) compared with other employment categories. COPD prevalence was lower with greater educational level. COPD also varied by marital status, with divorced, widowed, or separated respondents being more likely to report COPD (9.1%) than married respondents (4.7%). COPD was more common among current smokers (14.3%) than former smokers.
(7.0%) or never smokers (2.8%) and among respondents who reported not exercising in the past month compared with those who had exercised (8.8% versus 4.9%). COPD was also more common among those who reported each of the activity limitation measures: health-related activity limitation (15.1% versus 3.6%), difficulty walking or climbing stairs (18.2% versus 3.9%), use of special equipment (18.7% versus 4.9%), and being unable to work (20.4% versus 4.8%). State-specific prevalence of COPD ranged from 3.6% in Puerto Rico and 4.0% in Minnesota and South Dakota to >9% in West Virginia (9.4%), Alabama (9.6%), and Kentucky (10.3%). COPD prevalence was highest for states along the Ohio and lower Mississippi rivers (Figure 1).

More than one third (38.0%) of adults with COPD were current smokers. Activity limitations were common among adults with COPD. Adults who reported having COPD were more likely to report being unable to work (24.3% versus 5.3% for adults without COPD), having activity limitation because of health problems (49.6% versus 16.9%), having difficulty walking or climbing stairs (38.4% versus 11.3%), and use of special equipment for health problems (22.1% versus 6.7%) compared with adults without COPD. Among adults with COPD, nonsmokers who also reported being physically active were least likely to report all of the activity limitations (Figure 2), whereas those not physically active, regardless of smoking status, were most likely to report the activity limitations.

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TABLE. Age-adjusted* percentage of adults aged ≥18 years reporting having ever been told by a physician that they had chronic obstructive pulmonary disease (COPD)†, by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2013

| Characteristic | No.   | %§  | (95% CI)   | Estimated no.¶ with COPD |
|---------------|-------|-----|------------|--------------------------|
| Total respondents (crude) | 486,921 | 6.4 | (6.3–6.5)  | 15,667,000               |
| Total (age-adjusted) | 486,921 | 6.0 | (5.9–6.1)  |                         |
| Age group (yrs) (unadjusted) |         |     |            |                          |
| 18–34 | 77,294 | 2.6 | (2.4–2.8)  | 1,931,000                 |
| 35–44 | 59,556 | 3.6 | (3.3–3.9)  | 1,447,000                 |
| 45–54 | 83,324 | 6.7 | (6.4–7.1)  | 2,976,000                 |
| 55–64 | 106,090 | 9.7 | (9.3–10.0) | 3,823,000                 |
| 65–74 | 89,992 | 11.8 | (11.4–12.2)| 3,061,000                 |
| ≥75  | 70,665 | 12.3 | (11.8–12.8)| 2,429,000                 |
| Race/Ethnicity |         |     |            |                          |
| White, non-Hispanic | 373,527 | 6.3 | (6.2–6.5)  | 11,237,000               |
| Black, non-Hispanic | 38,686  | 6.5 | (6.1–6.9)  | 1,844,000                 |
| American Indian/Alaska Native, non-Hispanic | 7,626 | 10.2 | (8.8–11.7) | 267,000                   |
| Asian, non-Hispanic | 9,381  | 2.0 | (1.4–2.9)  | 181,000                   |
| Native Hawaiian/Pacific Islander, non-Hispanic | 1,531 | 6.2 | (3.1–12.0) | 30,000                    |
| Other race, non-Hispanic | 2,627  | 4.8 | (3.8–5.9)  | 44,000                    |
| Multiracial, non-Hispanic | 9,059 | 10.7 | (9.2–12.4)| 321,000                   |
| Hispanic | 36,826 | 4.1 | (3.7–4.5)  | 1,414,000                 |
| Sex |         |     |            |                          |
| Men | 199,660 | 5.4 | (5.2–5.6)  | 6,679,000                 |
| Women | 287,261 | 6.6 | (6.4–6.8)  | 8,988,000                 |
| Employment status |         |     |            |                          |
| Employed | 239,796 | 3.6 | (3.5–3.8)  | 4,352,000                 |
| Unemployed | 26,081 | 8.2 | (7.6–8.9)  | 1,351,000                 |
| Homemaker | 31,367 | 4.5 | (4.1–5.0)  | 782,000                   |
| Student | 12,602 | 7.5 | (5.1–10.8) | 309,000                   |
| Retired | 136,906 | 8.7 | (6.6–11.4) | 4,714,000                 |
| Unable to work | 37,170 | 20.4 | (19.3–21.4) | 4,067,000               |
| Education level |         |     |            |                          |
| Less than high school diploma or GED | 41,949 | 9.8 | (9.3–10.3) | 3,898,000                 |
| High school diploma or GED | 141,867 | 6.8 | (6.6–7.0)  | 5,145,000                 |
| At least some college | 301,281 | 4.6 | (4.5–4.8)  | 6,556,000                 |
| Marital status |         |     |            |                          |
| Married | 251,036 | 4.7 | (4.5–4.9)  | 6,924,000                 |
| Divorced/Widowed/Separated | 145,601 | 9.1 | (8.7–9.5)  | 5,822,000                 |
| Member of unmarried couple | 74,536 | 6.9 | (6.4–7.3)  | 2,339,000                 |
| Never married | 13,127 | 7.0 | (6.1–8.1)  | 511,000                   |

