Centers for Disease Control and Prevention

MMWR

Morbidity and Mortality Weekly Report

Weekly / Vol. 63 / No. 17

May 2, 2014

Potentially Preventable Deaths from the Five Leading Causes of Death — United States, 2008–2010

Paula W. Yoon, ScD[1], Brigham Bastian[2], Robert N. Anderson, PhD[2], Janet L. Collins, PhD[3], Harold W. Jaffe, MD[4]
(Author affiliations at end of text)

In 2010, the top five causes of death in the United States were 1) diseases of the heart, 2) cancer, 3) chronic lower respiratory diseases, 4) cerebrovascular diseases (stroke), and 5) unintentional injuries (*1*). The rates of death from each cause vary greatly across the 50 states and the District of Columbia (*2*). An understanding of state differences in death rates for the leading causes might help state health officials establish disease prevention goals, priorities, and strategies. States with lower death rates can be used as benchmarks for setting achievable goals and calculating the number of deaths that might be prevented in states with higher rates. To determine the number of premature annual deaths for the five leading causes of death that potentially could be prevented ("potentially preventable deaths"), CDC analyzed National Vital Statistics System mortality data from 2008–2010. The number of annual potentially preventable deaths per state before age 80 years was determined by comparing the number of expected deaths (based on average death rates for the three states with the lowest rates for each cause) with the number of observed deaths. The results of this analysis indicate that, when considered separately, 91,757 deaths from diseases of the heart, 84,443 from cancer, 28,831 from chronic lower respiratory diseases, 16,973 from cerebrovascular diseases (stroke), and 36,836 from unintentional injuries potentially could be prevented each year. In addition, states in the Southeast had the highest number of potentially preventable deaths for each of the five leading causes. The findings provide disease-specific targets that states can use to measure their progress in preventing the leading causes of deaths in their populations.

Mortality data from the National Vital Statistics System for the period 2008–2010 were analyzed. Population estimates for the period 2008–2010 were produced by the U.S. Census Bureau in collaboration with the National Center for Health Statistics. The calculations of potentially preventable deaths were restricted to U.S. residents and to deaths that occurred to persons aged <80 years. The age restriction is consistent with average life expectancy for the total U.S. population, which was nearly 79 years in 2010 (*2*). Analysis was restricted to deaths with an underlying cause of death among the five leading causes, based on *International Classification of Diseases, 10th Revision* (ICD-10) codes: diseases of the heart codes (I00–I09, I11, I13, I20–I51), cancer (C00–C97), chronic lower respiratory diseases (J40–J47), cerebrovascular diseases (stroke) (I60–I69), and unintentional injuries (V01–X59, Y85–Y86). The five leading causes of death represented 63% of all deaths in 2010; the next five most frequent causes accounted for only about 12% of deaths (*2*).

The annual number of potentially preventable deaths for each of the five leading causes of death by state was calculated in three steps. The first step was to calculate and rank state

INSIDE

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

disease-specific death rates by age group. Ages were initially grouped by 10-year increments, from 0–9 years through 70–79 years. However, these 10-year age groups, especially at the younger ages, frequently did not have enough deaths reported to be statistically reliable. Therefore, adjacent 10 year-age groups with small numbers of deaths were combined until enough deaths were aggregated to achieve reliability. For chronic lower respiratory diseases, for example, the age groupings were 0–49, 50–59, 60–69, and 70–79 years. The three states with the lowest observed death rates for each age group-specific cause of death category were then selected and their death rates averaged to calculate a lowest average age-specific death rate for each cause of death. The average of the lowest three states was chosen to minimize the effect of any extreme outlier and to represent the low end of the distribution of death rates among the states. The second step was to calculate expected deaths for each age group and state by multiplying the age-specific state populations by the lowest three-state average age-specific death rate for each cause. Total expected deaths for each cause per state were then calculated by summing expected deaths over all age groups up to age 79 years. Finally, the potentially preventable deaths were calculated by subtracting expected deaths from observed deaths. In instances where the result would be a negative number of potentially preventable deaths because the existing state rate was lower than the average of the three lowest states, the state's potentially preventable deaths were set to zero. Results are presented by state and by the 10 U.S. Department of Health and Human Services regions.*

During the period from 2008 to 2010, the average number of annual deaths from the five leading causes of death in persons aged <80 years was 895,317. This number represents 66% of annual deaths from all causes. The estimated average number of potentially preventable deaths for the five leading causes of death in persons aged <80 years were 91,757 for diseases of the heart, 84,443 for cancer, 28,831 for chronic lower respiratory diseases, 16,973 for cerebrovascular diseases (stroke), and 36,836 for unintentional injuries (Table 1). The Southeast (Region IV) had the highest number of potentially preventable deaths for all five leading causes of death (Table 2). The proportion of potentially preventable deaths among observed deaths for each of the five causes of death were 34% for diseases of the heart, 21% for cancer, 39% for chronic lower respiratory

* *Region 1:* Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. *Region 2:* New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands. *Region 3:* Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. *Region 4:* Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. *Region 5:* Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. *Region 6:* Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. *Region 7:* Iowa, Kansas, Missouri, and Nebraska. *Region 8:* Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. *Region 9:* Arizona, California, Hawaii, Nevada, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, and Republic of Palau. *Region 10:* Alaska, Idaho, Oregon, and Washington. Additional information available at http://www.hhs.gov/about/regionmap.html.

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR 2014;63:[inclusive page numbers].

TABLE 1. Annual number of deaths expected,* observed, and potentially preventable† for the five leading cause of death for persons aged <80 years, by state/area — United States, 2008–2010

	Diseases of the heart			Cancer			Chronic lower respiratory diseases			Cerebrovascular diseases (stroke)			Unintentional injuries		
State/Area	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths
Alabama	6,604	2,993	3,611	7,595	5,227	2,368	1,778	765	1,013	1,277	588	689	2,036	910	1,126
Alaska	463	331	132	703	588	115	112	77	35	91	62	29	331	131	200
Arizona	4,735	3,885	850	7,460	6,775	685	1,558	1,004	554	848	771	77	2,341	1,191	1,150
Arkansas	3,808	1,845	1,963	4,720	3,219	1,501	1,101	476	625	718	365	353	1,221	551	670
California	24,707	19,742	4,965	38,226	34,454	3,772	6,047	4,904	1,143	5,366	3,839	1,527	8,627	6,886	1,741
Colorado	2,815	2,707	108	4,944	4,752	192	1,141	665	476	604	520	84	1,525	940	585
Connecticut	2,569	2,176	393	4,367	3,805	562	509	544	0	425	420	5	905	679	226
Delaware	857	575	282	1,352	1,006	346	224	147	77	170	113	57	296	172	124
DC	729	310	419	742	543	199	73	78	0	107	61	46	169	117	52
Florida	17,586	13,352	4,234	28,249	23,195	5,054	5,327	3,501	1,826	3,481	2,655	826	6,927	3,675	3,252
Georgia	9,103	5,120	3,983	11,820	8,967	2,853	2,413	1,263	1,150	1,965	989	976	3,133	1,791	1,342
Hawaii	1,007	836	171	1,555	1,467	88	141	212	0	244	163	81	344	259	85
Idaho	1,080	883	197	1,753	1,546	207	409	224	185	234	174	60	516	285	231
Illinois	11,424	7,249	4,175	16,558	12,654	3,904	2,740	1,815	925	2,047	1,412	635	3,093	2,395	698
Indiana	6,421	3,783	2,638	9,385	6,612	2,773	2,154	954	1,200	1,240	739	501	2,064	1,209	855
Iowa	2,716	1,892	824	4,127	3,295	832	859	485	374	462	373	89	892	571	321
Kansas	2,248	1,636	612	3,624	2,854	770	826	414	412	485	321	164	1,010	525	485
Kentucky	5,332	2,662	2,670	7,499	4,655	2,844	1,792	675	1,117	934	520	414	2,240	826	1,414
Louisiana	5,784	2,609	3,175	6,909	4,562	2,347	1,106	658	448	1,003	510	493	1,771	850	921
Maine	1,083	928	155	2,259	1,627	632	443	237	206	229	180	49	390	262	128
Maryland	5,321	3,303	2,018	7,218	5,788	1,430	1,035	818	217	935	636	299	1,065	1,093	0
Massachusetts	4,416	3,926	490	8,319	6,865	1,454	1,115	984	131	807	761	46	1,507	1,252	255
Michigan	10,327	6,056	4,271	14,394	10,600	3,794	2,721	1,527	1,194	1,743	1,178	565	2,923	1,869	1,054
Minnesota	2,720	3,050	0	6,273	5,328	945	960	762	198	662	592	70	1,342	993	349
Mississippi	4,183	1,750	2,433	4,731	3,055	1,676	1,016	446	570	827	344	483	1,395	553	842
Missouri	6,553	3,691	2,862	9,023	6,442	2,581	2,090	941	1,149	1,164	724	440	2,328	1,133	1,195
Montana	826	650	176	1,304	1,143	161	341	166	175	162	127	35	416	190	226
Nebraska	1,252	1,063	189	2,254	1,852	402	543	270	273	294	209	85	490	337	153
Nevada	2,903	1,566	1,337	3,370	2,743	627	701	395	306	446	305	141	952	510	442
New Hampshire	916	828	88	1,772	1,455	317	315	206	109	163	158	5	381	255	126
New Jersey	7,106	5,243	1,863	10,948	9,147	1,801	1,436	1,312	124	1,319	1,015	304	1,888	1,665	223
New Mexico	1,510	1,253	257	2,393	2,194	199	535	320	215	310	246	64	1,013	386	627
New York	17,371	11,522	5,849	23,787	20,112	3,675	3,358	2,906	452	2,423	2,246	177	3,804	3,692	112
North Carolina	9,021	5,679	3,342	13,297	9,931	3,366	2,698	1,436	1,262	1,894	1,108	786	3,268	1,802	1,466
North Dakota	512	406	106	780	708	72	170	104	66	127	80	47	193	127	66
Ohio	11,875	7,164	4,711	17,413	12,514	4,899	3,729	1,818	1,911	2,271	1,400	871	4,016	2,184	1,832
Oklahoma	4,857	2,267	2,590	5,787	3,957	1,830	1,736	581	1,155	889	448	441	1,870	703	1,167
Oregon	2,421	2,364	57	5,212	4,153	1,059	1,110	599	511	635	461	174	1,068	730	338
Pennsylvania	12,668	8,221	4,447	19,114	14,340	4,774	3,051	2,101	950	2,194	1,611	583	4,319	2,435	1,884
Rhode Island	820	636	184	1,423	1,112	311	225	160	65	148	123	25	339	200	139
South Carolina	5,413	2,896	2,517	7,063	5,079	1,984	1,391	740	651	1,119	567	552	1,910	883	1,027
South Dakota	590	491	99	1,054	856	198	226	126	100	126	97	29	284	151	133
Tennessee	7,956	3,916	4,040	10,185	6,853	3,332	2,197	995	1,202	1,463	765	698	2,895	1,209	1,686
Texas	19,939	12,683	7,256	27,141	22,143	4,998	5,061	3,139	1,922	4,254	2,471	1,783	7,612	4,551	3,061
Utah	1,229	1,194	35	1,931	2,080	0	383	298	85	282	238	44	765	470	295
Vermont	482	411	71	921	723	198	167	103	64	91	79	12	181	122	59
Virginia	6,588	4,609	1,979	10,162	8,073	2,089	1,647	1,148	499	1,369	891	478	1,889	1,521	368
Washington	4,437	3,844	593	8,193	6,754	1,439	1,451	956	495	907	743	164	1,925	1,269	656
West Virginia	2,400	1,308	1,092	3,415	2,289	1,126	921	338	583	464	257	207	1,031	364	667
Wisconsin	4,513	3,424	1,089	7,530	5,978	1,552	1,190	862	328	869	667	202	1,666	1,074	592
Wyoming	492	333	159	695	585	110	186	83	103	73	65	8	296	106	190
Total	**272,688**	**181,261**	**91,757**	**400,949**	**316,652**	**84,443**	**74,458**	**45,738**	**28,831**	**52,360**	**35,390**	**16,973**	**94,862**	**58,055**	**36,836**

Abbreviation: DC = District of Columbia.
* Expected deaths are the lowest three-state average age-specific death rate times the age-specific state population rounded to the nearest whole number.
† Potentially preventable deaths are observed deaths minus expected deaths rounded to the nearest whole number.

