Botulism Associated with Home-Fermented Tofu in Two Chinese Immigrants — New York City, March–April 2012

In March 2012, the New York City Department of Health and Mental Hygiene (DOHMH) received two reports of recent immigrants from China admitted to the same hospital 23 days apart for suspected foodborne botulism. Patient 1 had a laboratory-confirmed case of foodborne botulism, and patient 2 had a probable case; patient 1's case was definitively associated with home-fermented tofu, and patient 2's case might have been associated with home-fermented tofu. Both patients had purchased fresh tofu from the same Chinese grocery in Queens, a New York City borough, in January 2012, and each had prepared home-fermented tofu using similar recipes. Similar fermentation practices at the two homes might have facilitated toxin production. Testing confirmed botulinum toxin type B in home-fermented tofu consumed by patient 1. Bulk tofu at the grocery in Queens was found to be sold in unrefrigerated, uncovered, water-filled bins. Traceback revealed that the grocery's fresh bulk tofu supplier at the time of the patients' purchases had gone out of business. DOHMH advised the grocery's manager of the need to properly store bulk tofu. Public health responders and clinicians should be aware of the association between botulism and fermented tofu.

Patient 1

On March 3, 2012, a Chinese man aged 39 years arrived at the hospital with a 4-day history of vomiting followed by dysphagia, diplopia, dysarthria, dyspnea, and difficulty walking. Neurologic examination revealed bilateral cranial nerve deficits: dilated pupils minimally reactive to light, ptosis, oculomotor palsy, and facial paralysis. Motor strength was normal, but deep tendon reflexes were hypoactive. He was admitted to the intensive-care unit and intubated because of concern for impending respiratory failure. An edrophonium chloride test was interpreted as positive for myasthenia gravis, and intravenous immune globulin treatment was initiated. Electromyography studies eventually were determined to be suspicious for, but not diagnostic of, botulism. On March 9,

unilateral upper extremity weakness was noted, and results of a test for antibodies to acetylcholine receptors (positive in myasthenia gravis) were negative. Serum and stool specimens were obtained for testing, and botulinum antitoxin was administered. On March 27, botulinum toxin type B was identified by mouse bioassay in stool specimens. Patient 1 improved and was discharged to a rehabilitation facility on March 26.

Patient 2

On March 28, 2012, a Chinese woman aged 36 years from the same Queens neighborhood as patient 1 was admitted to the same hospital after 2 days of vomiting and diarrhea followed by dysarthria, dysphagia, and dizziness. On examination, she had bilateral cranial nerve palsies: ptosis, dilated pupils minimally reactive to light, and oculomotor palsy. Mild, right upper extremity weakness and loss of upper extremity deep tendon reflexes were noted. She was intubated because of concern regarding impending respiratory failure. The same clinicians who had cared for patient 1, and who by this time had laboratory confirmation of botulism in patient 1, admitted patient 2; they immediately suspected botulism because of the similar clinical presentation. On March 29, serum and stool specimens were obtained, and botulinum antitoxin was administered. Electromyography studies performed March 30

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

were consistent with, but not diagnostic of, botulism. No botulinum toxin was detected in serum or stool specimens. The patient improved and was discharged home on April 18.

Public Health Investigation

On February 25 and 26, approximately a week before symptom onset, patient 1 and his wife ate home-fermented tofu prepared by patient 1's wife. Patient 1's wife consumed the same amount of tofu as patient 1, but was asymptomatic. Patient 2 consumed home-fermented tofu on at least 3 of the 7 days preceding symptom onset. No other persons were known to have eaten patient 2's tofu.

Patient 1's wife and patient 2 had emigrated from the same locality in Jiangxi Province, China, to the United States within the previous 2 years. Both resided in Queens, but they did not know each other. They reported purchasing fresh bulk tofu in January 2012 at the same Chinese grocery in Queens. Patient 1's wife cubed the tofu and placed it in a plastic container in layers separated by heavy paper. She covered the container with a nonairtight lid and allowed the contents to ferment at room temperature for 1 week. She next added chili pepper and salt, transferred the tofu to a glass jar, and stored it in the refrigerator for 3 weeks before consumption. Patient 2 placed blocks of tofu in a colander covered with plastic wrap and kept it at room temperature for 7–10 days. She then added salt, dried chili pepper, and orange peel, and stored the fermented tofu in glass jars in the refrigerator. The fermented tofu was not heated before consumption in either case.

On March 29, samples of fermented tofu were collected from both patients, and fresh bulk tofu was obtained from the grocery for laboratory testing. No samples of unfermented tofu purchased by the patients in January were available for testing. The laboratory detected botulinum toxin type B by mouse bioassay on April 2 in leftover fermented tofu from the same batch consumed by patient 1. Toxin was not detected in tofu from patient 2, in any additional foods from either household, or in fresh tofu obtained by DOHMH from the grocery in March 2012.

To help detect additional cases, DOHMH notified health-care practitioners and issued press releases in English and Chinese; no new cases were identified. A site visit to the grocery revealed that bulk tofu was sold in unrefrigerated, uncovered, water-filled bins. DOHMH informed the manager that bulk tofu must be maintained at a temperature <41°F (<5°C) in covered or sneeze-guard–protected containers in a well-supervised area with a means of preventing bare-hand contact. Food traceback revealed that the grocery's fresh bulk tofu supplier at the time of the patients' purchases had since permanently closed, and the business owner no longer resided in the United States.

Reported by

Edward Chai, MD, Eugene Choi, MD, Cristina Guitierrez, MD, Melvin Hochman, MD, Suja Johnkutty, MD, Wael Kamel, MD, Todd Mekles, MD, Reza Zarnegar, DO, New York Hospital, Queens; Joel Ackelsberg, MD, Sharon Balter, MD, Ellen H. Lee, MD, Lan Li, Angel Ramos, Teresa Rodriguez, Don Weiss, MD, Janette Yung, MPH, Benyang Zhao, PhD, New York City Dept of Health and Mental Hygiene; Stephen W. Davis, Christina Egan, PhD, George E. Hannett, MS, New York State Dept of Health. Agam Rao, MD, Div of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases; Amita Toprani, MD, Nandini Sreenivasan, MD, EIS officers, CDC. **Corresponding contributors:** *Amita Toprani, atoprani@health.nyc.gov, 212-788-5288; Nandini Sreenivasan, vii2@cdc.gov, 404-639-3510.*

Editorial Note

This suspected outbreak included one confirmed case linked to consumption of home-fermented tofu (patient 1) and one probable case in a person who also ate home-fermented tofu (patient 2). The recognition of these cases prompted concern that other cases might follow, and a rapid and vigorous public health response was conducted. This investigation was challenging because both clinical presentations were atypical, and because fermented tofu, an uncommon vehicle for botulism in the United States, was not immediately recognized as the potential source of illness.

