Drug Abuse Warning Network

The DAWN Report

February 24, 2011

Emergency Department Visits Involving Adverse Reactions to Medications among Older Adults

As adults age, they experience increased health problems, have more medical visits, and take an increasing number of medications (pharmaceuticals and over-the-counter [OTC] medications) compared with younger persons.[1,2] Because of physiological changes (e.g., decreased kidney and liver function) and because adults aged 50 or older (hereafter referred to as older adults) often take multiple medications, they are at higher risk of experiencing an adverse reaction to drugs than younger persons.[1,2] These increased risks represent a public health problem because the aging population is projected to increase in the next several decades.[3]

The Drug Abuse Warning Network (DAWN) is a public health surveillance system that monitors drug-related emergency department (ED) visits in the United States.[4] To be a DAWN case, the ED visit must have involved a drug, either as the direct cause of the visit or as a contributing factor. Within DAWN, ED visits involving an adverse reaction fall into the category of visits in which a prescription or over-the-counter pharmaceutical was taken for therapeutic purposes and was used as prescribed or directed but caused adverse drug reactions, side effects, drug-drug interactions, or drug-alcohol interactions. Because DAWN data include drug-related ED visits involving adverse reactions to pharmaceuticals, these national data can provide valuable information about adverse reactions serious enough to warrant emergency care.[5] This issue of *The DAWN Report* focuses on ED visits that involve adverse reactions to medications among older adults in 2008.[6]

In Brief

- In 2008, an estimated 1,111,686 emergency department (ED) visits were made by adults aged 50 or older for adverse reactions to pharmaceuticals or other types of medications
- More than half of these visits (61.5 percent) were made by adults aged 65 or older
- Central nervous system (CNS) drugs (e.g., pain relievers and drugs used to treat anxiety and insomnia) were involved in almost one fourth (24.3 percent) of ED visits for adverse drug reactions among older adults
- Nearly two thirds of older adults who visited the ED for adverse drug reactions were treated and released (64.2 percent), and nearly one third were admitted to the hospital (32.9 percent)

The DAWN Report is published periodically by the Center for Behavioral Health Statistics and Quality (formerly the Office of Applied Studies), Substance Abuse and Mental Health Services Administration (**SAMHSA**).

Overview and Demographic Characteristics

In 2008, an estimated 2,157,128 ED visits were made by patients for adverse reactions to pharmaceuticals or other types of medications. Older adults accounted for more than half (51.5 percent, or 1,111,686 visits) of all visits involving adverse reactions.

Among older adults, more than half of these visits (61.5 percent) were made by patients aged 65 or older (Table 1). Females accounted for 60.9 percent of the ED visits for adverse reactions to medications among older adults.

Table 1. Emergency Department (ED) Visits for Adverse Reactions to Drugs among Older Adults, by Age Group and Gender: 2008

Demographic Characteristic	Estimated Number of ED Visits	Percentage of Visits
Total ED Visits for Adverse Reaction	**1,111,686**	**100.0**
Aged 50 to 64	427,740	38.5
Aged 65 or Older	683,946	61.5
Male*	434,104	39.1
Female*	677,360	60.9

*Any ED visit for which gender or age was unknown was excluded.

Source: 2008 SAMHSA Drug Abuse Warning Network (DAWN).

Medications Involved in ED Visits

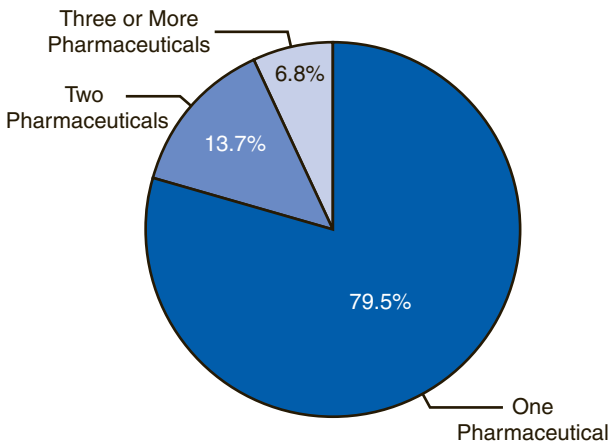
Of all ED visits involving adverse reactions among older adults, the majority involved pharmaceuticals only (98.9 percent), whereas a small percentage (1.1 percent) involved a combination of alcohol and pharmaceuticals. There were no differences by age group.