See table footnotes on page 293.
COPD is an important contributor to both mortality and disability in the United States (1,2). COPD is the primary contributor (>95%) to deaths from chronic lower respiratory diseases, the third leading cause of death in the United States (1). Among diseases and injuries, COPD also is the sixth largest contributor to number of years lived with disability in the United States (2). COPD is costly, with COPD-related medical costs estimated at $32 billion in the United States in 2010 and an additional $4 billion in absenteeism costs (6). Persons with COPD are less likely to be employed and more likely to be limited in the type of work they can do compared with persons without COPD (7).

In this study, adults with COPD were more likely to report activity limitations and being unable to work compared with adults without COPD. COPD has been found to be associated with a lower likelihood of employment, comparable with that for stroke and greater than that associated with heart disease or hypertension (8). After accounting for age, U.S. adults with COPD are also more likely to collect Social Security Disability Insurance and Supplemental Security Income than those without the condition (8). Together, these results underscore the substantial economic burden of COPD, which only adds to the impaired quality of life experienced by persons with COPD. Because there is currently no cure for COPD, public health efforts should focus on prevention, such as antismoking.

### TABLE. (Continued) Age-adjusted* percentage of adults aged ≥18 years reporting having ever been told by a physician that they had chronic obstructive pulmonary disease (COPD)†, by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2013

| Characteristic | No. | %§ (95% CI) | Estimated no.§ with COPD |
|---------------|-----|-------------|--------------------------|
| **Smoking status** | | | |
| Current smoker | 76,266 | 14.3 (13.8–14.8) | 5,754,000 |
| Former smoker | 137,125 | 7.0 (6.7–7.3) | 5,653,000 |
| Never smoker | 258,811 | 2.8 (2.7–2.9) | 3,752,000 |
| **Physical activity††** | | | |
| Yes | 329,512 | 4.9 (4.8–5.0) | 8,327,000 |
| No | 124,313 | 8.8 (8.5–9.1) | 6,159,000 |
| **Activity limitation due to health problems§§** | | | |
| Yes | 115,869 | 15.1 (14.6–15.6) | 8,430,000 |
| No | 361,933 | 3.6 (3.5–3.7) | 6,867,000 |
| **Difficulty walking or climbing stairs** | | | |
| Yes | 85,876 | 18.2 (17.4–19.0) | 7,237,000 |
| No | 389,975 | 3.9 (3.8–4.1) | 8,019,000 |
| **Use of special equipment** | | | |
| Yes | 55,401 | 18.7 (17.6–19.8) | 4,415,000 |
| No | 421,944 | 4.9 (4.8–5.0) | 10,874,000 |
| **Unable to work** | | | |
| Yes | 37,170 | 20.4 (19.3–21.4) | 4,067,000 |
| No | 446,752 | 4.8 (4.7–4.9) | 11,509,000 |
| **State/Area** | | | |
| Kentucky | 10,933 | 10.3 (9.5–11.2) | 367,000 |
| Alabama | 6,450 | 9.6 (8.6–10.8) | 382,000 |
| West Virginia | 5,853 | 9.4 (8.5–10.3) | 155,000 |
| Tennessee | 5,750 | 8.7 (7.8–9.7) | 473,000 |
| Mississippi | 7,401 | 8.4 (7.5–9.3) | 195,000 |
| Arkansas | 5,208 | 8.2 (7.3–9.3) | 200,000 |
| Michigan | 12,646 | 7.9 (7.2–8.5) | 661,000 |
| Ohio | 11,851 | 7.6 (7.0–8.3) | 737,000 |
| Indiana | 10,237 | 7.5 (6.9–8.1) | 394,000 |
| South Carolina | 10,601 | 7.3 (6.7–8.0) | 292,000 |
| Oklahoma | 8,202 | 7.3 (6.7–8.0) | 227,000 |
| Louisiana | 5,207 | 7.2 (6.3–8.2) | 261,000 |
| Missouri | 7,056 | 7.1 (6.3–8.0) | 351,000 |
| North Carolina | 8,768 | 6.9 (6.2–7.6) | 556,000 |
| Rhode Island | 6,455 | 6.8 (6.0–7.8) | 61,000 |
| Arizona | 4,205 | 6.8 (5.3–8.6) | 350,000 |
| Wyoming | 6,370 | 6.6 (5.9–7.4) | 32,000 |
| Florida | 33,776 | 6.4 (5.9–7.0) | 1,139,000 |
| Pennsylvania | 11,303 | 6.4 (5.8–7.0) | 712,000 |
| New Hampshire | 6,383 | 6.4 (5.6–7.2) | 74,000 |
| Virginia | 8,374 | 6.3 (5.7–7.0) | 422,000 |
| Nevada | 5,047 | 6.3 (5.2–7.6) | 142,000 |