TABLE 2. Annual number of deaths expected,* observed, and potentially preventable† for the five leading cause of death for persons aged <80 years, by U.S. Department of Health and Human Services region§ — United States, 2008–2010

Region	Diseases of the heart			Cancer			Chronic lower respiratory diseases			Cerebrovascular diseases (stroke)			Unintentional injuries		
	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths	Deaths observed	Deaths expected	Potentially preventable deaths
1	10,286	8,904	1,382	19,061	15,587	3,474	2,774	2,234	540	1,863	1,722	141	3,703	2,771	932
2	24,477	16,765	7,712	34,735	29,259	5,476	4,794	4,218	576	3,742	3,261	481	5,692	5,357	335
3	28,563	18,327	10,236	42,003	32,039	9,964	6,951	4,630	2,321	5,239	3,568	1,671	8,769	5,703	3,066
4	65,198	38,367	26,831	90,439	66,962	23,477	18,612	9,820	8,792	12,960	7,538	5,422	23,804	11,650	12,154
5	47,280	30,726	16,554	71,553	53,686	17,867	13,494	7,740	5,754	8,832	5,988	2,844	15,104	9,724	5,380
6	35,898	20,656	15,242	46,950	36,074	10,876	9,539	5,174	4,365	7,174	4,040	3,134	13,487	7,040	6,447
7	12,769	8,281	4,488	19,028	14,443	4,585	4,318	2,111	2,207	2,405	1,628	777	4,720	2,566	2,154
8	6,464	5,782	682	10,708	10,123	585	2,447	1,442	1,005	1,374	1,128	246	3,479	1,985	1,494
9	33,352	26,030	7,322	50,611	45,439	5,172	8,447	6,514	1,933	6,904	5,078	1,826	12,264	8,845	3,419
10	8,401	7,422	979	15,861	13,041	2,820	3,082	1,857	1,225	1,867	1,439	428	3,840	2,414	1,426
Total	**272,688**	**181,261**	**91,428**	**400,949**	**316,652**	**84,296**	**74,458**	**45,738**	**28,718**	**52,360**	**35,390**	**16,970**	**94,862**	**58,055**	**36,807**

* Expected deaths are the lowest three-state average age-specific death rate times the age-specific state population rounded to the nearest whole number. Differences between Table 1 and Table 2 are the result of rounding error when calculating states individually or by region.
† Potentially preventable deaths are observed deaths minus expected deaths rounded to the nearest whole number.
§ *Region 1:* Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. *Region 2:* New Jersey, New York, Puerto Rico, and the U.S. Virgin Islands. *Region 3:* Delaware, the District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia. *Region 4:* Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, and Tennessee. *Region 5:* Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin. *Region 6:* Arkansas, Louisiana, New Mexico, Oklahoma, and Texas. *Region 7:* Iowa, Kansas, Missouri, and Nebraska. *Region 8:* Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. *Region 9:* Arizona, California, Hawaii, Nevada, American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, and Republic of Palau. *Region 10:* Alaska, Idaho, Oregon, and Washington. Additional information available at http://www.hhs.gov/about/regionmap.html.

diseases, 33% for cerebrovascular diseases (stroke), and 39% for unintentional injuries (Figure).

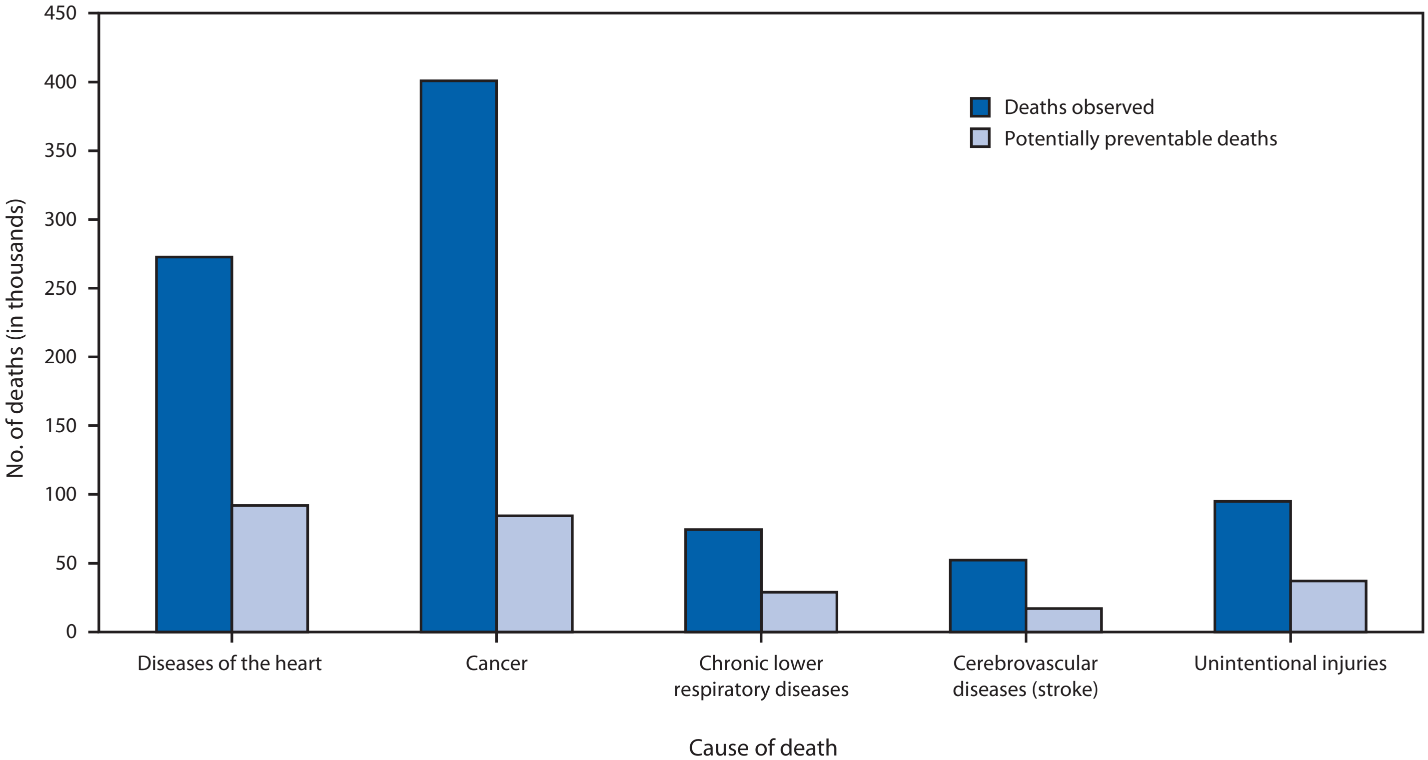
Discussion

Death rates are population health outcome measures that reflect the combined influences of multiple biological and social health determinants, public health efforts, and medical care. Examining which diseases and injuries result in the greatest number of deaths in populations, particularly for deaths that occur earlier than expected, allows health officials to establish disease prevention goals, priorities, and strategies. In the United States, the largest number of deaths during 2008–2010 occurred from diseases of the heart, cancer, chronic lower respiratory diseases, cerebrovascular diseases (stroke), and unintentional injuries (*1*). The results of this study demonstrate that if all states achieved the lowest observed mortality levels for the five leading causes, when considered separately, as many as 91,757 premature heart disease deaths, 84,443 cancer deaths, 28,831 chronic lower respiratory disease deaths, 16,973 stroke deaths, and 36,836 unintentional injury deaths might be prevented each year. These calculations translate to approximately one in three premature heart disease deaths, one in five premature cancer deaths, two out of five chronic lower respiratory disease deaths, one out of every three stroke deaths, and two out of every five unintentional injury deaths that could be prevented.

Reducing the number of earlier than expected deaths from the leading causes of death requires risk factor reduction, screening, early intervention, and successful treatment of the disease or injury. For the five leading causes of death, the major modifiable risk factors include 1) *diseases of the heart*: tobacco use, high blood pressure, high blood cholesterol, type 2 diabetes, poor diet, being overweight, and lack of physical activity (*3*); 2) *cancer*: tobacco use, poor diet, lack of physical activity, being overweight, sun exposure, certain hormones, alcohol, some viruses and bacteria, ionizing radiation, and certain chemicals and other substances (*4*); 3) *chronic lower respiratory diseases*: tobacco smoke, second hand smoke exposure, other indoor air pollutants, outdoor air pollutants, allergens, and occupational agents (*5*); 4) *cerebrovascular diseases (stroke)*: high blood pressure, high blood cholesterol, heart disease, diabetes, being overweight, tobacco use, alcohol use, and lack of physical activity (*6*); and 5) *unintentional injuries*: lack of vehicle restraint use, lack of motorcycle helmet use, unsafe consumer products, drug and alcohol use (including prescription drug misuse), exposure to occupational hazards, and unsafe home and community environments (*7*).

The majority of these risk factors do not occur randomly in populations; they are closely aligned with the social, demographic, environmental, economic, and geographic attributes of the neighborhoods in which people live and work (*8*). However, the calculation of potentially preventable deaths in this study did not account for differences in the attributes of states that might influence risk factors and ultimately death rates, such as proportion of the population below the poverty level. If health disparities were eliminated, as is called for by *Healthy People 2020* (*9*), all states should be closer to achieving the lowest possible death rates for the five leading causes of death.

FIGURE. Annual number of deaths observed and potentially preventable* for the five leading cause of death for persons aged <80 years — United States, 2008–2010



* Potentially preventable deaths are observed deaths minus expected deaths (the lowest three-state average age-specific death rate times the age-specific state population) rounded to the nearest whole number.