Botulism typically causes bilateral cranial nerve palsies, followed by bilateral descending flaccid paralysis over the course of hours or days, with eventual loss of deep tendon reflexes. Patients are usually afebrile, and sensation and cognition are unaffected; in foodborne botulism, neurologic symptoms might be preceded by nausea and vomiting (*1,2*). Atypical presentations, such as those of both patients in this cluster, can make recognition of botulism difficult. Both patients eventually were determined to have bilateral cranial nerve deficits, but this was not initially clear. Both patients also had loss of deep tendon reflexes and respiratory compromise but minimal or no muscle weakness. In patient 2's case, the weakness and loss of reflexes were unilateral. Patient 1 also had a positive edrophonium chloride test, a finding indicative of myasthenia gravis and only rarely reported positive in botulism (*3*). The clinicians caring for patient 2 ruled out other diseases that have similar signs and symptoms, and electromyography results were consistent with, but not diagnostic of, botulism.

Foodborne botulism occurs when *Clostridium botulinum* spores, which are ubiquitous in the environment, germinate and produce toxin. Spore germination and toxin formation require warm, anaerobic environments with low-acid, low-salt,

---

What is already known on this topic?

Foodborne botulism is caused by eating foods contaminated with botulinum toxin produced by the bacterium *Clostridium botulinum*. Botulism is characterized by acute onset of bilateral cranial nerve palsies followed by descending symmetric flaccid paralysis that can progress to respiratory failure or death. In the United States, foodborne botulism typically is associated with home-canned foods and traditional fermented Alaska Native foods.

What is added by this report?

This report highlights the potential for consumption of home-fermented tofu, a food commonly prepared in Chinese communities, to be a risk factor for botulism in the United States. It also documents the atypical clinical presentation of one confirmed and one probable case of botulism from home-fermented tofu prepared from fresh tofu purchased at the same grocery.

What are the implications for public health practice?

Public health professionals should be aware of the association between fermented tofu and botulism, and that botulism can present atypically. Early recognition of botulism can lead to timely diagnosis and appropriate treatment of suspected cases.

---

and low-sugar content (*4*). A patient's history of exposure to foods commonly associated with botulism can help with recognition of botulism. In the United States, home-canned foods and traditional fermented Alaska Native foods are major sources of botulism (*5*). Fermented tofu has only once been reported as associated with botulism in the United States (*6*). In China, however, home-fermented tofu and other fermented bean products cause the majority of foodborne botulism cases (*7*). The occurrence of two suspected cases in such close temporal and geographic proximity increased suspicion of a common vehicle, although patient 1's tofu was the only confirmed source of botulinum toxin; no other foods tested from either household were determined to be a toxin source.

Contamination of bulk tofu with *C. botulinum* spores might have occurred at the tofu manufacturing facility or at the grocery. Both patients had purchased tofu during the same month from the same grocery and fermented it using similar recipes. Subsequently, the fermentation processes, which involved prolonged storage at room temperature in a low-acid and low-salt environment, might have created conditions conducive to spore germination and toxin formation. Neither patient heated the tofu before eating it; therefore, toxin would not have been inactivated by heat. Neither patient reported using an airtight container for fermentation, but anaerobic pockets might have existed within the tofu. Previous investigations reveal that botulinum toxin can be distributed unevenly in food (*8*), which might explain why patient 1's wife did not contract botulism. Uneven distribution of toxin also might explain the negative test results for patient 2's leftover tofu.

Public health responders and clinicians should be aware that fermented foods, including tofu, can be vehicles for foodborne botulism. They should consider botulism as the potential cause of cranial nerve palsies and ask about consumption of foods known to cause botulism. Education of populations known to include fermented tofu in their diets might help prevent foodborne botulism associated with consumption of home-fermented tofu.

References

1. Shapiro RL, Hatheway C, Swerdlow DL. Botulism in the United States: a clinical and epidemiologic review. Ann Intern Med 1998;129:221–8.
2. Sobel J. Botulism. Clin Infect Dis 2005;41:1167–73.
3. Hughes JM, Blumental JR, Merson MH, Lombard GL, Dowell VR, Gangarosa EJ. Clinical features of types A and B food-borne botulism. Ann Intern Med 1981;95:442–545.
4. Sobel J, Tucker N, Sulka A, McLaughlin J, Maslanka S. Foodborne botulism in the United States, 1990–2000. Emerg Infect Dis 2004;10:1606–11.
5. CDC. Botulism outbreak associated with eating fermented food—Alaska, 2001. MMWR 2001;50:680–2.
6. CDC. Foodborne botulism from home-prepared fermented tofu—California, 2006. MMWR 2007;56:96–7.
7. Gao QY, Huang YF, Wu JG, Liu HD, Xia HQ. A review of botulism in China. Biomed Environ Sci 1990;3:326–36.
8. Kalluri P, Crowe C, Reller M, et al. An outbreak of foodborne botulism associated with food sold at a salvage store in Texas. Clin Infect Dis 2003; 37:1490–5.

Suicide and Suicidal Ideation Among Bhutanese Refugees — United States, 2009–2012

During the period February 2009–February 2012, the Office of Refugee Resettlement of the U.S. Department of Health and Human Services reported 16 suicides among the approximately 57,000 Bhutanese refugees who had resettled in the United States since 2008. In 2012, the office requested assistance from CDC and the Massachusetts Department of Public Health's Refugee Health Technical Assistance Center to identify risk factors that might be associated with suicidal ideation among Bhutanese refugees. In collaboration with the Massachusetts refugee health center, CDC conducted a survey of randomly selected Bhutanese refugees in four U.S. states with large populations of resettled refugees. The results indicated significant associations between ever having expressed suicidal ideation and current self-reported symptoms of mental health disorder (e.g., anxiety, depression, or posttraumatic stress disorder) and postmigration difficulties (e.g., family conflict or inability to find work). The findings highlight the need for development of culturally appropriate community-based interventions for suicide prevention and standard procedures for monitoring and reporting suicides and suicide attempts in the Bhutanese refugee population.

Suicide Rate Among Bhutanese Refugees

Based on the 16 reported suicides (four in 2009, six in 2010, five in 2011, and one as of February 2012), the annual suicide rate among Bhutanese refugees resettled in the United States was calculated by investigators as 21.5 per 100,000; the age-adjusted suicide rate using the U.S. 2000 population as the standard was 24.4 per 100,000. Both estimates were higher than the estimated annual global suicide rate for all persons of 16.0 per 100,000 (1) and the annual suicide rate for U.S. residents of 12.4 per 100,000 (2), but were similar to the prearrival suicide rate in Bhutanese refugee camps in Nepal of 20.7 per 100,000 (3).

Assessment of Suicidal Ideation

After stratifying by state, a sample of 579 Bhutanese refugees aged ≥18 years living in Arizona, Georgia, New York, and Texas was randomly selected. Trained bilingual and bicultural interviewers contacted the potential participants, obtained written informed consent, and administered the survey in the respondent's home using the respondent's preferred language (English or Nepali). The survey asked about demographics, mental health history, difficulties after arrival in the United States, perceived level of social support (4), current symptoms of posttraumatic stress disorder (PTSD) and traumatic experiences (using the Harvard Trauma Questionnaire [5]), and symptoms of anxiety, depression and psychological distress (using the Hopkins Symptom Checklist [6]). Participants also were provided information on local mental health services and were encouraged to access these services if needed.

