Unintentional Injuries in the Home in the United States
Part II: Morbidity

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Background: Homes are an important setting for nonfatal unintentional injuries. The purpose of this study was to quantify and describe nonfatal, unintentional injuries in the United States, in which the injury took place at home.

Methods: Data derived from the National Health Interview Survey, National Ambulatory Medical Care Survey, and National Hospital Ambulatory Medical Care Surveys for Outpatient and Emergency Departments. The nonfatal unintentional home injury rate and 95% confidence interval were computed for the United States overall (1998–1999), as well as by type of injury, gender, and age group. Weights were applied for each data set as designated by the National Center for Health Statistics.

Results: In 1998, there were more than 12 million unintentional home injuries requiring some form of medical attention. Falls were the most common injury among all age groups, followed by cutting/piercing injuries, and injuries associated with being struck by or against an object or person. Injury rates were highest among the oldest and youngest age groups. There was inconsistency across data sets with regard to the presence of location information and definitions of the home environment, inclusion criteria, and the presence of external cause of injury and poisoning codes (E-codes). Depending on the data set, information was missing for 8% and 41% of cases on the location of injury, making it impossible to determine whether the injuries occurred in the home environment.

Conclusions: Falls are a significant problem, particularly among older adults. Additionally, data collection systems need to be improved so that location of injury data are routinely collected using consistent definitions so as to allow comparisons across data sets and over time.
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Introduction

Despite the significant morbidity in the United States associated with unintentional injury,[1–6] fatalities often receive more attention, probably in part because of the greater accessibility and uniformity of mortality data. However, deaths represent only a small proportion of overall injury incidence.[7] In a recent study comparing fatal and nonfatal injuries to young people, there were nearly 1000 injuries that required care in an emergency department for each fatality.[6] Also, the causes of fatal and nonfatal injuries are distinct.[7] The leading causes of nonfatal unintentional injuries—falls, injuries associated with being struck by or against an object, overexertion, and cut/pierce injuries—are seldom lethal in the otherwise healthy individuals.[6,7] Furthermore, the debilitating long-term effects of nonfatal injuries for individuals and families contribute to significant social costs in the forms of lost days of work or school, and healthcare expenditures.[8]

The home environment is an important setting for unintentional injuries.[9–12] About one fifth of all fatal unintentional injuries take place in a home.[12] However, the incidence of nonfatal unintentional home injuries has not yet been fully established or described. In this study, the magnitude and nature of the problem of nonfatal unintentional home injury in the United

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Table 1. Inclusion criteria for analysis of data sets

Data can be used to produce national estimates.
Data have a clear classification of injury, consistent with groupings used by ICD-9-CM.[a]
Data in the data set are clearly identified as nonfatal cases.
Data have a clear classification specifying unintentional cases consistent with ICD-9-CM.[a]
Data have a clear classification of injury mechanism, consistent with groupings used by ICD-9-CM[a]
Data are forced to choose a primary mechanism out of a set that covers a full range of mutually exclusive injury mechanisms.
Data have a clear classification of injury location, including the home, which covers a large majority of mechanisms.
Data are forced to choose a location out of a full range of mutually exclusive locations.
Data are part of an active surveillance system that does not rely on self-initiated reporting.
Data are recent (covers a period within the most recent 5 years of analysis).
Data are part of an ongoing collection process with a high degree of periodicity (every 1 to 2 years).
Data collection periodicity is measured in units of complete calendar years, to facilitate cross-comparisons with other data sets.
Data seasonality issues are not introduced by data collection methods of data set.

[a]International Classification of Diseases, Ninth Revision, Clinical Modification.[13]

States were documented using available data from several sources. The utility of available data was examined to describe the problem, to understand patterns by age and sex, and to identify opportunities for intervention. Finally, the data set characteristics were documented that could result in incomplete analyses or an inability to make comparisons across data sets, or across years, as part of an overall surveillance strategy for unintentional home injury. Specifically, differences were noted between data sets with respect to the definition of the home environment, the definition of populations used for rates, and the presence of systematically missing data.