The findings in this report are subject to at least four limitations. First, uncertainty and error in the diagnosis and reporting of cause of death might result in errors in death rate estimations for some causes of death. Second, state affiliation is based on the person's residency at the time of death. With the exception of unintentional injuries, the factors that led to the resulting cause of death for some persons might have accumulated over a lifetime spent in different geographic locations. Third, the potentially preventable deaths are based on existing levels of state performance for the three states with the lowest death rates for each condition and might underestimate the benefit if these three states made full use of optimal health promotion and disease prevention strategies. Finally, to the extent that natural (i.e., random) variability in state death rates from year to year is responsible for the selection of the three states with the lowest death rates, there will be a tendency to regress to the mean. The method used tends to slightly overestimate the number of potentially preventable deaths. Nevertheless, the random component of the variation in state death rates is minimal and any bias is also minimal.

What is already known on this topic?

The top five causes of death in the United States are diseases of the heart, cancer, chronic lower respiratory diseases, cerebrovascular diseases (stroke), and unintentional injuries. Death rates for these diseases vary widely across the states because of the distribution of health determinants, access and use of health services, and public health efforts.

What is added by this report?

This report demonstrates that if all states could achieve the lowest observed death rates for the five leading causes, when considered separately, as many as 91,757 premature heart disease deaths, 84,443 cancer deaths, 28,831 chronic lower respiratory disease deaths, 16,973 stroke deaths, and 36,836 unintentional injury deaths might be prevented in the United States each year.

What are the implications for public health practice?

State health officials can use the lower death rates as benchmarks to establish disease prevention goals, priorities, and strategies. Reducing the number of earlier than expected deaths from the leading causes of death requires the joint effort of public health and heath-care organizations and personnel to support risk factor prevention and reduction, screening, early intervention, and successful treatment of diseases or injuries.

As a further note of caution, potentially preventable deaths cannot be added across causes of death by state or for the nation as a whole because of competing risks. For example, for a state that has been able to reduce its heart disease mortality, some premature deaths will be prevented altogether, but others will be pushed to different causes of death. A person who avoids death from heart disease might then be exposed to a higher risk for dying from injury or cancer. The result is that there is less variation by state in the death rate for all causes combined than for any particular cause of death.

States can use the disease-specific aspirational goals for potentially preventable deaths presented in this report in several ways. They can identify other states with similar populations but better outcomes and examine what those are doing differently to address the leading causes of death. Although each state has a unique set of factors that determine health outcomes, states might find neighboring states or states within their region as good sources of information on effective policies, programs, and services. The goals can also be used to educate state policymakers and leaders about what is achievable if they were able to match the best state outcomes.

[1]Division of Epidemiology, Analysis, and Library Services, Center for Surveillance, Epidemiology, and Laboratory Services; [2]Division of Vital Statistics, National Center for Health Statistics; [3]Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion; [4]Office of the Associate Director for Science, CDC (Corresponding author: Paula W. Yoon, pyoon@cdc.gov, 404-498-6298)

References

1. Hoyert DL, Xu JQ. Deaths: preliminary data for 2011. Natl Vital Stat Rep 2012;61(6).
2. Murphy SL, Xu JQ, Kochanek KD. Deaths: final data for 2010. Natl Vital Stat Rep 2013;61(4).
3. National Heart Lung and Blood Institute. What are the risk factors for heart disease? Washington, DC: National Institutes of Health; 2012. Available at http://www.nhlbi.nih.gov/educational/hearttruth/lower-risk/risk-factors.htm.
4. National Cancer Institute. Prevention, genetics, causes. Washington, DC: National Institutes of Health; 2013. Available at http://www.cancer.gov/cancertopics/prevention-genetics-causes.
5. World Health Organization. Risk factors for chronic respiratory diseases. In: Global surveillance, prevention and control of chronic respiratory diseases: a comprehensive approach. Geneva, Switzerland: World Health Organization; 2007:37–55. Available at http://www.who.int/gard/publications/GARD%20Book%202007.pdf.
6. CDC. Stroke risk factors. Atlanta, GA: US Department of Health and Human Services, CDC; 2010. Available at http://www.cdc.gov/stroke/risk_factors.htm.
7. Doll LS, Bonzo SE, Mercy JA, Sleet DA, eds. Handbook of injury and violence prevention. New York, NY: Springer; 2007.
8. CDC. CDC health disparities and inequalities report—United States, 2013. MMWR 2013;62(Suppl No. 3).
9. US Department of Health and Human Services. Healthy people 2020. Washington, DC: US Department of Health and Human Service; 2013. Available at http://www.healthypeople.gov/2020.

Outbreak of Campylobacteriosis Associated with a Long-Distance Obstacle Adventure Race — Nevada, October 2012

Mariah Zeigler, DVM[1], Chad Claar, MPH[1], Daviesha Rice, MPH[1], Jack Davis, PhD[1], Tammy Frazier[1], Alex Turner[1], Corinna Kelley[1], Jonathan Capps[1], Andrea Kent[1], Valerie Hubbard[1], Christiana Ritenour[1], Cristina Tuscano[1], Zuwen Qiu-Shultz, MPH[2], Collette Fitzgerald Leaumont, PhD[3] (Author affiliations at end of text)

On October 12, 2012, the Nellis Air Force Base Public Health Flight (Nellis Public Health), near Las Vegas, Nevada, was notified by the Mike O'Callaghan Federal Medical Center (MOFMC) emergency department (ED) of three active-duty military patients who went to the ED during October 10–12 with fever, vomiting, and hemorrhagic diarrhea. Initial interviews by clinical staff members indicated that all three patients had participated October 6–7 in a long-distance obstacle adventure race on a cattle ranch in Beatty, Nevada, in which competitors frequently fell face first into mud or had their heads submerged in surface water. An investigation by Nellis Public Health, coordinated with local and state health officials, identified 22 cases (18 probable and four confirmed) of *Campylobacter coli* infection among active-duty service members and civilians. A case-control study using data provided by patients and healthy persons who also had participated in the race showed a statistically significant association between inadvertent swallowing of muddy surface water during the race and *Campylobacter* infection (odds ratio = 19.4; p<0.001). Public health agencies and adventure race organizers should consider informing race attendees of the hazards of inadvertent ingestion of surface water.

Campylobacter is one of the most common causes of diarrheal illness in the United States. Most persons who become ill with campylobacteriosis get diarrhea, cramping, abdominal pain, and fever within 2–5 days after exposure to the organism. The diarrhea can be bloody and can be accompanied by nausea and vomiting. The illness typically lasts about 1 week. Most cases occur as isolated, sporadic events and are usually associated with eating raw or undercooked poultry or from cross-contamination of other foods by these items (*1*).

Initial Epidemiologic Investigation

Because of the three cases of hemorrhagic diarrhea and the suspected source of infection reported to Nellis Public Health by ED staff members on October 12, definitions were developed to identify additional cases. A probable case was defined as diarrhea (three or more loose stools in a 24-hour period), any episode of bloody diarrhea, or a combination of other gastrointestinal illness symptoms (e.g., abdominal cramps, nausea, or vomiting) in a person who participated in the obstacle adventure race during October 6–7. A confirmed case was defined as a probable case in a patient who also had laboratory isolation of *Campylobacter* from a stool specimen.

An additional 19 patients, including both military and civilian personnel, were identified through active reporting by clinical staff members throughout MOFMC, a retrospective review of ED logs from October 6–16, and announcements to the Nellis community that encouraged self-identification. These efforts resulted in the identification of a total of 18 probable and four confirmed cases of illness. The investigation was limited to the population of the Nellis community, primarily because of the short incubation period for *Campylobacter*, the time lags between the event, symptom onset, and investigative findings, and the lack of additional cases reported to the Southern Nevada Health District by civilian health-care providers.

Among the 22 patients, the mean time from exposure to illness was 3.3 days (range = 1–9 days) (Figure). The most common symptoms were diarrhea (18 of 19 patients), cramps (14 of 18 patients), fever (10 of 18 patients), and nausea (10 of 17 patients) (Table 1). Twenty of the 22 patients sought medical care, and two reported their illness directly to Nellis Public Health without seeking care. One person with chronic gastrointestinal illness was hospitalized and treated with supportive care and intravenous antibiotics. All 22 patients made a full recovery.

To obtain information about the outbreak source, a 72-hour food and drinking water history questionnaire, which included questions on surface water exposure, was used to interview the ill persons. An analysis of the questionnaire data indicated that muddy surface water was a possible source of infection.

Case-Control Study

A case-control study was conducted to identify the source of infection. Twenty-four healthy controls consisting of both military personnel and civilians who had been race participants were identified through contact investigation of the 22 case-patients. Nellis Public Health developed a new questionnaire for this investigation and administered it by telephone. The questionnaire evaluated the 22 case-patients and 24 controls with regard to their water consumption, food consumption,

FIGURE. Number of probable and confirmed cases of *Campylobacter coli infection* among participants in a long-distance obstacle adventure race, by date of symptom onset — Nevada, October 2012

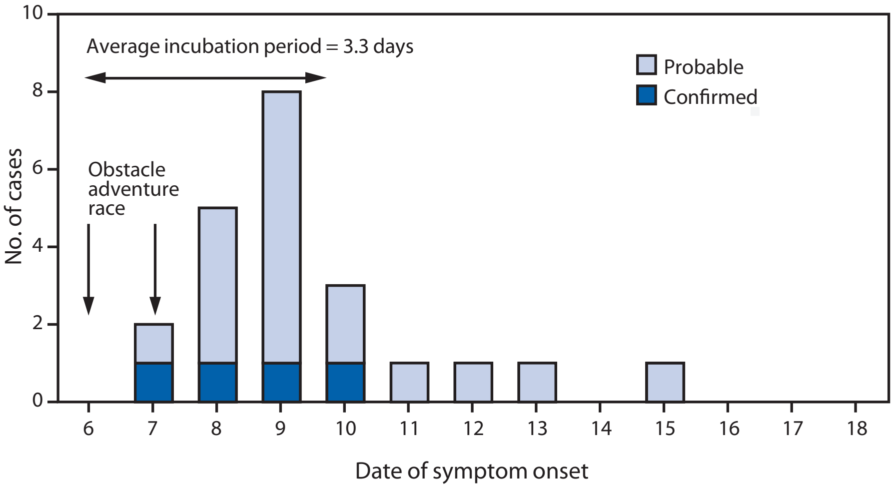


TABLE 1. Number of persons (N = 22) with signs and symptoms of confirmed or probable *Campylobacter coli* infection after participating in a long-distance obstacle adventure race — Nevada, October 2012

Sign/Symptom	No.*	(%*)
Diarrhea	18 of 19	(95)
Cramps	14 of 19	(74)
Fever	10 of 18	(56)
Nausea	10 of 18	(56)
Vomiting	9 of 17	(53)
Watery diarrhea	7 of 10	(70)
Bloody diarrhea	6 of 10	(60)
Influenza-like illness	6 of 10	(60)
Mucus-like diarrhea	3 of 10	(30)
Chills	3 of 7	(43)

* Denominator values varied as a result of nonreporting by some participants.

and environmental water exposure during the October 6–7 obstacle race.