Participants were asked if they had ever expressed suicidal ideation (i.e., ever thought seriously about committing suicide in their lifetimes). Interviewers were trained to implement a distressed respondent protocol if a participant expressed suicidal thoughts during the interview. Data were summarized and tested for statistically significant differences between men and women using the chi-square test for categorical variables and t-test for continuous variables. Adjusted bivariate associations (by age, sex, and state of residence) between suicidal ideation and other variables were estimated with adjusted odds ratios, associated Wald chi-square tests, and 95% confidence intervals, using conditional logistic regression.

The response rate for the survey was 73% (423 of 579). Of the 423 participants, 221 (52%) were men. Most (72%) were married, Hindu (72%), and had a regular income (65%). Median age was 34 years (range: 18–83 years), and median time in the United States was 1.8 years (range: 0.2–5.0 years). A total of 148 (35%) participants had no education, 56 (13%) had no more than a primary education, 163 (38%) had attended a secondary school, and 54 (13%) had a university or graduate degrees. Fifteen (4%) participants reported ever having been diagnosed with a mental health disorder. Seventy-nine (19%) had current anxiety symptoms (15% of men, compared with 23% of women, p=0.04); 82 (20%) had current depressive symptoms (16% of men, compared with 26% of women, p=0.01), and 69 (17%) had current psychological distress symptoms (13% of men, compared with 23% of women, p=0.01). Using a scoring algorithm created by the Harvard Refugee Trauma Group based on the PTSD symptom criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR), the prevalence of PTSD symptoms was estimated at 5% (3% of men, compared with 6% of women, p=0.17).

A total of 153 (36%) participants reported experiencing four to seven presettlement traumatic events or significant stressors, and 145 (34%) reported experiencing eight or more traumatic events or stressors. The most common traumatic event was lack of nationality or citizenship (90%), followed by having to flee suddenly (54%), and lack of freedom of movement (52%).

Commonly reported postarrival difficulties were language barriers (62%), lack of choice (46%), and worries about family back home (39%).

Of the 423 participants, 131 (30%) had personally known someone who had taken their own life; of the 131, a total of 24 (18%) had been emotionally close to the suicide decedents. Thirteen (3%) of the 423 participants reported that they had ever expressed suicidal ideation. Of these, nine had thought about it in the past 12 months, three had once made a plan, and one had attempted suicide. One participant expressed suicidal thought during the interview, and the appropriate distressed respondent protocol was implemented to provide care for this participant.

Respondents who were not providers for their family were more likely (adjusted odds ratio [AOR] = 6.6) to have ever expressed suicidal ideation than family providers (i.e., persons expected to be financially responsible for the family, regardless of current employment status) (Table). Self-reported symptoms of anxiety (AOR = 38.1), distress (AOR = 15.0), and depression (AOR = 11.2) were strongly associated with ever expressing suicidal ideation, compared with those without those symptoms. Those categorized as reporting symptoms of PTSD were more likely to report suicidal ideation than those without PTSD (AOR = 9.3). Among postarrival difficulties faced by refugees, increased family conflict (AOR = 22.6) and being unable to find work (AOR = 11.1) were the difficulties most strongly associated with suicidal ideation (Table).

Reported by

Jennifer Cochran, MPH, Paul L. Geltman, MD, Refugee Health Technical Assistance Center, Massachusetts Dept of Public Health. Heidi Ellis, PhD, Boston Children's Hospital and Harvard Medical School. Cheryl Brown, Stephanie Anderton, New York State Dept of Health. Jessica Montour, MPH, Texas Dept of State Health Svcs. Monica Vargas, MSPH, Georgia Dept of Public Health. Kenneth Komatsu, MPH, Carrie Senseman, MPA, Arizona Dept of Health Svcs. Barbara Lopes Cardozo, MD, Teresa I. Sivilli, MPH, Curtis Blanton, MS, Div of Global Health Protection, Center for Global Health; Sharmila Shetty, MD, Div of Global Migration and Quarantine, National Center for Emerging and Zoonotic Infectious Diseases; Eboni Taylor, PhD, Emily Lankau, DVM, Trong Ao, ScD, EIS officers, CDC. **Corresponding contributor:** *Trong Ao, trongao@cdc.gov, 404-639-2172.*

Editorial Note

Since the early 1990s, approximately 100,000 Bhutanese of Nepali origin (*Lhotshampas*) have been living in refugee camps in Nepal because of cultural and religious persecution in Bhutan. Third-country resettlement began in 2008, and to date, approximately 57,000 Bhutanese refugees have been resettled in the United States. Since the study described in this report was concluded, four additional suicides have been reported among Bhutanese refugees in the United States (U.S. Department of Health and Human Services, Office for Refugee Resettlement, unpublished data, 2013). Currently, reporting

TABLE. Adjusted odds ratios (AORs)* for ever expressing suicidal ideation, among Bhutanese refugees (N = 423) resettled in the United States, by selected characteristics, 2012

Characteristic	Suicidal ideation		No suicidal ideation		AOR	(95% CI)
	No. (n = 13)	(%)	No. (n = 404)	(%)		
Nonprovider for family	11	(84.6)	204	(50.5)	6.6	(1.4–31.9)
Anxiety[†]	11	(84.6)	67	(16.6)	38.1	(7.9–185.1)
Depression[†]	8	(66.7)	74	(19.4)	11.2	(2.9–42.1)
Distress[†]	8	(66.7)	60	(15.8)	15.0	(3.9–57.1)
Posttraumatic stress disorder[§]	3	(23.1)	16	(3.9)	9.3	(2.1–41.0)
Experienced burning down of house or shelter	7	(53.9)	105	(26.0)	3.4	(1.1–10.3)
Postmigration experience						
Increased family conflict	4	(30.8)	8	(1.9)	22.6	(5.5–92.6)
Being unable to find work	11	(84.6)	145	(35.9)	11.1	(2.4–51.5)
Poor access to counseling services	8	(61.5)	75	(18.6)	7.9	(2.5–25.4)
Lack of community structures for family dispute	3	(23.1)	30	(7.4)	4.8	(1.2–19.8)
Lack of choice over future	10	(76.9)	185	(45.8)	4.7	(1.2–17.8)
Little help from government	8	(61.5)	125	(30.9)	3.6	(1.2–11.4)
Coping mechanism						
Wished people would just leave you alone	5	(38.5)	23	(5.7)	14.5	(3.9–52.8)
Thought about what needed to be done	11	(84.6)	205	(50.7)	7.0	(1.5–33.1)
Talked with community leaders or elders	4	(30.8)	49	(12.1)	3.4	(1.0–11.7)

Abbreviation: CI = confidence interval.
* Adjusted for state of residence, age, and sex.
[†] Based on the Hopkins Symptom Checklist.
[§] Defined as at least one of four reexperiencing symptoms in addition to at least three of seven avoidance and numbing symptoms, and at least two of five arousal symptoms.

of suicides and suicide attempts among Bhutanese refugees is through informal channels of communication, including the community, resettlement agencies, state refugee health coordinators, and the Office for Refugee Resettlement. A timely reporting system that accurately obtains information about suicide and suicide attempts in these communities is needed to enable appropriate supportive care for the families and community affected.