See table footnotes on page 293.
efforts, and treatment to slow the progression of the disease, manage comorbidities, and lessen symptoms (9). Smoking, the leading cause of COPD in the United States, is also associated with worse symptoms among persons with COPD (10), and smoking cessation has been shown to slow the progression of COPD (3). Among adults with COPD in these analyses, more than one third were current smokers. Current smoking was associated with a greater likelihood of three of the four activity limitations measured among those who reported being physically active. This result reinforces the importance of smoking cessation by COPD patients. Health care providers play a critical role in motivating and assisting their patients, including those with COPD, with smoking cessation. Information for health care providers on helping patients quit smoking is available online. Quitting resources for patients also are available.

**Available at [http://www.cdc.gov/tobacco/campaign/tips/quit-smoking/quitting-resources.html](http://www.cdc.gov/tobacco/campaign/tips/quit-smoking/quitting-resources.html).**

### TABLE. (Continued) Age-adjusted* percentage of adults aged ≥18 years reporting having ever been told by a physician that they had chronic obstructive pulmonary disease (COPD)**, by selected characteristics — Behavioral Risk Factor Surveillance System, United States, 2013

| Characteristic | No. | %§ (95% CI) | Estimated no.¶ with COPD |
|---------------|-----|-------------|--------------------------|
| Georgia       | 8,051 | 6.2 (5.6–6.9) | 485,000                   |
| Maine         | 8,031 | 6.1 (5.5–6.8) | 75,000                    |
| District of Columbia | 4,841 | 6.0 (5.1–7.2) | 31,000                    |
| Oregon        | 5,908 | 6.0 (5.3–6.8) | 199,000                   |
| Guam          | 1,875 | 6.0 (4.6–7.9) | 6,000                     |
| Kansas        | 23,135 | 5.8 (5.5–6.2) | 135,000                   |
| Montana       | 9,638 | 5.8 (5.2–6.5) | 51,000                    |
| Iowa          | 8,094 | 5.8 (5.2–6.5) | 149,000                   |
| Alaska        | 4,533 | 5.6 (4.7–6.7) | 30,000                    |
| New Mexico    | 9,224 | 5.5 (4.9–6.2) | 93,000                    |
| Delaware      | 5,150 | 5.5 (4.8–6.3) | 43,000                    |
| New Jersey    | 13,179 | 5.4 (4.9–6.0) | 400,000                   |
| Texas         | 10,783 | 5.3 (4.7–5.9) | 1,040,000                 |
| Connecticut   | 7,609 | 5.3 (4.7–6.0) | 163,000                   |
| Washington    | 11,065 | 5.3 (4.8–5.8) | 301,000                   |
| New York      | 8,805 | 5.2 (4.7–5.9) | 856,000                   |
| Massachusetts | 14,914 | 5.1 (4.7–5.7) | 296,000                   |
| Vermont       | 6,322 | 5.1 (4.5–5.8) | 28,000                    |
| Maryland      | 12,830 | 5.0 (4.5–5.6) | 244,000                   |
| Wisconsin     | 6,521 | 5.0 (4.2–5.8) | 245,000                   |
| Nebraska      | 17,017 | 4.9 (4.4–5.3) | 74,000                    |
| Illinois      | 5,586 | 4.8 (4.1–5.5) | 491,000                   |
| California    | 11,507 | 4.5 (4.1–5.0) | 1,352,000                 |
| North Dakota  | 7,275 | 4.5 (3.9–5.1) | 27,000                    |
| Colorado      | 13,487 | 4.4 (4.0–4.9) | 182,000                   |
| Hawaii        | 7,788 | 4.4 (3.7–5.1) | 51,000                    |
| Utah          | 12,648 | 4.2 (3.8–4.6) | 80,000                    |
| Idaho         | 5,573 | 4.2 (3.6–4.9) | 52,000                    |
| South Dakota  | 6,859 | 4.0 (3.4–4.7) | 28,000                    |
| Minnesota     | 14,180 | 4.0 (3.4–4.6) | 175,000                   |
| Puerto Rico   | 5,967 | 3.6 (3.1–4.2) | 104,000                   |
| **Median (range)** | 6.0 (3.6–10.3) | |

**Abbreviations:** CI = confidence interval; GED = General Education Development certificate.
* Age-adjusted to the 2000 U.S. standard population aged ≥18 years.
† Includes emphysema and chronic bronchitis.
§ Weighted percentage.
¶ Numbers might not add to total because of rounding.
** Respondents were categorized as engaging in physical activity if they answered “yes” to the question, “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?”
†† Respondents were categorized as having activity limitations if they answered “yes” to the question, “Are you limited in any way in any activities because of physical, mental, or emotional problems?”