Analysis of the case-control study identified a statistically significant association with "inadvertent swallowing of muddy water while competing" and *Campylobacter* infection (odds ratio = 19.4; p<0.001) (Table 2). No significant association (p<0.05) was found with drinking water or eating food provided by race organizers, full body submersion in surface water, or getting surface water or mud in the eyes or mouth.

Laboratory Testing

Nellis Public Health requested stool specimens from all 22 patients and recommended cultures for *Shigella, Campylobacter, Salmonella,* and *Escherichia coli* 0157:H7, plus testing for Shiga toxin and a search for ova and parasites. Initially, four stool specimens were obtained and each tested negative for all organisms, including *Campylobacter*. Persistence in obtaining seven additional stool specimens resulted in four laboratory-confirmed cases positive for *Campylobacter* by growth on selective media, oxidase testing, and Gram stain at the MOFMC laboratory. These four isolates were identified as hippurate-negative *Campylobacter* (not *Campylobacter jejuni*) by the Southern Nevada Health District Public Health Laboratory and further identified as *Campylobacter coli* by CDC.

Further characterization of the four *C. coli* isolates by pulsed-field gel electrophoresis using *SmaI* and *KpnI*, multilocus sequence typing, and antimicrobial susceptibility testing at CDC, identified all four as the same strain. This *C. coli* outbreak strain was pansusceptible to the antimicrobials tested on the CDC national antimicrobial resistance monitoring system panel, and was assigned PulseNet patterns DBBS16.0134/ DBBK02.0272 and sequence type (ST) 6159. All specimens tested for *E. coli* 0157:H7, *Salmonella, Shigella*, Shiga toxin, and ova and parasite testing were negative.

Public Health Action

Because commercial obstacle adventure races often are marketed to military personnel, Nellis Public Health provided educational outreach to the base population regarding the risk for disease when competing in such events. Emphasis was placed on the importance of hand washing and avoidance of exposure (especially ingestion) to contaminated surface water to prevent disease. This investigation also highlighted the importance of outbreak investigators continuing stool specimen collection, culture, and serial testing, even after initial results are negative.

Discussion

Inadvertent ingestion of muddy surface water contaminated with cattle or swine feces during a long-distance obstacle adventure course competition likely resulted in an outbreak of campylobacteriosis in 22 participants. Four of the 22 had laboratory-confirmed infections with *Campylobacter coli*.

High-intensity and competitive muddy obstacle adventure course races have surged in popularity across the United States, drawing an estimated 1.5 million participants in 2012 (*2*). These military-style adventure races attract high numbers of active-duty military personnel, along with young, active, extremely fit civilians. Persons typically are advised of the risks of participating and required to sign a liability waiver. Races are commonly held on farmlands where animal feces increase the risk for zoonotic disease transmission. Primary and emergency care providers, as well as public health professionals, should be aware that obstacle adventure race events

TABLE 2. Comparison of case-patients with *Campylobacter coli* infection and control subjects among participants in a long-distance obstacle adventure race, by food and water exposures — Nevada, October 2012

	Case-patients (n = 22)	Controls (n = 24)		
Exposure	%*	%*	Odds ratio	p-value
Inadvertent swallowing of muddy water while competing	89	30	19.4	<0.001
Consumption of potable drinking water provided by race organizers	100	100	2.6	0.48
Consumption of food provided by race organizers	93	74	4.9	0.16
Full body submersion in surface water	94	96	0.7	0.86
Exposure of eyes or mouth to surface water or mud	100	74	6.4	0.09

* Denominator values varied as a result of nonreporting by some participants.

could pose a heightened risk for outbreaks from inadvertent ingestion of contaminated water or mud and might consider outreach to educate participants on the health risks from oral contact with contaminated surface water or mud.

Documented common-source outbreaks of campylobacteriosis (especially those caused by *C. coli*) are rare, but have been previously attributed to contact with nonchlorinated water contaminated with the feces of cattle, poultry, and swine (*3*). *Campylobacter* is an important cause of acute zoonotic bacterial diarrhea across all age groups. An estimated 5%–14% of diarrhea cases worldwide are attributed to this organism, and approximately 2.4 million human cases of campylobacteriosis occur annually in the United States (*4*).

Participation in obstacle adventure races is relatively common among men and women of the U.S. military. These events typically are held in rural areas and often include man-made slurry fields (a mixture of soil or clay and water) as race "challenges." In areas commonly frequented by animals (*5*), topsoil used in the creation of slurry fields can be contaminated with feces from domestic fowl (*6*) or ruminants (*7*) or wild animals. Competitors who run or ride through such areas might unintentionally swallow sufficient numbers of organisms to cause clinical disease. Fewer than 500 *Campylobacter* organisms are needed to cause illness (*1*). The race described in this report was held on a cattle ranch, and participants reported seeing cattle and swine on or near the course on race day. Obstacle adventure race planners should consider building slurry field challenges where animal fecal contamination is not likely.

Although contaminated food and drinking water are more common sources of *Campylobacter* outbreaks, previous outbreaks have been associated with unintentional ingestion of contaminated mud or muddy water. Campylobacteriosis outbreaks were associated with two bicycle races in Norway in the 1990s, in which unintentional ingestion of dirty water splashing from bicycle wheels was implicated (*8*). Similarly, ingestion of mud was found the most likely cause of *Campylobacter* outbreaks during mountain bike races in Wales in 2008 (*9*) and in British Columbia in 2010 (*10*).

Warning participants in outdoor sporting events who might be exposed to fecally contaminated water or slurry that potentially serious diarrheal disease can result if ingested, even inadvertently, could reduce exposures to these pathogens. Event organizers should consider including the risk for waterborne outbreaks in their participant waivers and advise participants to avoid drinking or swallowing unsafe water. Participants also need to be encouraged to seek appropriate medical care for postcompetition diarrhea, especially bloody diarrhea, and to inform medical personnel of their exposure. In addition, health-care providers need to be aware of the association between these adventure races and the risk for exposure to *Campylobacter* or other pathogens via contaminated water, mud, or slurry so that appropriate diagnostic testing and treatment can be provided to ill participants.

What is already known on this topic?

Campylobacter is an important cause of acute zoonotic bacterial enteric disease worldwide. The most common cause of campylobacteriosis in humans is *Campylobacter jejuni*, with *Campylobacter coli* less common. Livestock, including cattle and swine, are important reservoirs for human infection with *C. coli*. Multiple outbreaks have been linked to contaminated surface water.

What is added by this report?

In 2012 a total of 22 cases of acute diarrheal disease attributed to *C. coli* were identified among participants in a long-distance obstacle adventure race in Beatty, Nevada. Eleven stool specimens were collected for culture, and four were positive for *C. coli*. This investigation established an association between inadvertent swallowing of muddy surface water and *C. coli* infection. In addition, the investigation demonstrated the potential need for ongoing collection of stool specimens for culture during a food or waterborne outbreak to identify the causative agent and implement public health preventive measures.

What are the implications for public health practice?

Participation in adventure races combining mud and obstacles has become popular with extremely fit members of the general public, including military personnel. The races often take place on farmland exposing participants to numerous zoonotic pathogens. This outbreak highlights *C. coli* as a cause of diarrhea associated with such exposures and the importance of informing participants and race organizers regarding these hazards.

Acknowledgments

Paul Hug, Southern Nevada Health District. Barbara Mahon, MD, Patrick Kwan, PhD, Janet Pruckler, Jessica Halpin, MS, Steven Stroika, Lexie Vaughn, Division of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC. James A. Mullins, DVM, Air Combat Command Public Health. Mark R. Duffy, DVM, US Air Force School of Aerospace Medicine. Stefani Ruiz, MHS, US Air Force School of Aerospace Medicine. Brenna Shackelford, MD, Nellis Air Force Base Emergency Services; Dana Windhorst, MD, Nellis Air Force Base Aerospace Medicine; Ruth A. Jones, Nellis Air Force Base Clinical Laboratory.

[1]Nellis Air Force Base Public Health Flight, Nellis Air Force Base, Nevada; [2]Southern Nevada Health District, Las Vegas, Nevada; [3]Division of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC (Corresponding author: Chad Claar, chad.claar@nellis.af.mil, 702-653-3440)

References

1. CDC. *Campylobacter*. How do people get infected with this germ? Atlanta, GA: US Department of Health and Human Services, CDC; 2013. Available at http://www.cdc.gov/nczved/divisions/dfbmd/diseases/campylobacter/#how_infect.
2. Keneally S. Playing dirty. *Outside* [magazine]. November 2012. Available at http://www.outsideonline.com/outdoor-adventure/multisport/playing-dirty-november-2012.html.
3. Scallan E, Hoekstra RM, Angulo FJ, et al. Foodborne illness acquired in the United States—major pathogens. Emerg Infect Dis 2011;17:7–15.
4. Saeed AM, Harris NV, DiGiacomo RF. The role of exposure to animals in the etiology of *Campylobacter jejuni/coli* enteritis. Am J Epidemiol 1993;137:108–14.
5. Rosef O, Gondrosen B, Kapperud G, Underdal B. Isolation and characterization of *Campylobacter jejuni* and *Campylobacter coli* from domestic and wild mammals in Norway. Appl Environ Microbiol 1983;46:855–9.
6. Pearson AD, Greenwood MH, Donaldson J, et al. Continuous source outbreak of campylobacteriosis traced to chicken. J Food Prot 2000;63:309–14.
7. Kemp R, Leatherbarrow AJ, Williams NJ, et al. Prevalence and genetic diversity of *Campylobacter* spp. in environmental water samples from a 100-square-kilometer predominantly dairy farming area. Appl Environ Microbiol 2005;71:1876–82.
8. Kapperud G, Lomo OM, Styrmo K, Gregusson S, Melby K, Vardund T. Two outbreaks of *Campylobacter* infection after bicycle races—dirty water splash from the wheels identified as a likely source of infection [in Norwegian]. MSIS-rapport 2000;28. Available at http://www.fhi.no/davx/nyhetsbrev/msis/2000/8/msis.pdf.
9. National Public Health Service for Wales. The investigation of an outbreak of diarrhoeal illness in participants of the Builth Wells Mountain Bike Marathon: final report. Available at http://www.wales.nhs.uk/sitesplus/888/document/149181.
10. Stuart TL, Sandhu J, Stirling R, et al. Campylobacteriosis outbreak associated with ingestion of mud during a mountain bike race. Epidemiol Infect 2010;138:1695–703.