Although prearrival and postarrival suicide rates among Bhutanese refugees appear similar, different psychological stressors occur at each stage of the resettlement process. This study identified postarrival difficulties (e.g., being unable to find work and increased family conflict) and symptoms of anxiety, depression, and psychological distress as factors significantly associated with having ever expressed suicidal ideation. Both continuing those interventions already implemented to address the prearrival risk factors in the Nepal refugee camps (e.g., maintaining peer-support groups and providing informal counseling sessions with community psychosocial workers) and addressing these postarrival difficulties and symptoms are important to a comprehensive suicide prevention strategy.

Although only 4% of respondents reported being previously diagnosed with a mental health disorder, this investigation identified much higher prevalences of current anxiety, depression, and distress symptoms (19%, 21%, and 17%, respectively), with significantly higher proportions among women. This might suggest high levels of undiagnosed mental health disorders in these communities. For comparison, the prevalence of current self-reported depression among adults in the United States was approximately 8% in the National Health and Nutrition Examination Survey during 2007–2010 (7), and the prevalence of self-reported depression was 15.1% in a population-based study in Chennai, India (8).

The findings in this report are subject to at least three limitations. First, suicide and mental health are inherently sensitive topics; therefore, reported mental health disorders and suicidal ideation and suicide attempts might have been underreported. Because no structured clinical interviews were conducted, the extent to which self-reported symptoms of PTSD, psychological distress, depression, and anxiety might be matched by clinical diagnoses is uncertain. In addition, cultural or religious perspectives on suicide were not explored, and an understanding of these might have provided additional context for interpretation of the accuracy of the data. Second, the cross-sectional study design did not allow inference of causal relationships between the risk factors and expression of suicidal ideation. Finally, the 73% response rate might have resulted in bias. However, when the characteristics of the participants were compared with those for the U.S. population

of Bhutanese refugees, no marked differences were observed. Nonetheless, these results, drawn from data in four states, are not generalizable to other Bhutanese populations inside and outside of the United States or to other refugee populations.

Based on the findings of this investigation, the following strategies might be important in creating a comprehensive suicide prevention plan in these communities: 1) immediately follow up with the recent suicides to connect affected families and communities with supportive services; 2) integrate cultural brokers (i.e., Bhutanese refugee community leaders who act as a liaison between community members and service providers) into existing mental health services to promote language and cultural access for refugees; 3) engage the suicide prevention coordinator in each state to facilitate linkages between refugee communities/resettlement networks and suicide prevention services; and 4) follow the CDC Recommendations for a Community Plan for the Prevention and Containment of Suicide Clusters and Recommendations for Reporting on Suicide (9) when there is a cluster of suicides in a community.

In addition to predeparture suicide prevention strategies already implemented by the International Organization for Migration in Bhutanese refugee camps (3), this report highlights the need for further suicide prevention activities in the United States that might include providing 1) training for

---

What is already known on this topic?

Mental health and suicide among Bhutanese in refugee camps in Nepal are growing public health concerns.

What is added by this report?

Sixteen suicides among U.S.-resettled Bhutanese refugees were reported to the Office of Refugee Resettlement during February 2009–February 2012. The age-adjusted incidence of suicide among Bhutanese refugees resettled in the Untied States was 24.4 per 100,000. Expression of suicidal ideation was reported by 3% of respondents. Suicidal ideation was significantly associated with having symptoms of mental illness and postarrival difficulties such as family conflict and being unable to find work.

What are the implications for public health practice?

These findings suggest that Bhutanese refugees who have resettled in the United States could have a high percentage of undiagnosed mental illness. Prioritizing mental health services might be important to the successful resettlement of Bhutanese refugees in the United States. Current programs that address postarrival challenges such as job training and language training should consider adding social support and mental health components. Refugee communities and service providers might benefit from additional suicide awareness training to identify those at greatest risk and greatest need for early intervention.

suicide prevention gatekeepers (i.e., anyone who comes into regular contact with distressed persons or families); 2) other nonclinical community support interventions in Bhutanese community activities, such as religious singing groups and sports teams; and 3) standardized and coordinated reporting of information on confirmed suicides or suicide attempts.

References

1. World Health Organization. Suicide prevention (SUPRE). Geneva, Switzerland, World Health Organization; 2013. Available at http://www. who.int/mental_health/prevention/suicide/suicideprevent/en.
2. CDC. Web-based Injury Statistics Query and Reporting System (WISQARS). Atlanta, GA: CDC; 2013. Available at http://www.cdc.gov/ injury/wisqars/fatal_injury_reports.html.
3. Schinina G, Sharma S, Gorbacheva O, Mishra AK; International Organization for Migration. Who am I? Assessment of psychosocial needs and suicide risk factors among Bhutanese refugees in Nepal and after third country resettlement, 2011.
4. Cutrona CE. Objective determinants of perceived social support. J Pers Soc Psychol 1986;50:349–55.
5. Mollica RF, Caspi-Yavin Y, Bollini P, Truong T, Tor S, Lavelle J. The Harvard Trauma Questionnaire: validating a cross-cultural instrument for measuring torture, trauma, and posttraumatic stress disorder in Indochinese refugees. J Nerv Ment Dis 1992;180:111–6.
6. Shrestha NM, Sharma B, Van Ommeren M, et al. Impact of torture on refugees displaced within the developing world: symptomatology among Bhutanese refugees in Nepal. JAMA 1998;280:443–8.
7. National Health and Nutrition Examination Survey, 2007–2010. Available at http://www.cdc.gov/nchs/nhanes.htm.
8. Poongothai S, Pradeepa R, Ganesan A, Mohan V. Prevalence of depression in a large urban South Indian population—the Chennai Urban Rural Epidemiology Study (CURES-70). PLoS One 2009;4:e7185.
9. CDC. CDC recommendations for a community plan for the prevention and containment of suicide clusters. MMWR 1988;37(Suppl 6).

Vital Signs: Overdoses of Prescription Opioid Pain Relievers and Other Drugs Among Women — United States, 1999–2010

On July 2, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

Abstract

Background: Overdose deaths have increased steadily over the past decade. This report describes drug-related deaths and emergency department (ED) visits among women.

Methods: CDC analyzed rates of fatal drug overdoses and drug misuse- or abuse-related ED visits among women using data from the National Vital Statistics System (1999–2010) and the Drug Abuse Warning Network (2004–2010).

Results: In 2010, a total of 15,323 deaths among women were attributed to drug overdose, a rate of 9.8 per 100,000 population. Deaths from opioid pain relievers (OPRs) increased fivefold between 1999 and 2010 for women; OPR deaths among men increased 3.6 times. In 2010, there were 943,365 ED visits by women for drug misuse or abuse. The highest ED visit rates were for cocaine or heroin (147.2 per 100,000 population), benzodiazepines (134.6), and OPR (129.6). ED visits related to misuse or abuse of OPR among women more than doubled between 2004 and 2010.

Conclusions: Although more men die from drug overdoses than women, the percentage increase in deaths since 1999 is greater among women. More women have died each year from drug overdoses than from motor vehicle–related injuries since 2007. Deaths and ED visits related to OPR continue to increase among women. The prominent involvement of psychotherapeutic drugs, such as benzodiazepines, among overdoses provides insight for prevention opportunities.