Methods
Data Set Selection

We compiled a list of injury data sources by searching data systems available from federal agencies and in consultation with an advisory panel selected by the Home Safety Council, the foundation sponsoring the research. We developed a set of criteria for inclusion of data sets into this study, with the main requirement being that any data set be part of an ongoing surveillance system that includes information about nonfatal unintentional injuries occurring at home (Table 1). An additional criterion was that the data set had a clear classification system for specifying nonfatal and unintentional injuries that was consistent with groupings used by the *International Classification of Diseases, Ninth Revision, Clinical Modification* (ICD-9-CM).[13]

For each data set, data from the most recent year available were analyzed. The four data sets that met the inclusion

criteria are the National Health Interview Survey, 1998 (NHIS)[14,15]; National Hospital Ambulatory Medical Care Survey-Emergency Department, 1999 (NHAMCS-ED)[16]; National Hospital Ambulatory Medical Care Survey-Outpatient Department, 1999 (NHAMCS-OPD)[16]; and National Ambulatory Medical Care Survey, 1999 (NAMCS).[17] Each of the four data sets used external cause of injury and poisoning codes (E-codes) defined by the ICD-9-CM as a tool for classifying intent and mechanism of injury.[13] Developed by the World Health Organization, E-codes provide a framework for categorizing the intentionality and causes of injuries. The NAMCS, NHAMCS-OPD, and NHAMCS-ED data sets had a substantial amount of missing data related to E-codes. E-codes were missing for 24%, 21%, and 11% of records, respectively. Consequently, the intent and mechanism of injury for these cases could not be determined, and they were excluded from these analyses. The NHIS did not contain E-codes for any poisoning records, but did provide E-codes for all other injury mechanisms (Table 2). Thus, while injuries with missing E-codes were known to be poisonings, the intent could not be determined in such cases. A description of the four data sets follows.

The National Health Interview Survey. The NHIS is an annual multipurpose health survey conducted with a national probability sample of civilian, noninstitutionalized U.S. residents to assess health status, receipt of medical care, and the prevalence of health behaviors.[14,15] In 1998, there were

Table 2. External cause of injury codes (E-codes) for classification of unintentional injury by mechanism[a]

Mechanism of injury	E-code[b]
Fall	E880–E886, E888
Motor vehicle traffic	E810–E819
Struck by or against an object	E916–E917
Overexertion	E927
Cut/pierce	E920
Natural/environmental factors	E900–E909, E928.0–E928.2
Poisoning	E850–E869
Fire/burn	E890–E899, E924
Machinery	E919
Pedal, cycle, nontraffic and other	E800–E807 (.3), E820–E825(.6), E826 (no decimal), E826.1, E826.9
Motor vehicle, nontraffic	E820–E825 (no decimal, .0–.5, .7–.9)
Other transportation	E800–E807 (no decimal, .0–.2, .8–.9), E826(.0, .2–.8), E827–E829, E831, E833–E845
Suffocation	E911–E913
Firearm	E922 (no decimal, .0–.3, .5–.9).
Drowning/submersion	E830, E832, E910
Other, not elsewhere classified	E846–E848, E914–E915, E918, E921, E923, E925–E926, E929 (.0–.5, .8), E928.8, E922.4
Mechanism unspecified	E887, E928 (no decimal, .9), E929 (no decimal), E929.9, E849.4

[a]Codes are adapted from *National Hospital Ambulatory Medical Care Survey: 1999 Emergency Department Summary.*[17]
[b]E-codes are defined in *International Classification of Diseases, Ninth Revision.*[13]

Table 3. National estimates of number of nonfatal, unintentional injuries, by location, United States, 1998–1999

| | Nonfatal, unintentional injury associated with: | | | | | | | |
| | Use of any medical advice or therapy (NHIS, 1998[a]) | | Visit to office-based physician (NAMCS, 1999[b]) | | Visit to a hospital outpatient department (NHAMCS-OPD, 1999[c]) | | Visit to hospital emergency department (NHAMCS-ED, 1999[c]) | |
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Home	12,922,220	38	9,266,532	16	1,436,422	22	9,823,226	33
Other	18,162,604	53	27,283,627	46	2,340,553	36	11,333,648	38
Unknown	840,784	2	22,552,551	38	2,661,736	41	8,741,026	29
Not recorded[d]	2,045,952	6	—	—	—	—	—	—
Total	33,971,560	100	59,102,710	100	6,438,711	100	29,897,900	100

[a]National Center for Health Statistics, Division of Health Interview Statistics. *Dataset Documentation, National Health Interview Survey, 1999* (Machine Readable Data File and Documentation). Hyattsville, MD: National Center for Health Statistics, 2001.[14]
[b]National Center for Health Statistics. *1999 National Ambulatory Medical Care Survey Data File and File Documentation*. Hyattsville, MD: National Center for Health Statistics, 2002.[16]
[c]National Center for Health Statistics. *1999 National Hospital Ambulatory Medical Care Survey Data File and File Documentation*. Hyattsville, MD: National Center for Health Statistics, 2002.
[d]The NHIS dataset does not include information about intentionality with respect to poisonings. We included all poisonings in this table. Thus, injuries in the NHIS dataset for which the place of occurrence is listed as "not recorded" are poisonings.