Falls and Fall Injuries Among Adults with Arthritis — United States, 2012

Kamil E. Barbour, PhD[1], Judy A. Stevens, PhD[2], Charles G. Helmick, MD[1], Yao-Hua Luo, PhD[1], Louise B. Murphy, PhD[1], Jennifer M. Hootman, PhD[1], Kristina Theis, MPH[1], Lynda A. Anderson, PhD[1], Nancy A. Baker, ScD[3], David E. Sugerman, MD[2]
(Author affiliations at end of text)

Falls are the leading cause of injury-related morbidity and mortality among older adults, with more than one in three older adults falling each year,* resulting in direct medical costs of nearly $30 billion (*1*). Some of the major consequences of falls among older adults are hip fractures, brain injuries, decline in functional abilities, and reductions in social and physical activities (*2*). Although the burden of falls among older adults is well-documented (*1,2*), research suggests that falls and fall injuries are also common among middle-aged adults (*3*). One risk factor for falling is poor neuromuscular function (i.e., gait speed and balance), which is common among persons with arthritis (*2*). In the United States, the prevalence of arthritis is highest among middle-aged adults (aged 45–64 years) (30.2%) and older adults (aged ≥65 years) (49.7%), and these populations account for 52% of U.S. adults (*4*). Moreover, arthritis is the most common cause of disability (*5*). To examine the prevalence of falls among middle-aged and older adults with arthritis in different states/territories, CDC analyzed data from the 2012 Behavioral Risk Factor Surveillance System (BRFSS) to assess the state-specific prevalence of having fallen and having experienced a fall injury in the past 12 months among adults aged ≥45 years with and without doctor-diagnosed arthritis. This report summarizes the results of that analysis, which found that for all 50 states and the District of Columbia (DC), the prevalence of any fall (one or more), two or more falls, and fall injuries in the past 12 months was significantly higher among adults with arthritis compared with those without arthritis. The prevalence of falls and fall injuries is high among adults with arthritis but can be addressed through greater dissemination of arthritis management and fall prevention programs in clinical and community practice.

BRFSS is an annual, random-digit–dialed landline and cellphone survey representative of the noninstitutionalized adult population aged ≥18 years of the 50 states, DC, and the U.S. territories. In 2012, a total of 338,734 interviews with persons aged ≥45 years were completed, and data from 50 states, DC, Puerto Rico, and Guam are included in this report (the U.S. Virgin Islands did not collect BRFSS data). Response rates ranged from 27.7% to 60.4%, with a median of 45.2%.†

Respondents were defined as having arthritis if they answered "yes" to the question, "Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?" The BRFSS survey asks about falls in the past year, explaining to the respondent that, "By a fall, we mean when a person unintentionally comes to rest on the ground or another lower level." Respondents were considered to have fallen if they answered the question, "In the past 12 months, how many times have you fallen?" with a number of one or more. The number of falls was analyzed as a categorical variable (zero, one, or two or more) and as a dichotomous variable (yes or no). Those who reported one or more falls were also asked, "How many of these falls caused an injury? By an injury, we mean the fall caused you to limit your regular activities for at least a day or to go see a doctor?" Injury from any fall was categorized as a dichotomous variable (yes or no).

All analyses used sampling weights to account for the complex sample design, nonresponse, noncoverage, and cellphone-only households. Since 2011, iterative proportional weighting (raking) has been used and shown to reduce nonresponse bias and error within estimates compared with post-stratification weighting.§ Thus, 2012 estimates should not be compared with estimates made before 2011. The unadjusted prevalence of any fall (one or more in the past 12 months) with 95% confidence intervals (CIs) for combined state/territory data was used to assess the similarity of prevalence for two age groups (45–64 and ≥65 years). State-specific unadjusted prevalence of fall outcomes among adults aged ≥45 years with and without arthritis are available at http://www.cdc.gov/arthritis/data_statistics/prevalence-injuries-falls-by-state.htm. Age-adjusted estimates were standardized to the year 2000 U.S. standard population

* Information available at http://www.cdc.gov/injury/wisqars.

† The response rate was the number of respondents who completed the survey as a proportion of all eligible and likely eligible persons. Response rates for BRFSS were calculated using standards set by the American Association of Public Opinion Research response rate formula no. 4. Additional information available at http://www.cdc.gov/brfss/annual_data/2012/pdf/summarydataqualityreport2012_20130712.pdf.

§ Additional information available at http://www.cdc.gov/brfss/annual_data/2012/pdf/overview_2012.pdf.

using five age-groups (45–54, 55–64, 65–74, 75–84, and ≥85 years). Age-adjusted estimates were presented and used to compare the prevalence of one fall, any fall, two or more falls, and fall injuries by arthritis status across states/territories. In addition, medians and ranges for all states and DC were determined for each fall outcome. For all comparisons, differences were considered statistically significant if the CIs of the age-adjusted estimates did not overlap.

The unadjusted prevalence of having experienced any fall in the past 12 months was similar for adults aged 45–64 years (25.5%) and ≥65 years (27.0%); therefore, state-specific findings for the combined ≥45 years age group are reported. Overall the unadjusted median state prevalence of arthritis among adults aged ≥45 years was 40.1% (range = 31.0%–51.9%), and the median prevalence of one fall, two or more falls, and fall injuries in the preceding year was 13.8% (range = 8.8%–16.7%), 13.3% (range = 6.1%–21.0%), and 9.9% (range = 4.5%–13.3%), respectively.

In analyses of adults with arthritis, the age-adjusted median prevalence for one fall was 15.5% (range = 10.7% in Wisconsin to 20.1% in Washington), for two or more falls was 21.3% (range = 7.7% in Wisconsin to 30.6% in Alaska), and for fall injuries was 16.2% (range = 8.5% in Wisconsin to 22.1% in Oklahoma) (Table). Among adults without arthritis, the age-adjusted median prevalence of one fall, two or more falls, and fall injuries was 12.1% (range = 7.7% in Wisconsin to 15.1% in Wyoming), 9.0% (range = 4.1% in Wisconsin to 14.6% in Alaska), and 6.5% (range = 2.7% in Wisconsin to 9.0% in Alaska), respectively. Within every state and territory except Guam, the prevalence of two or more falls and fall injuries was significantly higher for those with arthritis compared with those without arthritis (Table). The age-adjusted median prevalence of one fall, any fall, two or more falls, and fall injuries was 28%, 79%, 137%, and 149% higher (relative differences), respectively, among adults with arthritis compared with adults without arthritis.

In 2012, 46 states and DC had an age-adjusted prevalence of any fall in the past 12 months of ≥30% among adults with arthritis, and 16 states had an age-adjusted prevalence of any fall of ≥40% (Figure). Among adults without arthritis, no state/territory had an age-adjusted prevalence of falls ≥30% or had a significantly higher age-adjusted prevalence of falls compared with adults with arthritis.

Discussion

In all 50 states and DC, the prevalence of any fall (one or more), two or more falls, and fall injuries in the past 12 months was significantly higher among adults aged ≥45 years with arthritis compared with those without arthritis. Among persons with arthritis, about half of all states had a prevalence of multiple falls (two or more) ranging from 21% to 31% and a prevalence of fall injuries ranging from 16% to 22%. In 45 states and DC, the age-adjusted prevalence of any fall among adults with arthritis was ≥30%; in contrast, the prevalence of any fall in adults without arthritis did not reach 30% in any state. Finally, the age-adjusted median prevalence of two or more falls and fall injuries among adults with arthritis was approximately 2.4 and 2.5 times higher, respectively, than those without arthritis.

The 2010 U.S. Census reported 81.5 million adults (26.4% of the population) aged 45–64 and 40.3 million persons (13.0%) aged ≥65 years. The projected rapid growth in the population aged ≥65 years[¶] and the increase in adults with arthritis (an estimated 67 million by 2030) (*6*) demonstrate the need for increasing fall prevention efforts.

Public health approaches to prevent falls among older adults have focused on modifying fall risk factors (e.g., muscle weakness in the legs, gait and balance problems, psychoactive medication use, poor vision, and environmental hazards such as slippery surfaces or tripping hazards), in addition to identifying and treating the symptoms of chronic conditions that increase fall risk, such as arthritis.[**] Public health approaches to preventing poor outcomes among adults with arthritis have focused on evidence-based self-management education and physical activity interventions[††] that have been proven to reduce pain and improve function by correcting muscle weakness and balance dysfunction. Combining arthritis exercise programs with proven fall prevention intervention might reduce the risk for falls in this at-risk population.

Effective fall prevention interventions can be multifaceted, but the most effective single strategy involves exercise or physical therapy to improve gait, balance, and lower body strength, which have been shown to reduce fall risk by 14%–37% (*7*). For an exercise program to be effective in reducing falls it must 1) focus on improving balance, 2) become progressively more challenging, and 3) involve at least 50 hours of practice (e.g., a 1-hour Tai Chi class taken twice a week for 25 weeks) (*8*). As a form of exercise, Tai Chi is an effective fall prevention intervention[§§] that has also been shown to improve neuromuscular function (*9*). However, the effects of Tai Chi intervention programs on arthritis-specific outcomes are still being evaluated; therefore, Tai Chi is not currently endorsed

¶ Additional information available at https://www.census.gov/prod/2010pubs/p25-1138.pdf.

** Additional information available at http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2010.

†† Additional information available at http://www.cdc.gov/arthritis/interventions/marketing-support/compendium/docs/pdf/compendium-2012.pdf.

§§ Additional information available at http://www.cdc.gov/homeandrecreationalsafety/falls/preventfalls.html#compendium.

TABLE. Weighted age-adjusted prevalence of falls* and fall injuries in the past 12 months,† among adults aged ≥45 years with and without arthritis,§ by state/territory¶ — Behavioral Risk Factor Surveillance System, United States, 2012