Implications for Public Health Practice: Health-care providers should follow guidelines for responsible prescribing, including screening and monitoring for substance abuse and mental health problems, when prescribing OPR. Health-care providers who treat women for pain should use their state's prescription drug monitoring program and regularly screen patients for psychological disorders and use of psychotherapeutic drugs, with or without a prescription.

Introduction

In 2010, enough opioid pain relievers (OPR) were sold to medicate every adult in the United States with the equivalent of a typical dose of 5 mg of hydrocodone every 4 hours for 1 month (*1*), a 300% increase in the sales rate over 11 years. This rise in distribution of OPR is concomitant with increasing rates of drug overdose death and chronic, nonmedical use of OPR (*2,3*).

Differences between men and women related to prescription drug use outcomes are complicated. The death rate for OPR overdose is higher among men than women, but since 1993, hospitalizations for OPR overdoses have been more frequent among women than men (*4*). During 2004–2008, women and men had similar emergency department (ED) visit rates related to nonmedical use of OPR and benzodiazepines (*5*). OPR prescribing and use patterns also differ by gender. Women are more likely than men to be prescribed OPR, to use them chronically, and to receive prescriptions for higher doses of OPR (*6,7*). This might be because the most common forms of pain are more prevalent among women, and pain is more intense and of longer duration in women than men (*8,9*). Women also might be more likely than men to engage in "doctor shopping" (receiving a prescription for a controlled substance from multiple providers), and more likely to be prescribed OPR combined with sedatives (*10,11*). Sex-specific health risks associated with long-term OPR use among women include amenorrhea and infertility (*12,13*). Finally, the progression to dependence on OPR might be accelerated in women, and women with substance use disorders are more likely than men to face barriers in access to substance abuse treatment (*14,15*). Taken together, these health concerns indicate a need to examine drug overdose deaths and ED visits among women to guide development of targeted prevention strategies.

Methods

For this report, death rates are based on the National Vital Statistics System multiple cause of death files (1999–2010). Drug poisoning deaths, referred to as drug overdose deaths in this report, were defined as those with an underlying cause of death classified using the *International Classification of Diseases, 10th Revision*
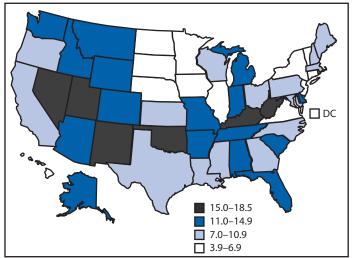
(ICD-10) external cause of injury codes as X40-X44, X60-X64, X85, or Y10-Y14. Rates include injury deaths of any intent (unintentional, suicide, homicide, or undetermined) for U.S. residents. Among deaths with drug overdose as the underlying cause, CDC identified the type of drug involved based on ICD-10 codes for prescription drugs (T36-T39, T40.2-T40.4, T41-T43.5, and T43.8-T50.8), prescription OPR (T40.2-T40.4), benzodiazepines (T42.4), antidepressants (T43.0-T43.2), heroin (T40.1), and cocaine (T40.5). The codes used to categorize prescription drugs might capture some over-the-counter medications. Deaths involving more than one type of drug were counted in multiple categories. Rates were age adjusted to the 2000 U.S. Census population using bridged-race population estimates (Figure 1).*

The Substance Abuse and Mental Health Services Administration's Drug Abuse Warning Network (DAWN) is a public health information system that tracks the impact of drug use, misuse, and abuse in the United States by monitoring drug-related hospital ED visits. This report used 2004–2010 DAWN public use files for analyses.† DAWN collects data from a stratified, simple random sample of approximately 220 nonfederal, short-stay general hospitals that operate 24-hour EDs. Rates presented in this report are based on the numbers of ED visits weighted to be representative of the U.S. population. Denominators for this report were based on U.S. Census postcensal estimates. DAWN defines misuse or abuse of a drug, based on information in the medical record, as taking a higher-than-recommended dose, taking a drug prescribed for another person, drug-facilitated assault (patient was administered a drug by another person for a malicious purpose), or documented misuse or abuse. ED visits related to the misuse or abuse of alcohol only by persons aged <21 years, which are typically included in DAWN misuse or abuse estimates, were not included in this analysis. ED visits involving more than one type of drug were counted in multiple categories.

Results

In 2010, a total of 15,323 deaths among women were attributed to drug overdose, a rate of 9.8 per 100,000 population. Among these, a drug was specified in 10,922 (71.3%) deaths. One or more prescription drugs were involved in 9,292 (85%) of the drug-specified deaths among women, and OPRs were involved in 6,631 (71.3%) of the prescription drug overdose deaths. These numbers represent substantial increases from 1999 (5,591 drug overdose deaths among women and 1,287 OPR overdose deaths). The percentage increase in number of

---

* Information about bridged-race estimates is available at http://wonder.cdc.gov/wonder/help/mcd.html.
† Information about DAWN files is available at http://www.icpsr.umich.edu/icpsrweb/SAMHDA.

FIGURE 1. Age-adjusted death rates* for drug overdose deaths among women — National Vital Statistics System, United States, 2009–2010

* Deaths per 100,000 population; age-adjusted to the 2000 U.S. standard population using the bridge-race estimates.

OPR overdose deaths was 415% for women and 265% for men. The rate for OPR deaths (4.2 per 100,000 population) was four times the rate for cocaine and heroin deaths combined (1.0) (Table 1). The drug overdose death rate among men (23,006 drug overdoses and 10,020 OPR overdose deaths in 2010) was 1.55 times the rate among women for all drugs (down from 2.1 times the rate in 1999).

Death rates varied by age and race. The rate for all drug overdose deaths among women was highest among those aged 45–54 years (21.8 per 100,000 population). American Indian/Alaska Native (14.5) and non-Hispanic white (12.7) women had the highest drug overdose death rates. The rate of suicide drug overdose deaths was similar for women (1.8) and men (1.7), although drug overdose–related suicide deaths accounted for 34% of all suicide deaths among women compared with 8% among men. OPRs were involved in one in 10 suicides among women.

In 2010, women made 943,365 ED visits for drug misuse or abuse; a rate of 601 per 100,000 population (Table 2) (for every OPR overdose death there were 30 ED visits for OPR misuse or abuse). Cocaine or heroin (147.2), benzodiazepines (134.6), and OPR (129.6) were associated with the highest ED visit rates. ED visit rates among women for all drugs tended to be highest among those aged 25–34 years. The rates for all drug or OPR misuse- or abuse-related ED visits were not significantly different between men and women. The all drug rate for men was 1.35 times the rate for women in 2010, and the OPR rate for men was 1.2 times the rate for women.