Nearly 8 in 10 visits (79.5 percent, or 873,975 visits) involved only one pharmaceutical, almost 1 in 7 visits (13.7 percent, or 151,009 visits) involved two pharmaceuticals, and less than 1 in 10 (6.8 percent, or 74,904 visits) involved three or more pharmaceuticals (Figure 1).

Central nervous system (CNS) drugs (e.g., pain relievers and drugs used to treat anxiety and insomnia) were involved in almost one fourth (24.3 percent) of ED visits for adverse drug reactions among older adults (Table 2). The most commonly involved CNS drugs most commonly involved in visits for adults aged 50 to 64 were narcotic pain relievers (9.7 percent). Less than 1 in 10 visits among adults aged 65 or older involved narcotic pain relievers (8.3 percent) and non-narcotic pain relievers (8.7 percent).

After CNS drugs, the medications most often involved in ED visits for adverse reactions varied by age group. For those aged 50 to 64, anti-infection medications were the second most commonly involved type of medications in these visits, followed by cardiovascular system medications and drugs for metabolic disorders. For those aged 65 or older, blood modifiers were the second most commonly involved type of medications, followed by cardiovascular system medications and anti-infection medications.

Figure 1. Number of Pharmaceuticals Involved in Emergency Department (ED) Visits for Adverse Reactions among Adults 50 or Older: 2008



Source: 2008 SAMHSA Drug Abuse Warning Network (DAWN).

Disposition of ED Visits

Nearly two thirds of older adults who visited the ED for adverse drug reactions were treated and released (64.2 percent, or 714,099 visits) and nearly one third were admitted to the hospital (32.9 percent, or 365,993 visits) (Figure 2). Considerable variation was noted between the two age groups, with patients aged 50 to 64 being admitted to the hospital at a lower percentage than those aged 65 or older (25.5 vs. 37.6 percent, respectively). Less than 4 percent of both age groups were admitted to the intensive care unit (3.5 percent for patients aged 50 to 64 and 3.4 percent for patients aged 65 or older).

Of the older adults experiencing an adverse reaction that resulted in a hospital admission, more than 3 in 4 visits (76.9 percent, or 281,448 visits) involved one medication, less than 1 in 6 visits (14.5 percent, or 53,104 visits) involved two medications, and less than 1 in 10 visits (8.6 percent, or 31,440 visits) involved three or more medications. Blood modifiers (24.3 percent), CNS drugs (22.4 percent), and cardiovascular system medications (18.3 percent) were the drugs most commonly involved in visits that resulted in hospital admissions.

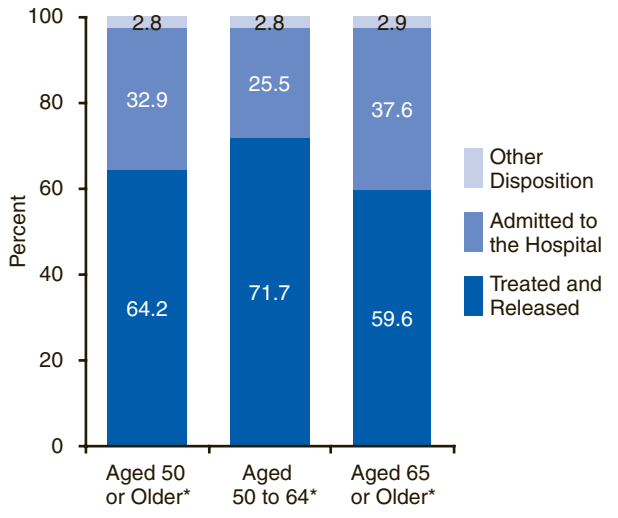
Table 2. Selected Medications Involved in Emergency Department (ED) Visits for Adverse Reactions among Older Adults, by Age Group: 2008

Drug Category	Percentage of Visits,* Patients Aged 50 or Older (N = 1,111,686)	Percentage of Visits,* Patients Aged 50 to 64 (n = 427,740)	Percentage of Visits,* Patients Aged 65 or Older (n = 683,946)
Central Nervous System Drugs	24.3	25.2	23.8
Narcotic Pain Relievers	8.9	9.7	8.3
Non-narcotic Pain Relievers	7.7	6.0	8.7
Blood Modifiers	17.6	9.6	22.6
Cardiovascular System Medications	16.4	13.8	18.1
Anti-infection Medications	15.1	16.9	14.1
Metabolic Disorder Drugs	12.2	12.2	12.2
Cancer Drugs	6.4	7.1	6.0
Psychothera-peutic Drugs	5.0	6.8	3.9

* Because multiple drugs may be involved in each visit, percentages may add to more than 100 percent.