State/Area	One fall						Two or more falls						Fall injury					
			Arthritis		No arthritis				Arthritis		No arthritis				Arthritis		No arthritis	
	Sample size**	Population**	%	(95% CI)	%	(95% CI)	Sample size**	Population**	%	(95% CI)	%	(95% CI)	Sample size**	Population**	%	(95% CI)	%	(95% CI)
Alabama	980	256,858	16.0	(14.2–18.0)	11.3	(10.0–12.9)	1,101	324,718	26.0	(23.7–28.4)	9.3	(7.9–11.0)	835	228,719	18.7	(16.6–20.9)	5.4	(4.5–6.4)
Alaska	409	36,579	15.0	(12.3–18.1)	14.3	(11.9–17.0)	534	53,317	30.6	(26.5–35.0)	14.6	(12.4–17.1)	350	35,369	20.8	(17.4–24.7)	9.0	(7.1–11.5)
Arizona	813	328,358	16.3	(13.3–19.7)	12.1	(10.4–14.0)	732	299,524	21.9	(18.6–25.7)	8.2	(6.8–9.9)	606	262,168	18.1	(15.1–21.5)	7.0	(5.8–8.5)
Arkansas	548	146,006	14.4	(12.3–16.7)	11.0	(9.4–12.8)	678	209,133	27.8	(24.8–30.9)	11.5	(9.8–13.5)	488	144,016	20.9	(18.2–23.8)	6.0	(4.9–7.4)
California	1,309	1,712,404	15.6	(13.9–17.5)	13.3	(12.0–14.8)	1,182	1,563,446	19.4	(17.4–21.6)	9.7	(8.6–10.8)	1,027	1,334,678	15.6	(13.9–17.5)	6.5	(5.6–7.4)
Colorado	1,287	288,047	18.2	(16.4–20.2)	14.2	(13.0–15.5)	1,122	243,734	19.8	(17.8–22.0)	9.5	(8.5–10.6)	909	211,557	17.8	(15.9–19.9)	7.1	(6.2–8.0)
Connecticut	845	186,356	14.0	(12.1–16.1)	11.1	(9.8–12.5)	732	177,566	19.9	(17.3–22.8)	7.9	(6.8–9.0)	641	148,629	17.1	(14.8–19.8)	6.0	(5.1–7.1)
Delaware	473	46,888	15.4	(12.7–18.5)	10.3	(8.8–12.1)	422	44,498	19.4	(16.4–22.7)	7.2	(5.9–8.8)	365	35,880	14.0	(11.5–16.8)	6.6	(5.4–8.0)
DC	396	31,436	13.9	(10.6–17.9)	15.1	(12.4–18.2)	315	27,168	24.2	(19.3–29.8)	7.5	(6.0–9.3)	291	26,465	20.0	(15.6–25.1)	8.0	(5.9–10.7)
Florida	749	968,371	14.3	(11.8–17.2)	10.4	(9.0–12.1)	721	971,220	20.8	(18.0–23.9)	7.2	(6.1–8.6)	669	862,502	17.4	(14.7–20.4)	6.3	(5.2–7.5)
Georgia	597	479,332	16.6	(14.0–19.5)	12.0	(10.4–13.8)	602	476,094	22.4	(19.6–25.5)	8.4	(7.1–10.0)	511	390,040	18.4	(15.9–21.3)	6.5	(5.4–7.9)
Hawaii	613	67,584	15.2	(12.4–18.6)	10.4	(8.9–12.2)	451	45,385	13.5	(11.0–16.5)	6.2	(5.0–7.6)	418	41,177	13.3	(10.6–16.7)	5.0	(4.2–6.0)
Idaho	707	86,883	15.0	(12.4–18.0)	14.4	(12.3–16.9)	761	93,282	25.2	(21.3–29.5)	11.2	(9.5–13.2)	570	67,320	18.9	(15.6–22.8)	7.6	(6.2–9.3)
Illinois	593	678,156	15.5	(13.3–18.0)	12.3	(10.6–14.2)	476	567,290	16.6	(14.0–19.4)	8.0	(6.6–9.7)	408	464,542	15.2	(12.8–18.0)	5.1	(4.1–6.3)
Indiana	888	374,522	16.9	(15.0–18.9)	13.7	(12.3–15.3)	926	381,394	23.8	(21.6–26.2)	10.0	(8.7–11.4)	663	275,651	16.8	(14.9–18.9)	6.9	(5.9–8.1)
Iowa	789	186,009	15.2	(13.3–17.4)	15.0	(13.5–16.5)	674	175,584	22.8	(20.2–25.5)	9.9	(8.7–11.4)	500	125,108	15.9	(13.7–18.3)	6.7	(5.7–7.8)
Kansas	1,295	159,978	16.5	(14.9–18.3)	12.9	(11.8–14.0)	1,205	156,339	22.4	(20.3–24.6)	9.8	(8.8–10.9)	824	103,103	15.3	(13.5–17.2)	5.8	(5.1–6.7)
Kentucky	1,144	229,858	15.4	(13.8–17.2)	11.7	(10.3–13.2)	1,319	298,532	26.0	(23.6–28.6)	10.3	(8.9–11.9)	1,008	213,288	18.4	(16.5–20.6)	6.2	(5.2–7.4)
Louisiana	769	181,584	12.2	(10.4–14.4)	9.1	(7.9–10.5)	910	222,659	21.3	(18.7–24.2)	6.7	(5.5–8.1)	607	151,012	12.4	(10.6–14.6)	5.9	(4.9–7.2)
Maine	1,138	92,883	16.8	(15.1–18.6)	13.8	(12.6–15.1)	1,136	96,548	24.3	(22.2–26.6)	10.7	(9.6–11.8)	840	69,631	18.4	(16.5–20.4)	6.8	(5.9–7.7)
Maryland	1,217	278,273	15.6	(13.5–18.0)	10.9	(9.7–12.1)	991	219,260	15.1	(13.3–17.0)	6.7	(5.8–7.8)	864	187,961	12.9	(11.3–14.8)	5.6	(4.8–6.6)
Massachusetts	2,079	352,749	16.4	(14.7–18.2)	11.8	(10.8–12.8)	1,762	293,545	18.6	(16.8–20.5)	7.6	(6.8–8.4)	1,653	267,905	16.2	(14.6–18.0)	6.4	(5.7–7.1)
Michigan	815	407,924	12.2	(10.8–13.9)	8.1	(7.1–9.2)	514	305,661	12.0	(10.2–14.1)	4.3	(3.6–5.3)	472	249,957	10.1	(8.5–12.0)	3.0	(2.4–3.8)
Minnesota	1,218	291,368	16.4	(14.5–18.6)	12.8	(11.7–13.9)	985	254,660	21.1	(18.6–23.7)	8.2	(7.3–9.2)	802	194,999	16.2	(14.1–18.7)	5.7	(5.0–6.5)
Mississippi	787	139,653	15.4	(13.5–17.5)	10.0	(8.7–11.5)	889	179,522	24.9	(22.5–27.5)	9.2	(7.8–10.7)	680	124,024	17.1	(15.1–19.3)	5.6	(4.7–6.8)
Missouri	764	360,504	18.1	(15.9–20.6)	12.6	(11.0–14.4)	756	379,648	24.1	(21.4–27.1)	10.0	(8.4–11.8)	605	284,659	18.6	(16.2–21.3)	6.9	(5.7–8.3)
Montana	922	63,860	16.8	(14.8–19.1)	13.3	(11.9–14.8)	1,111	78,636	25.5	(23.1–28.1)	14.0	(12.5–15.5)	742	49,480	17.0	(14.9–19.2)	7.9	(6.8–9.1)
Nebraska	2,218	114,065	18.5	(16.8–20.3)	14.5	(13.5–15.6)	1,886	91,793	19.0	(17.2–21.0)	9.4	(8.5–10.3)	1,445	70,856	15.8	(14.2–17.5)	6.5	(5.8–7.2)
Nevada	451	123,607	14.5	(11.5–18.2)	11.1	(9.2–13.4)	451	117,912	20.0	(16.5–23.9)	7.9	(6.5–9.6)	351	91,292	13.9	(11.1–17.2)	6.5	(5.0–8.3)
New Hampshire	853	81,481	16.3	(14.4–18.5)	12.9	(11.5–14.5)	859	83,990	19.8	(17.5–22.3)	11.0	(9.7–12.5)	661	63,234	15.5	(13.5–17.6)	7.8	(6.7–9.1)
New Jersey	1,273	392,045	14.2	(12.6–16.0)	9.9	(8.8–11.0)	974	311,829	15.8	(14.1–17.8)	5.9	(5.1–6.8)	964	295,364	14.1	(12.4–16.0)	5.5	(4.8–6.4)
New Mexico	871	115,409	16.5	(14.5–18.7)	13.4	(12.0–14.8)	912	123,436	26.0	(23.4–28.7)	11.0	(9.8–12.3)	743	98,863	19.6	(17.5–21.9)	7.7	(6.7–8.8)
New York	609	1,160,253	17.7	(14.9–20.9)	13.8	(11.9–15.9)	489	972,909	20.2	(16.9–23.8)	8.7	(7.2–10.5)	460	829,218	15.3	(12.9–18.2)	7.8	(6.4–9.5)
North Carolina	1,102	502,240	14.8	(13.1–16.6)	12.5	(11.2–13.8)	1,100	513,843	21.9	(19.9–24.1)	8.8	(7.8–10.1)	822	358,263	14.8	(13.1–16.6)	6.1	(5.3–6.9)
North Dakota	517	40,120	16.4	(13.8–19.4)	12.5	(10.9–14.4)	447	36,715	18.3	(15.3–21.7)	10.6	(8.9–12.6)	348	27,347	15.7	(12.8–19.1)	6.6	(5.4–8.2)
Ohio	1,242	619,185	14.8	(13.3–16.4)	11.8	(10.6–13.1)	1,300	616,621	20.8	(18.9–22.7)	8.4	(7.4–9.5)	1,034	492,055	16.1	(14.5–17.8)	6.3	(5.5–7.4)
Oklahoma	801	202,036	15.5	(13.7–17.5)	12.0	(10.7–13.5)	1,031	266,556	29.7	(27.1–32.4)	10.6	(9.3–12.0)	742	186,433	22.1	(19.8–24.6)	5.8	(4.9–6.9)
Oregon	427	170,229	13.8	(11.4–16.8)	8.6	(7.3–10.1)	280	109,037	10.6	(8.5–13.1)	4.9	(3.9–6.2)	263	100,791	9.4	(7.5–11.7)	4.1	(3.2–5.2)
Pennsylvania	2,056	775,966	16.9	(15.4–18.5)	12.8	(11.6–14.0)	1,838	651,072	19.2	(17.6–20.9)	7.6	(6.8–8.5)	1,534	538,263	14.6	(13.3–16.1)	6.6	(5.8–7.5)
Rhode Island	502	52,092	15.3	(13.0–17.8)	10.1	(8.6–11.7)	461	50,039	17.5	(15.0–20.3)	8.1	(6.7–9.8)	420	43,397	14.9	(12.7–17.4)	6.5	(5.4–7.7)
South Carolina	1,238	244,630	16.2	(14.3–18.2)	11.3	(10.1–12.7)	1,258	263,224	24.1	(21.9–26.5)	8.1	(7.1–9.3)	1,011	207,080	18.8	(16.8–21.0)	6.1	(5.2–7.2)
South Dakota	900	54,348	19.6	(16.4–23.2)	14.7	(12.7–17.0)	751	40,861	20.3	(17.2–23.8)	9.0	(7.5–10.8)	617	34,616	18.9	(15.7–22.5)	7.0	(5.7–8.7)
Tennessee	605	305,920	14.2	(12.2–16.5)	11	(9.4–12.7)	749	372,174	23.7	(21.3–26.3)	8.1	(6.8–9.6)	439	225,958	12.5	(10.6–14.6)	5.9	(4.8–7.2)
Texas	844	1,106,235	14.3	(12.3–16.7)	11.9	(10.4–13.6)	834	1,196,235	21.9	(19.3–24.8)	9.0	(7.8–10.3)	679	904,705	16.8	(14.4–19.5)	6.6	(5.6–7.7)
Utah	1,126	116,915	17.9	(16.0–20.0)	12.9	(11.7–14.2)	1,038	106,471	19.2	(17.3–21.3)	10.0	(8.9–11.2)	759	78,484	15.3	(13.5–17.2)	6.5	(5.7–7.5)
Vermont	691	42,124	15.7	(13.6–18.1)	14.4	(12.7–16.2)	766	48,216	26.3	(23.5–29.3)	12.4	(10.9–14.1)	514	30,740	17.1	(14.8–19.8)	7.2	(6.1–8.5)
Virginia	642	370,673	14.8	(12.8–17.0)	10.1	(8.8–11.5)	598	390,276	21.2	(18.5–24.1)	7.6	(6.5–8.8)	436	273,548	14.1	(12.0–16.3)	5.2	(4.3–6.2)
Washington	1,922	449,370	20.1	(18.3–22.0)	15.0	(14.0–16.1)	1,704	412,140	22.0	(20.3–24.0)	11.9	(10.9–13.0)	1346	326,695	18.4	(16.7–20.2)	8.5	(7.6–9.4)
West Virginia	479	97,758	12.9	(11.2–14.7)	10.3	(8.8–11.9)	598	131,714	23.3	(20.8–25.9)	9.8	(8.3–11.6)	380	79,390	13.8	(11.9–16.0)	5.5	(4.4–6.8)
Wisconsin	333	197,943	10.7	(8.5–13.5)	7.7	(6.2–9.6)	235	138,625	10.0	(7.7–12.8)	4.1	(3.1–5.5)	182	109,173	8.5	(6.3–11.5)	2.7	(1.9–3.9)
Wyoming	744	33,459	16.6	(13.8–19.7)	15.1	(13.2–17.3)	807	38,643	29.5	(25.8–33.6)	11.5	(9.8–13.5)	559	27,191	20.2	(17.0–23.8)	7.5	(6.2–9.1)
Median††			*15.5*		*12.1*				*21.3*		*9.0*				*16.2*		*6.5*	
Range††			*10.7–20.1*		*7.7–15.1*				*10.0–30.6*		*4.1–14.6*				*8.5–22.1*		*2.7–9.0*	
Puerto Rico	504	160,786	12.6	(10.9–14.6)	10.2	(8.8–11.7)	459	175,156	16.9	(14.5–19.5)	7.4	(5.3–10.3)	463	170,429	16.6	(14.4–19.2)	8.9	(7.5–10.6)
Guam	107	5,278	16.3	(11.5–22.6)	12.1	(8.7–16.6)	98	4,703	18.6	(12.3–27.0)	9.8	(8.3–11.7)	81	3,790	15.7	(9.9–23.9)	6.6	(4.4–9.9)