During 2009–2010, rates for drug overdose deaths among women varied widely by state (Figure 1). Age-adjusted drug

TABLE 1. Drug overdose deaths* and rates† among women, by selected characteristics, and comparison with 1999 — National Vital Statistics System, United States, 2010

Characteristic	Antidepressants No.	Antidepressants Rate (CI)	Benzodiazepines No.	Benzodiazepines Rate (CI)	Cocaine/Heroin No.	Cocaine/Heroin Rate (CI)	Opioids No.	Opioids Rate (CI)	All prescription drugs No.	All prescription drugs Rate (CI)	All drugs No.	All drugs Rate (CI)	M:F rate ratio (all drugs), 2010	% change in female rate (all drugs), 1999 to 2010
Total	2,204	1.4 (1.3–1.5)	2,579	1.6 (1.6–1.7)	1,598	1.0 (1.0–1.1)	6,631	4.2 (4.1–4.3)	9,292	5.9 (5.8–6.0)	15,323	9.8 (9.6–9.9)	1.55	151.3
Age groups (yrs)														
<18	12	—	15	—	11	—	66	0.2 (0.1–0.2)	91	0.3 (0.2–0.3)	138	0.4 (0.3–0.4)	1.50	100.0
18–24	66	0.4 (0.3–0.6)	159	1.1 (0.9–1.2)	172	1.1 (1.0–1.3)	396	2.6 (2.4–2.9)	511	3.4 (3.1–3.7)	899	6.0 (5.6–6.4)	2.58	160.9
25–34	285	1.4 (1.2–1.6)	451	2.2 (2.0–2.4)	326	1.6 (1.4–1.8)	1,093	5.3 (5.0–5.7)	1,423	7.0 (6.6–7.3)	2,422	11.9 (11.4–12.3)	2.10	158.7
35–44	483	2.3 (2.1–2.5)	593	2.9 (2.6–3.1)	381	1.8 (1.7–2.0)	1,515	7.3 (7.0–7.7)	2,014	9.8 (9.3–10.2)	3,464	16.8 (16.2–17.3)	1.48	93.1
45–54	785	3.4 (3.2–3.7)	839	3.7 (3.4–3.9)	526	2.3 (2.1–2.5)	2,239	9.8 (9.4–10.2)	2,986	13.1 (12.6–13.5)	4,986	21.8 (21.2–22.4)	1.31	202.8
55–64	452	2.0 (2.2–2.6)	386	2.0 (1.8–2.2)	166	0.9 (0.7–1.0)	1,038	5.5 (5.2–5.8)	1,530	8.1 (7.7–8.5)	2,436	12.9 (12.4–13.4)	1.34	268.6
≥65	121	0.5 (0.4–0.6)	136	0.6 (0.5–0.7)	15	—	284	1.2 (1.1–1.4)	737	3.2 (3.0–3.4)	977	4.3 (4.0–4.5)	1.00	65.4
Race/Ethnicity§														
White	1,907	1.9 (1.8–2.0)	2,320	2.3 (2.2–2.4)	1,015	1.0 (0.9–1.1)	5,757	5.7 (5.5–5.8)	7,990	7.9 (7.8–8.0)	12,946	12.7 (12.5–12.9)	1.50	188.6
Black	148	0.7 (0.6–0.8)	117	0.6 (0.5–0.7)	414	2.0 (1.8–2.2)	425	2.1 (1.9–2.3)	635	3.1 (2.8–3.3)	1,217	5.9 (5.6–6.2)	1.71	55.3
American Indian/Alaska Native	25	1.9 (1.2–2.8)	21	1.6 (1.0–2.5)	22	1.7 (1.1–2.5)	96	7.3 (5.9–9.0)	120	9.2 (7.5–10.8)	190	14.5 (12.5–16.6)	1.26	190.0
Asian/Pacific Islander	16	—	13	—	11	—	40	0.5 (0.3–0.6)	87	1.0 (0.8–1.3)	126	1.5 (1.2–1.8)	1.67	50.0
Hispanic	99	0.4 (0.3–0.5)	99	0.4 (0.3–0.5)	127	0.5 (0.4–0.6)	294	1.2 (1.0–1.3)	436	1.9 (1.7–2.1)	794	3.2 (3.0–3.4)	2.19	68.4
Intent														
Unintentional	1,349	0.9 (0.8–0.9)	1,938	1.2 (1.2–1.3)	1,457	0.9 (0.9–1.0)	5,144	3.3 (3.2–3.4)	6,483	4.1 (4.0–4.2)	11,168	7.1 (4.0–4.2)	1.75	238.1
Suicide	624	0.4 (0.4–0.4)	451	0.3 (0.3–0.3)	52	0.0 (0.0–0.0)	820	0.5 (0.5–0.6)	1,887	1.2 (1.1–1.3)	2,748	1.8 (1.7–1.8)	0.94	50.0
Undetermined	231	0.1 (0.1–0.2)	189	0.1 (0.1–0.1)	87	0.1 (0.0–0.1)	658	0.4 (0.4–0.5)	908	0.6 (0.5–0.6)	1,385	0.9 (0.8–0.9)	1.11	50.0

Abbreviations: CI = confidence interval; M:F = male to female.
* Drug-related homicide deaths are not included as a separate row because of small numbers, but are included in overall numbers. Deaths involving more than one type of drug were counted in multiple categories.
† Per 100,000 population.
§ Persons identified as Hispanic might be of any race. Persons identified as any of the other categories were non-Hispanic.

overdose death rates ranged from 3.9 per 100,000 women in North Dakota to 18.5 in Nevada.

During 2004–10, OPR death rates and ED visit rates increased substantially among women (Figure 2). During this period, the rate of OPR deaths among women increased 70% and the rate of OPR misuse- or abuse-related ED visits more than doubled. Cocaine deaths and ED visits declined during the same period. Starting in 2008, more women visited EDs because of misuse or abuse of benzodiazepines or OPR than for cocaine.

Conclusions and Comment

Since 2007, more women have died from drug overdoses than from motor vehicle traffic injuries, and in 2010, four times as many died as a result of drug overdose as were victims of homicide. Men are more likely than women to die from drug overdose; however, between 1999 and 2010, the percentage increase in the rate of overdose deaths was greater for women (151%) than for men (85%). The prescribing of controlled substances, drug overdose deaths, and drug misuse- and abuse-related ED visits among women have risen despite numerous recommendations over the past decade for more cautious use of OPR and efforts to curb abuse and prevent deaths.

Between 1999 and 2010, OPR overdose deaths increased more than fivefold among women (a total of 47,935 OPR overdose deaths during that period). Abuse of OPR is a particular problem for women of childbearing age. Given the risk for neonatal abstinence syndrome as a result of OPR abuse during pregnancy (16), and the potential effects of OPR on an embryo during the first trimester (17), health-care providers

TABLE 2. Drug misuse- or abuse-related emergency department visits among women, by selected characteristics and rates,* and comparison with 2004 — Drug Abuse Warning Network, United States, 2010