Source: 2008 SAMHSA Drug Abuse Warning Network (DAWN).

Figure 2. Disposition of Emergency Department (ED) Visits for Adverse Reactions to Medications among Older Adults, by Age Group: 2008



*Percentages may not add to 100 percent because of rounding.

Source: 2008 SAMHSA Drug Abuse Warning Network (DAWN).

Discussion

ED visits and hospital admissions related to adverse reactions among older adults are common and place a costly burden on health care services. The demand for such services will increase as the United States population ages, in general, and when the "baby boom" generation reaches older adulthood in particular. This report shows that the majority of visits involving adverse reactions among older adults involved only one pharmaceutical. Moreover, of the nearly one third (32.9 percent) of visits that resulted in a hospital admission among this population, 76.9 percent involved only one medication as well.

These findings underscore the critical importance for continued surveillance of adverse reactions to maintain drug safety. Enhancing drug safety is an important step toward increasing medical care quality and reducing health care costs overall. Although most adverse reactions involve a sungle drug, patients can help prevent drug-drug interactions by informing physicians, nurses, and mental health care providers of all medications, supplements, and vitamins they take and making sure that any medical records are shared with all physicians, including specialists. Patients can safeguard against adverse reactions by using one pharmacy to handle all their prescriptions and by advising their pharmacy of any adverse reactions to prescription or OTC medications.[7]

As parents age, family members and other care providers may have increasing responsibility to monitor the drugs taken by older adults. Caregivers need to be knowledgeable about the potential side effects of both prescription and over-the-counter medications and be aware of any past history of adverse reactions to particular pharmaceuticals and medications.

End Notes

[1] Routledge, P. A., O'Mahony, M. S., & Woodhouse, K. W. (2004). Adverse drug reactions in elderly patients. *British Journal of Clinical Pharmacology, 57*(2), 121-126. doi: 10.1046/j.1365-2125.2003.01875.x

[2] Budnitz, D. S., Pollock, D. A., Weidenbach, K. N., Mendelsohn, A. B., Schroeder, T. J., & Annest, J. L. (2006). National surveillance of emergency department visits for outpatient adverse drug events. *JAMA, 296*(15), 1858-1866.

[3] Beers, M. H. (2000). Age-related changes as a risk factor for medication-related problems. *Generations, 24*(4), 22-27.

[4] Data are collected from a nationally representative sample of short-term, general, non-Federal hospitals across the Nation. Specialty hospitals, including Veterans Affairs hospitals, are not included in the DAWN sample.

[5] Adverse reactions, as defined by DAWN, include ED visits in which an adverse health consequence resulted when taking prescription drugs, OTC medications, or dietary supplements as prescribed or recommended.

[6] Any ED visit for which age was unknown was excluded from the analyses in this report.

[7] Van Grootheest, A. C., & De Jong-van den Berg, L. T. W. (2005). The role of hospital and community pharmacists in pharmacovigilance. *Research in Social and Administrative Pharmacy, 1*, 126-133.

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Findings from SAMHSA's 2008 Drug Abuse Warning Network (DAWN)

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The Drug Abuse Warning Network (DAWN) is a public health surveillance system that monitors drug-related morbidity and mortality. DAWN uses a probability sample of hospitals to produce estimates of drug-related emergency department (ED) visits for the United States and selected metropolitan areas annually. DAWN also produces annual profiles of drug-related deaths reviewed by medical examiners or coroners in selected metropolitan areas and States.

Any ED visit related to recent drug use is included in DAWN. All types of drugs—licit and illicit—are covered. Alcohol involvement is documented for patients of all ages if it occurs with another drug. Alcohol is considered an illicit drug for minors and is documented even if no other drug is involved. The classification of drugs used in DAWN is derived from the Multum *Lexicon*, copyright 2010 Lexi-Comp, Inc. and/or Cerner Multum, Inc. The Multum Licensing Agreement governing use of the *Lexicon* can be found at http://dawninfo.samhsa.gov/drug_vocab.

DAWN is one of three major surveys conducted by the Substance Abuse and Mental Health Services Administration's Center for Behavioral Health Statistics and Quality (SAMHSA/CBHSQ). For more information on other CBHSQ surveys, go to http://oas.samhsa.gov. SAMHSA has contracts with Westat (Rockville, MD) and RTI International (Research Triangle Park, NC) to operate the DAWN system and produce publications.

For publications and additional information about DAWN, go to http://DAWNinfo.samhsa.gov/.

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