Abbreviations: CI = confidence interval; DC = District of Columbia.

* Falls were defined as self-reported number of falls in past 12 months.

† Injury from a fall was defined as self-reported injury caused by a fall in past 12 months that caused respondent to limit their regular activities for ≥1 days or to go see a doctor.

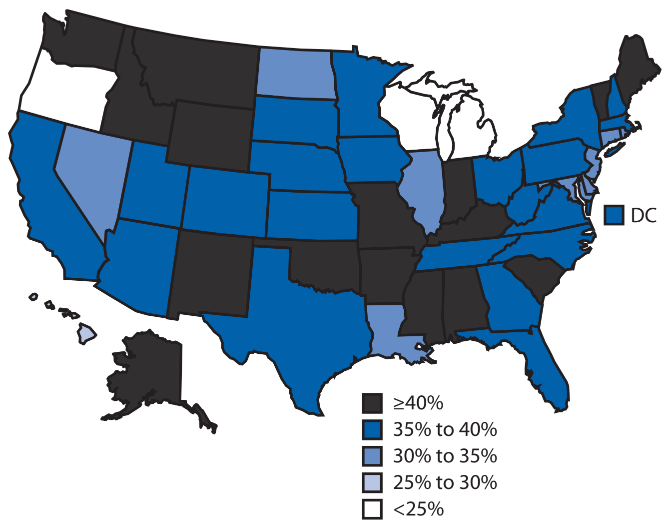
§ Doctor-diagnosed arthritis was defined based on a "yes" response to the question, "Have you ever been told by a doctor or other health professional that you have some form of arthritis, rheumatoid arthritis, gout, lupus, or fibromyalgia?"

¶ Includes all 50 states, DC, Puerto Rico, and Guam.

** Sample size represents the actual number with the outcome, whereas population is the weighted number of adults with the outcome.

†† Does not include Puerto Rico or Guam.

FIGURE. Age-standardized prevalence of having one or more falls in the past 12 months among adults aged ≥45 years with arthritis — Behavioral Risk Factor Surveillance System, United States, 2012



for use by the 12 CDC-funded state arthritis programs that disseminate arthritis-appropriate, evidence-based intervention programs for use in local communities. Existing arthritis physical activity interventions, especially EnhanceFitness and Fit and Strong¶¶ might reduce the risk for falls and fall injuries but have not yet been evaluated for these outcomes.

The findings in this report are subject to at least four limitations. First, data in BRFSS are based on self-report; therefore, arthritis status, falls, and a fall injury might be misclassified. The case-finding question used in BRFSS to assess arthritis status has been judged to be sufficiently sensitive and specific for public health surveillance purposes among those aged ≥65 years, but it is less sensitive for those aged <65 years than is desirable (*10*); however, recall bias might contribute to an underestimate of self-reported falls. Conversely, the broad definition of a fall injury might have led participants to report minor falls as injurious, resulting in an overestimate. Second, because BRFSS is a cross-sectional survey, the temporal sequence of arthritis and falls could not be established. Nonetheless, a meta-analysis of seven longitudinal studies showed that persons with arthritis have more than a two-fold increased risk for falls (*2*). Third, no BRFSS questions assess the severity, location, or type of arthritis, which might affect falls and fall injuries differently. Finally, the 2012 median survey response rate for all states and DC was 45.2% and ranged from 27.7% to 60.4%; lower response rates can result in nonresponse bias, although the application of sampling weights is expected to reduce nonresponse bias.

¶¶ Additional information available at http://www.cdc.gov/arthritis/interventions/marketing-support/compendium/docs/pdf/compendium-2012.pdf.

What is already known on this topic?

In the United States, arthritis, falls, and fall injuries are highly prevalent conditions among middle-aged (aged 45–64 years) and older (aged ≥65 years) adults. Falls are the leading cause of injury-related morbidity and mortality among older adults; meanwhile, arthritis remains the most common cause of disability.

What is added by this report?

During 2012, for all 50 states and the District of Columbia, the prevalence of any fall (one or more), two or more falls, and fall injuries in the past 12 months was significantly higher among adults with arthritis compared with those without arthritis. Moreover, among adults with arthritis, the age-adjusted median prevalences of one fall, any fall, two or more falls, and fall injuries were 28% , 79%, 137%, and 149% higher, respectively, compared with adults without arthritis.

What are the implications for public health practice?

The burden of falls and fall injuries is high among adults with arthritis but can be addressed through greater dissemination of arthritis management and fall prevention programs in clinical and community practice.

The number of adults with arthritis is expected to increase steadily through at least 2030 (*6*), putting more adults at higher risk for falls and fall injuries. Efforts to address this growing public health problem require raising awareness about the link between arthritis and falls, evaluating evidence-based arthritis interventions for their effects on falls, and implementing fall prevention programs more widely through changes in clinical and community practice.

[1]Division of Population Health, National Center for Chronic Disease Prevention and Health Promotion, CDC; [2]Division of Unintentional Injury Prevention; National Center for Injury Prevention and Control, CDC; [3]Department of Occupational Therapy, University of Pittsburgh (Corresponding author: Kamil E. Barbour, kbarbour@cdc.gov, 770-488-5145)

References

1. Stevens JA, Corso PS, Finkelstein EA, Miller TR. The costs of fatal and non-fatal falls among older adults. Inj Prev 2006;12:290–5.
2. Rubenstein LZ, Josephson KR. Falls and their prevention in elderly people: what does the evidence show? Med Clin North Am 2006;90:807–24.
3. Talbot LA, Musiol RJ, Witham EK, Metter EJ. Falls in young, middle-aged and older community dwelling adults: perceived cause, environmental factors and injury. BMC Public Health 2005;5:86.
4. CDC. Prevalence of doctor-diagnosed arthritis and arthritis-attributable activity limitation—United States, 2010–2012. MMWR 2013;62:869–73.
5. CDC. Prevalence and most common causes of disability among adults—United States, 2005. MMWR 2009;58:421–6.

6. Hootman JM, Helmick CG. Projections of US prevalence of arthritis and associated activity limitations. Arthritis Rheum 2006;54:226–9.
7. Gillespie LD, Robertson MC, Gillespie WJ, et al. Interventions for preventing falls in older people living in the community. Cochrane Database Syst Rev 2009;2(CD007146).
8. Sherrington C, Tiedemann A, Fairhall N, Close JC, Lord SR. Exercise to prevent falls in older adults: an updated meta-analysis and best practice recommendations. N S W Public Health Bull 2011;22:78–83.
9. Jahnke R, Larkey L, Rogers C, Etnier J, Lin F. A comprehensive review of health benefits of qigong and tai chi. Am J Health Promot 2010;24:e1–25.
10. Sacks JJ, Harrold LR, Helmick CG, Gurwitz JH, Emani S, Yood RA. Validation of a surveillance case definition for arthritis. J Rheumatol 2005;32:340–7.

Notes from the Field

Investigation of Infectious Disease Risks Associated With a Nontransplant Anatomical Donation Center — Arizona, 2014

Marie A. de Perio, MD[1], Bruce P. Bernard, MD[1], Lisa J. Delaney, MS[1], Nicki Pesik, MD[2], Nicole J. Cohen, MD[2]
(Author affiliations at end of text)

On April 25, 2014, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

CDC is investigating reports of potential occupational exposure to human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and *Mycobacterium tuberculosis* among workers performing preparation and dissection procedures on human nontransplant anatomical materials at a nontransplant anatomical donation center in Arizona. CDC is working with Arizona public health officials to inform persons exposed to these potentially infected materials. Nontransplant anatomical centers around the United States process thousands of donated cadavers annually. These materials (which might be fresh, frozen, or chemically preserved) are used by universities and surgical instrument and pharmaceutical companies for medical education and research. The American Association of Tissue Banks has developed accreditation policies for nontransplant anatomical donation organizations (*1*). It also has written standards (*1*) that specify exclusion criteria for donor material, as well as use of proper environmental controls and safe work practices to prevent transmission of infectious agents during receipt and handling of nontransplant anatomical materials. At the center under investigation, which is now closed, these standards might not have been consistently implemented.

CDC has assisted Arizona public health officials in notifying former workers at the center regarding potential exposure to HIV, HBV, and HCV, and *M. tuberculosis* while preparing nontransplant anatomical materials. Bloodborne pathogens (e.g., HIV, HBV, and HCV) can be transmitted when blood or other potentially infectious materials contact mucous membranes, such as the eyes, mouth, or nonintact skin, or when they enter the body through a percutaneous injury such as a needlestick or scalpel wound. *M. tuberculosis* can be transmitted by infectious aerosols generated by manipulation of infectious tissues.