Characteristic	Antidepressants		Benzodiazepines		Cocaine/Heroin		Opioids		All prescription drugs		All drugs		M:F rate ratio (all drugs), 2010	% change (all drugs), 2004 to 2010
	No.	Rate (CI)	No.	Rate (CI)	No.	Rate (CI)	No.	Rate (CI)	No.	Rate (CI)	No.	Rate (CI)		
Total	67,151	42.8 (33.2–52.4)	211,339	134.6 (97.4–171.9)	231,058	147.2 (100.8–193.6)	203,417	129.6 (98.7–160.4)	672,049	428.2 (333.8–522.5)	943,365	601.0 (472.0–730.1)	1.35	47.0
Age groups (yrs)														
<18	4,013	11.1 (5.9–16.2)	4,379	12.1 (6.4–17.8)	4,332	12.0 (6.0–17.9)	5,351	14.8 (9.8–19.7)	45,166	124.6 (88.5–160.8)	66,353	183.1 (132.6–233.6)	0.99	5.0
18–24	9,914	66.0 (42.8–89.3)	29,446	196.2 (130.2–262.2)	33,841	225.4 (163.0–287.9)	30,719	204.6 (130.6–278.6)	104,691	697.5 (538.1–856.8)	159,189	1,060.0 (830.6–1,290.4)	1.37	45.0[†]
25–34	15,368	75.2 (57.6–92.8)	57,262	280.3 (167.7–392.8)	65,405	320.1 (213.3–426.9)	47,246	231.2 (163.5–298.9)	154,672	757.0 (547.6–966.4)	225,190	1,102.2 (824.9–1,379.4)	1.31	47.4
35–44	14,224	68.9 (52.8–85.1)	46,314	224.5 (157.8–291.1)	60,866	295.0 (197.4–392.5)	41,558	201.4 (146.3–256.5)	128,086	620.7 (468.4–773.1)	188,304	912.6 (701.0–1,124.2)	1.31	33.2
45–54	15,301	66.9 (47.0–86.8)	43,457	190.1 (146.8–233.3)	52,035	227.6 (134.5–320.6)	43,860	191.8 (143.2–240.4)	128,633	562.6 (438.2–687.0)	179,531	785.2 (608.8–961.6)	1.46	74.0[†]
55–64	5,481	29.0 (19.9–38.2)	19,676	104.2 (68.4–140.0)	13,776	73.0 (27.7–118.2)	19,761	104.7 (79.6–129.7)	57,580	305.0 (232.9–377.0)	71,132	376.7 (287.7–465.8)	1.53	142.7[†]
≥65	2,849	12.4 (5.5–19.4)	10,804	47.2 (28.5–65.8)	—[§]	—[§]	14,922	65.1 (47.6–82.7)	52,892	230.9 (175.2–286.6)	53,666	234.4 (178.2–290.3)	0.95	86.9
Race/Ethnicity[¶]														
White	49,020	48.2 (36.1–60.2)	171,453	167.5 (114.2–222.8)	114,902	112.9 (76.1–149.7)	162,788	160.0 (114.6–205.4)	483,342	475.1 (352.6–597.6)	609,368	598.9 (452.7–745.2)	1.19	91.5[†]
Black	7,314	35.5 (1.5–69.4)	17,204	83.4 (27.8–139.1)	83,460	404.7 (156.8–652.5)	19,531	94.7 (43.7–145.7)	84,077	407.6 (205.3–610.0)	178,943	867.6 (413.7–1,321.5)	1.79	34.3
Other and unknown race	6,921	71.1 (32.1–110.0)	13,948	143.2 (88.9–197.5)	16,071	165.0 (96.0–234.0)	12,147	124.7 (75.8–173.6)	54,575	560.3 (356.2–764.4)	77,865	799.5 (495.3–1,103.7)	1.33	-36.2
Hispanic	3,896	15.7 (7.2–24.1)	8,733	35.1 (17.4–52.8)	16,625	66.9 (24.4–109.4)	8,952	36.0 (18.1–53.9)	50,055	201.4 (99.9–302.8)	77,190	310.5 (148.2–472.8)	1.80	—[§]

Abbreviations: CI = confidence interval; M:F = male to female.
* Per 100,000 population.
[†] Significant to at least p<0.05.
[§] Numbers and rates are small and might be unstable.
[¶] Persons identified as Hispanic might be of any race. Persons identified as any of the other categories were non-Hispanic.

should include discussions of pregnancy plans within the context of treatment and monitoring of patients taking OPR for medical or nonmedical reasons. Women treated for OPR abuse should be counseled regarding risks to the fetus of OPR abuse during pregnancy. The risks and benefits of treatment of chronic conditions with OPR during pregnancy should be weighed carefully (18). Use of benzodiazepines and antidepressants during pregnancy, or at any time in combination with OPR, also should be considered carefully by women and their health-care providers. Psychological conditions, which might co-occurr with pain or substance abuse (19), need to be assessed and addressed within a treatment regime.

The findings in this report are subject to at least four limitations. First, vital statistics underestimate the rates of drug involvement in deaths because the type of drug is not specified on many death certificates. Second, injury mortality data might underestimate by up to 35% the actual numbers of deaths for American Indian/Alaskan Natives and certain other racial/ethnic populations (e.g., Hispanics) because of the misclassification of race/ethnicity of decedents on death certificates (20). Third, all the drugs involved in ED visits might not be identified. Fourth, information on the motivation for use

might be incomplete; some ED visits might have resulted from suicide attempts. Finally, distinguishing between drugs taken for nonmedical and medical reasons is not always possible, especially when multiple drugs are involved.

Public health interventions to reduce prescription drug overdose must strike a balance between reducing misuse and abuse and safeguarding legitimate access to treatment. Health-care providers who treat women for pain should follow prescribing guidelines. Providers should screen all their patients for psychological disorders and for use of psychotherapeutic drugs, either with or without a prescription. Checking state prescription drug monitoring programs before long-term prescribing of controlled substances should be a standard of care. Communities should try to increase access for women, especially pregnant women, to substance abuse treatment services. Medicaid programs, which enroll disproportionate numbers of young women, should ensure that the prescribing of controlled substances to their clients meets established guidelines. Overdose deaths and ED visits related to prescription drugs, especially OPR, continue to be unacceptably high, and targeted efforts are needed to reduce the number of deaths in this epidemic.
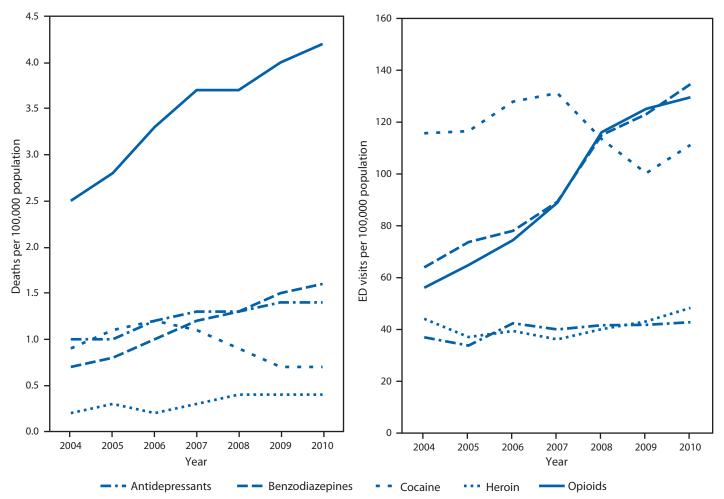
FIGURE 2. Crude rates* for drug overdose deaths and drug misuse- or abuse-related emergency department (ED) visits among women, by select drug class — National Vital Statistics System and Drug Abuse Warning Network, United States, 2004–2010

* Scales differ for deaths and emergency department visits.