**Available at [http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/index.html](http://www.ahrq.gov/professionals/clinicians-providers/guidelines-recommendations/tobacco/index.html) and at [http://www.cdc.gov/tobacco/campaign/tips/partners/health/hcp](http://www.cdc.gov/tobacco/campaign/tips/partners/health/hcp).**

**Available at [http://www.cdc.gov/tobacco/campaign/tips/quit-smoking/quitting-resources.html](http://www.cdc.gov/tobacco/campaign/tips/quit-smoking/quitting-resources.html).**
breath can cause activity limitations, COPD is also associated with muscle weakness, which can also contribute to limited mobility (5). Although physical activity might be challenging for persons with COPD, exercise training is an essential part of pulmonary rehabilitation (5). Pulmonary rehabilitation is a personalized program that includes both education and exercise components to improve management of breathing problems, increase stamina, and decrease shortness of breath. These programs should incorporate both strength and endurance (or aerobic) training. Patients can learn more about pulmonary rehabilitation online.†† Physicians should refer to the latest clinical practice guidelines (5).

The findings in this report are subject to at least three limitations. First, COPD diagnosis relied on self-report and not on evaluation by breathing tests or review of medical records. Second, this was a cross-sectional study; therefore, it is not possible to determine whether the COPD or activity limitations came first. Finally, state response rates ranged from 29.0% to 60.3%; therefore, nonresponse bias might have affected the results.

COPD is strongly associated with activity limitations and an inability to work. Current smoking and lack of physical activity were both associated with greater percentages reporting activity limitation and inability to work among those with COPD. COPD patients who smoke should be encouraged to quit and provided with the support they need to achieve this objective, whereas all COPD patients might benefit from pulmonary rehabilitation and a personalized exercise regimen.

What is already known on this topic?
Chronic obstructive pulmonary disease (COPD) is a group of progressive respiratory conditions, including emphysema and chronic bronchitis, characterized by airflow obstruction and symptoms such as shortness of breath, chronic cough, and sputum production. COPD is an important contributor to mortality and disability in the United States.

What is added by this report?
Adults who reported having COPD were more likely to report being unable to work (24.3% versus 5.3%), activity limitation resulting from a health problem (49.6% versus 16.9%), difficulty walking or climbing stairs (38.4% versus 11.3%), and use of special equipment for health problems (22.1% versus 6.7%) compared with adults without COPD. Among adults with COPD, nonsmokers who also reported being physically active were least likely to report all of the activity limitation measures, whereas those who were inactive, regardless of smoking status, were most likely to report the activity limitations.

What are the implications for public health practice?
COPD patients who smoke should be encouraged to quit and provided with the support they need to achieve this objective, whereas all COPD patients might benefit from pulmonary rehabilitation and a personalized exercise regimen.

†† Available at http://www.thoracic.org/patients/patient-resources/resources/pulmonary-rehab.pdf.

§§ Available at http://www.cdc.gov/tobacco/stateandcommunity/best_practices/index.htm.

¶¶ Available at http://www.cdc.gov/obesity/downloads/PA_2011_WEB.pdf.

1Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC (Corresponding author: Anne G. Wheaton, awheaton@cdc.gov, 770-488-5362)

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FIGURE 2. Age-adjusted percentage* of adults with chronic obstructive pulmonary disease (COPD)† aged ≥18 years with activity limitations, by smoking§ and physical activity¶ status — Behavioral Risk Factor Surveillance System, United States, 2013

- Current smoker/Physical activity
- Current smoker/No physical activity
- Nonsmoker/Physical activity
- Nonsmoker/No physical activity

* Age-adjusted to the 2000 U.S. standard population aged ≥18 years.
† Based on a positive response to the question, “Have you ever been told by a doctor or health professional that you have COPD, emphysema, or chronic bronchitis?”
§ Current smokers reported smoking ≥100 cigarettes in their life and currently smoking cigarettes some days or every day. Nonsmokers include former smokers and never smokers.
¶ Respondents were categorized as engaging in physical activity if they answered “yes” to the question, “During the past month, other than your regular job, did you participate in any physical activities or exercises such as running, calisthenics, golf, gardening, or walking for exercise?”
** 95% confidence interval.
†† Respondents were categorized as having activity limitations if they answered “yes” to the question, “Are you limited in any way in any activities because of physical, mental, or emotional problems?”

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