Arizona public health officials have offered former workers at the center cost-free testing for HIV, HBV, and HCV, and *M. tuberculosis* infection as well as counseling regarding these infections. End users of nontransplant anatomical materials for medical training or research purposes are thought to be at considerably lower risk for infection because of the reduced survival and infectivity of these organisms over time, and are being notified separately where possible. Waste treatment, storage, and transportation workers handling containers or packaged nontransplant anatomical materials would not directly contact these materials during regular work and are not considered to be at risk unless there is a spill of infectious material. If a spill were to occur, proper disinfection procedures, determination of employee exposure, and worker follow-up with an assessment of transmission risk should take place, per facility protocols and the Bloodborne Pathogens Standard of the Occupational Safety and Health Administration (OSHA) (*2*). There are no known risks to the general public, and these activities are unrelated to organs or tissues recovered for transplantation in human recipients.

Employers and employees in the nontransplant anatomical donation industry and end users should recognize that cadavers and nontransplant anatomical materials are considered potentially infectious with *M. tuberculosis* and other pathogens, even if they are known to test negative for HIV, HBV, and HCV. Employers must comply with the OSHA Bloodborne Pathogens Standard, which requires a written exposure control plan, use of engineering and work practice controls, appropriate personal protective equipment, and provision of hepatitis B vaccine to employees assigned to jobs with occupational exposure risk (*2*). CDC's Guidelines for Safe Work Practices in Human and Animal Medical Diagnostic Laboratories (*3*) and the Standards for Non-Transplant Anatomical Donation have been published (*1*). When transported, these materials should be packaged and labeled in accordance with all applicable regulations. Should a spill or damage to a package of nontransplant anatomical materials occur, procedures, such as those found in the U.S. Postal Service, Handbook EL–812, Hazardous Materials and Spill Response (*4*) and U.S. Department of Transportation Hazardous Materials Regulations (*5*) should be followed.

[1]National Institute for Occupational Safety and Health, CDC; [2]National Center for Emerging and Zoonotic Infectious Diseases, CDC (Corresponding author: Marie de Perio, MD, mdeperio@cdc.gov, 513-841-4116).

References

1. American Association of Tissue Banks. Standards for non-transplant anatomical donation for education and/or research. First edition. McLean, VA: American Association of Tissue Banks; 2011.
2. Occupational Safety and Health Administration. Bloodborne pathogens standard (29 CFR Part 1910.1030). Washington, DC: US Department of Labor, Occupational Safety and Health Administration. Available at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=10051&p_table=STANDARDS.
3. CDC. Guidelines for safe work practices in human and animal medical diagnostic laboratories: recommendations of a CDC-convened, biosafety blue ribbon panel. MMWR 2012;61(Suppl 1).
4. US Postal Service. Handbook EL–812. Hazardous materials and spill response: general guidelines. Washington, DC: US Postal Service. Available at http://pe.usps.com/text/pub52/pub52c2_019.htm.
5. Department of Transportation. Hazardous materials regulations. 49CFR171-180. Washington, DC: Department of Transportation. Available at http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title49/49cfrv2_02.tpl.

Announcements

National High Blood Pressure Education Month — May 2014

May is National High Blood Pressure Education Month. High blood pressure, also known as hypertension, is the leading risk factor for stroke and a major cause of morbidity and mortality (*1*). In the United States, nearly one in three adults has hypertension, but only about half (47%) of those have it under control (*1*). Hypertension is considered the "silent killer" because it can damage the heart, brain, and kidneys without any symptoms (*1*). Each day in the United States, nearly 1,000 deaths are associated with hypertension (*2*). National High Blood Pressure Education Month aims to save lives by increasing awareness and educating the public about cardiovascular risks and how to prevent them.

To control hypertension, patients can take medications as directed, measure their blood pressure, and eat a lower-sodium diet and more fruits and vegetables (*1*). Health-care providers can use electronic health records, blood pressure monitoring, and a team-based care approach to help improve their patients' hypertension control (*3*).

CDC's Division for Heart Disease and Stroke Prevention focuses on promoting cardiovascular health and improving quality of care for all and eliminating disparities associated with heart disease and stroke. Additional information is available at http://www.cdc.gov/bloodpressure and http://www.cdc.gov/stroke.

References

1. CDC. Vital signs: awareness and treatment of uncontrolled hypertension among adults—United States, 2003–2010. MMWR 2012;61:703–9.
2. Kochanek KD, Xu JQ, Murphy SL, Miniño AM, Kung HC. Deaths: final data for 2009. Nat Vital Stat Rep 2011;60(3).
3. Go AS, Mozaffarian D, Roger VL, et al. Heart disease and stroke statistics—2014 update: a report from the American Heart Association. Circulation. 2014;128:e28–e292.

Older Americans Month — May 2014

Each May, the nation celebrates Older Americans Month to recognize older persons for their contributions and provide information to help them stay healthy and active. This year's focus is injury prevention, with the theme "Safe Today. Healthy Tomorrow."

Injuries and violence are serious threats to the health of persons aged ≥65 years. Unintentional injuries among this population result in approximately 48,550 deaths annually (*1*). Falls are the leading cause of fatal and nonfatal injuries among older adults (*2*). About a third of those aged ≥65 years fall each year, resulting in costs of nearly $30 billion annually (*1*). Older adults are also at higher risk for traumatic brain injury and injuries associated with residential fires, abuse and maltreatment, and suicide (*3*).

To improve older adult health, CDC works to reduce risk factors for injuries and ensure widespread adoption of effective injury prevention strategies. Information on fire safety and interventions to prevent falls among older adults, for example, can be found at http://www.cdc.gov/homeandrecreationalsafety. Information and resources (including posters and sample articles) about Older Americans Month are available at http://www.acl.gov/newsroom/observances/oam/index.aspx.

References

1. Finkelstein EA, Corso PS, Miller TR. The incidence and economic burden of injuries in the United States. New York, NY: Oxford University Press; 2006.
2. CDC. Web-Based Injury Statistics Query and Reporting System (WISQARS). Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://www.cdc.gov/ncipc/wisqars.
3. CDC. Violence prevention. Atlanta, GA: US Department of Health and Human Services, CDC; 2014. Available at http://www.cdc.gov/violenceprevention.

Announcements

ALS Awareness Month — May 2014

May is Amyotrophic Lateral Sclerosis (ALS) Awareness Month. ALS, also known as Lou Gehrig's disease, is a progressive, fatal, neurodegenerative disorder of the upper and lower motor neurons. The etiology of ALS is not well understood, and currently there is no cure. Persons with ALS usually die within 2–5 years of diagnosis.

In October 2010, the Agency for Toxic Substances and Disease Registry (ATSDR) launched the National ALS Registry (http://www.cdc.gov/als) to collect and analyze data regarding persons with ALS in the United States. The goals are to determine the incidence and prevalence of ALS, characterize the demographics of those living with ALS, and examine the potential risk factors for the disease. The registry uses data from existing national databases, including the Centers for Medicare and Medicaid Services and the U.S. Department of Veterans Affairs, as well as information provided by persons with ALS through the secure online web portal. Registrants can also take brief online surveys regarding potential risk factors for the disease.

ATSDR is collaborating with the ALS Association (http://www.alsa.org), Muscular Dystrophy Association (http://www.als-mda.org), Les Turner Foundation (http://www.lesturnerals.org), and other organizations to make all persons with ALS and their families aware of the opportunity to register in the National ALS Registry. Additional features have been added to enhance the registry for patients and researchers, including state and metropolitan area–based ALS surveillance to assist in evaluating the completeness of the registry, a research notification system to inform persons with ALS about new research studies, a biorepository study to evaluate the feasibility of collecting biospecimens from enrollees, and mobile apps to help find the nearest ALS clinics and support groups.

Erratum

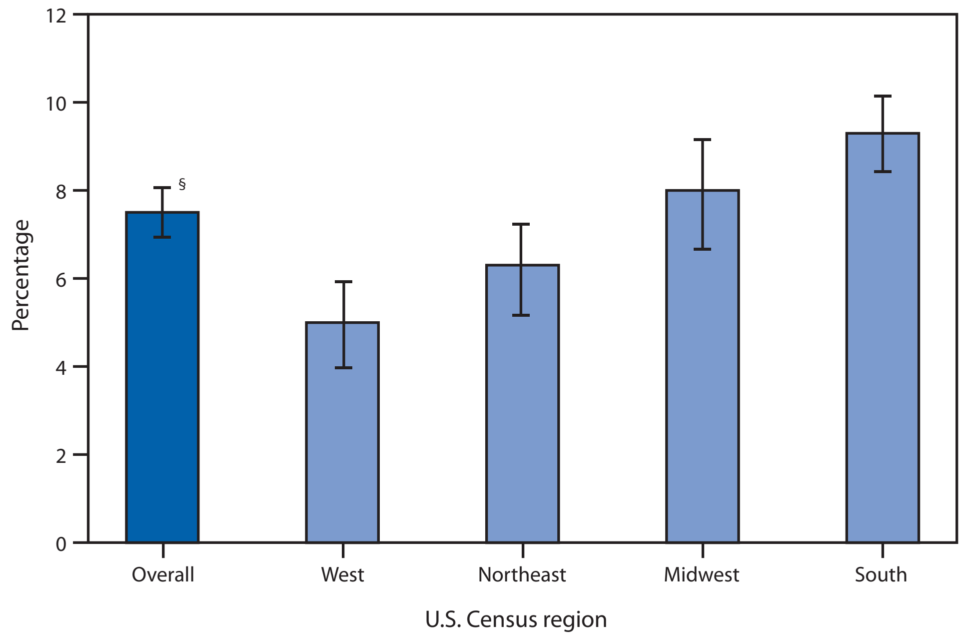
Vol. 63, No. 14

In the report, "Measles Outbreak Associated with Adopted Children from China — Missouri, Minnesota, and Washington, July 2013," an error occurred on page 302 in the fifth sentence of the second paragraph of the right column. The sentence should reads as follows: "He arrived in the United States on July 4, developed a fever on July 10, rash on July 14, and tested **PCR**-positive for measles on July 16."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Children Aged 6–17 Years Prescribed Medication During the Preceding 6 Months for Emotional or Behavioral Difficulties,* by Census Region — National Health Interview Survey,† United States, 2011–2012



* Based on responses to the question, "During the past 6 months, was [child's name] prescribed medication or taking medication for difficulties with emotions, concentration, behavior, or being able to get along with others."

† Estimates are based on household interviews of a sample of the noninstitutionalized, civilian U.S. population and are derived from the National Health Interview Survey sample child component.

§ 95% confidence interval.

During 2011–2012, among children aged 6–17 years, 7.5% overall had been prescribed medication for emotional or behavioral difficulties during the preceding 6 months. By U.S. Census region, the percentages were 9.3% in the South, 8.0% in the Midwest, 6.3% in the Northeast, and 5.0% in the West.

Source: National Health Interview Survey, 2011–2012. Available at http://www.cdc.gov/nchs/nhis.htm.

Reported by: LaJeana D. Howie, MPH, lhowie@cdc.gov, 301-458-4611; Patricia N. Pastor, PhD; Susan L. Lukacs, DO.

U.S. Government Printing Office: 2014-723-032/01055 Region IV ISSN: 0149-2195