Reported by

Karin A. Mack, PhD, Christopher M. Jones, PharmD, Leonard J. Paulozzi, MD, Div of Unintentional Injury Prevention, National Center for Injury Prevention and Control, CDC. **Corresponding contributor:** *Karin Mack, kmack@cdc.gov, 770-488-4389.*

References

1. CDC. Vital signs: overdoses of prescription opioid pain relievers—United States, 1999–2008. MMWR 2011;60:1487–92.
2. Jones CM, Mack KA, Paulozzi LJ. Pharmaceutical overdose deaths, United States, 2010. JAMA 2013;309:657–9.
3. Jones CM. Frequency of prescription pain reliever nonmedical use: 2002–2003 and 2009–2010. Arch Intern Med 2012;172:1265–7.
4. Unick GJ, Rosenblum D, Mars S, Ciccarone D. Intertwined epidemics: national demographic trends in hospitalizations for heroin- and opioid-related overdoses, 1993–2009. PLoS One 2013;8(2):e54496.
5. CDC. Emergency department visits involving nonmedical use of selected prescription drugs—United States, 2004–2008. MMWR 2010;59:705–9.
6. Campbell CI, Weisner C, Leresche L, et al. Age and gender trends in long-term opioid analgesic use for noncancer pain. Am J Public Health 2010;100:2541–7.
7. Williams RE, Sampson TJ, Kalilani L, Wurzelmann JI, Janning SW. Epidemiology of opioid pharmacy claims in the United States. J Opioid Manag 2008;4:145–52.
8. Fillingim RB, King CD, Ribeiro-Dasilva MC, Rahim-Williams B, Riley JL 3rd. Sex, gender, and pain: a review of recent clinical and experimental findings. J Pain 2009;10:447–85.
9. Unruh AM. Gender variations in clinical pain experience. Pain 1996; 65:123–67.
10. Hall AJ, Logan JE, Toblin RL, et al. Patterns of abuse among unintentional pharmaceutical overdose fatalities. JAMA 2008;300:2613–20.
11. Saunders KW, Von Korff M, Campbell CI, et al. Concurrent use of alcohol and sedatives among persons prescribed chronic opioid therapy: prevalence and risk factors. J Pain 2012;13:266–75.
12. Daniell HW. Opioid endocrinopathy in women consuming prescribed sustained-action opioids for control of nonmalignant pain. J Pain 2008;9:28–36.
13. Fillingim RB, Ness TJ, Glover TL, et al. Morphine responses and experimental pain: sex differences in side effects and cardiovascular responses but not analgesia. J Pain 2005;6:116–24.

14. Substance Abuse and Mental Health Services Administration. Substance abuse treatment: addressing the specific needs of women. Treatment Improvement Protocol (TIP) 51. Rockville, MD: US Department of Health and Human Services, Substance Abuse and Mental Health Services Administration; 2009. Available at http://www.ncbi.nlm.nih.gov/books/nbk83252.

15. Tuchman E. Women and addiction: the importance of gender issues in substance abuse research. J Addict Dis 2010;29:127–38.

16. Patrick SW, Schumacher RE, Benneyworth BD, Krans EE, McAllister JM, Davis MM. Neonatal abstinence syndrome and associated health care expenditures: United States, 2000–2009. JAMA 2012;307:1934–40.

17. Broussard CS, Rasmussen SA, Reefhuis J, et al. Maternal treatment with opioid analgesics and risk for birth defects. Am J Obstet Gynecol 2011; 204(4):314.e1–11.

18. Chou R, Fanciullo GJ, Fine PG, et al. Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain. J Pain 2009;10:113–30.

19. Tetrault JM, Desai RA, Becker WC, Fiellin DA, Concato J, Sullivan LE. Gender and non-medical use of prescription opioids: results from a national US survey. Addiction 2008;103:258–68.

20. Arias E, Schauman WS, Eschbach K, Sorlie PD, Backlund E. The validity of race and Hispanic origin reporting on death certificates in the United States. Vital Health Stat 2 2008;148:1–23.

Announcements

National Cleft and Craniofacial Awareness and Prevention Month

Annually, approximately 7,000 U.S. infants are born with a cleft palate alone or a cleft lip with or without cleft palate (*1*). Other common craniofacial birth defects include craniosynostosis (when the skull sutures fuse prematurely) and microtia/anotia (when an infant's ear is small and poorly formed or missing). To increase awareness about these conditions, July is designated as National Cleft and Craniofacial Awareness and Prevention Month.

CDC and its partners work to better understand causes of cleft and craniofacial defects and how these conditions affect children and their families by focusing on risk factors, health-care service use, access to care, quality of life, health outcomes, and management and treatment of these conditions. Research has identified risk factors for cleft lip with or without cleft palate, including maternal diabetes (*2*), smoking (*3*), and certain medications (*4,5*). For craniosynostosis, research has shown an increased risk associated with maternal thyroid disease or its treatment during pregnancy (*6*). Parameters of care recently were developed to help treat children with craniosynostosis (*7*).

Health-care providers should encourage patients who are thinking about becoming pregnant to control diagnosed diabetes and quit smoking, and should work with patients to make informed decisions about medication treatment during pregnancy. Information regarding National Cleft and Craniofacial Awareness and Prevention Month is available at http://www.nccapm.org/about.html. Additional information on craniofacial birth defects is available at http://www.cdc.gov/ncbddd/features/cleft-awareness-july2013.html.

References

1. Parker SE, Mai CT, Canfield MA, et al.; National Birth Defects Prevention Network. Updated national birth prevalence estimates for selected birth defects in the United States, 2004–2006. Birth Defects Res A Clin Mol Teratol 2010;88:1008–16.
2. Correa A, Gilboa SM, Besser LM, et al. Diabetes mellitus and birth defects. Am J Obstet Gynecol 2008;199:237.e1–9.
3. Honein MA, Rasmussen SA, Reefhuis J, et al. Maternal smoking, environmental tobacco smoke, and the risk of oral clefts. Epidemiology 2007;18:226–33.
4. Margulis AV, Mitchell AA, Gilboa SM, et al. Use of topiramate in pregnancy and risk of oral clefts. Am J Obstet Gynecol 2012;207:405.e1–7.
5. Reefhuis J, Honein MA, Schieve LA, Rasmussen SA; the National Birth Defects Prevention Study. Use of clomiphene citrate and birth defects, National Birth Defects Prevention Study, 1997–2005. Hum Reprod 2011;26:451–7.
6. Rasmussen SA, Yazdy MM, Carmichael SL, Jamieson DJ, Canfield MA, Honein MA. Maternal thyroid disease as a risk factor for craniosynostosis. Obstet Gynecol 2007;110:369–77.
7. McCarthy JG, Warren SM, Bernstein J, et al.; Craniosynostosis Working Group. Parameters of care for craniosynostosis. Cleft Palate Craniofac J 2012;49:1S–24S.

New Health Reform Planning Tool for State and Local Health Departments

The Georgia Health Policy Center has released "Leading Through Health System Change: A Public Health Opportunity," a new tool to help public health organizations adapt to the changing health-care environment. The tool's interactive website can be used to examine the basics of health reform, apply adaptive thinking to questions of health system change, and create a simple implementation plan to increase opportunities for improving population health. The tool was created through a cooperative agreement with CDC and the National Network of Public Health Institutes. The tool is available at http://www.metacat.net/metacat/app/ghpc.