38,209 household interviews conducted. We analyzed NHIS data for injuries requiring advice or therapy from any health-care professional that had occurred within the 3 months before the survey, as well as data regarding days lost from work or school due to injury.

The National Ambulatory Medical Care Survey. NAMCS data come from a probability sample of private, office-based physicians selected to record a variety of information about patients' symptoms and prescribed medications.[16] Information about the provision and use of medical care services are recorded by trained physicians who complete patient record forms on a random sample of patients. Whether the health incident leading up to the visit was an injury is determined by an injury check box on the patient record form and by the notation of an E-code.[19]

The National Hospital Ambulatory Medical Care Surveys. NHAMCS data are based on a national sample of visits to the emergency (NHAMCS-ED) or outpatient (NHAMCS-OPD) department of nonfederal, noninstitutional, short-stay hospitals.[17] Data on provision of medical services are collected by trained hospital staff and are recorded on patient record forms. As with the NAMCS data set, medical visits were classified as injury-related based on whether an injury was cited on the patient record form as a reason for the visit, a presenting complaint, or a diagnosis, as well as by E-codes. Although fatal injuries were present in the NHAMCS data sets, they were excluded from these analyses.

Definitions of Home Environment

Each data set included place of occurrence information. We used this information to classify injuries as having occurred within the home environment, outside of the home environment, or in an unknown location. Our project conceptualized the home environment to include not just areas inside of a dwelling, but also outside areas that are part of the home, such as a porch, deck, yard, a garden, or driveway. We did not consider farmlands,

pastures or fields, barns or other farm buildings to be part of the home environment. We did not require that injured persons were injured in their own home.

There was some discrepancy in the definition of the home environment across the data sets with respect to college dormitories. Although the NHIS data set includes dormitories within the definition of the home, the remaining three data sets do not provide a clear indication of how college dormitories are handled, allowing for the possibility of categorization in either the home or school environment. The NHIS data set is also clear in excluding institutionalized populations (e.g., prisoners, nursing home residents) from the survey, which in effect keeps injuries taking place in those locations from being defined as occurring in the home, thus providing consistency with the choice of a civilian noninstitutionalized population as the denominator for rate calculations. Although the NAMCS and NHAMCS data sets theoretically exclude institutional settings when defining the home environment, the potential for misinformation is greater than within the NHIS data set. For example, it is feasible that someone who lives in a nursing home could experience an injury requiring medical attention while visiting a home that is not their usual dwelling, and thus be included in the sample.

In the NAMCS and NHAMCS data sets, between 29% and 41% of records were missing place of occurrence information (Table 3). The NHIS data set had the smallest proportion of records with missing information on place of occurrence (8%). Thirty-eight percent of the unintentional injuries reported in the NHIS data set took place in a home environment. Unintentional home injuries were associated with at least 16% of all visits to office-based physicians for unintentional injury (NAMCS), 22% of all visits to hospital-based physicians for unintentional injury (NHAMCS-OPD), and 33% of visits to hospital emergency departments.

Analysis

We analyzed the data sets, determining the weighted estimate of the rate and number of incidents and/or medical visits

| Mechanism of injury | Nonfatal, unintentional injury associated with: | | | | | | | | | | | | | | | |
| | Use of any medical advice or therapy (NHIS, 1998[a]) | | | Visit to office-based physician (NAMCS, 1999[b]) | | | Visit to hospital outpatient department (NHAMCS-OPD, 1999[c]) | | | Visit to hospital emergency department (NHAMCS-ED, 1999[c]) | | |
	n	National estimate	Rate per 100,000 (95% CI)	n	National estimate	Rate per 100,000 (95% CI)	n	National estimate	Rate per 100,000 (95% CI)	n	National estimate	Rate per 100,000 (95% CI)
Fall	487	5,596,700	2,081 (1864–2297)	123	4,238,356	1,560 (1096–2023)	179	1,436,422	191 (127–255)	719	3,752,895	1,381 (1195–1567)
Cut/pierce	152	1,746,292	649 (537–761)	17	—*	—	47	144,870	53 (25–82)	298	1,392,269	512 (422–603)
Overexertion	134	1,687,892	627 (509–746)	15	—	—	40	116,673	43 (18–68)	88	450,304	166 (120–211)
Struck by/against	127	1,551,244	577 (476–677)	33	1,191,746	439 (205–672)	68	171,824	63 (32–95)	309	1,606,745	591 (491–691)
Natural/environmental	39	465,524	173 (118–228)	14	—	—	26	—	—	96	517,495	190 (141–239)

[a]National Center for Health Statistics, Division of Health Interview Statistics. *Dataset Documentation, National Health Interview Survey, 1999* (Machine Readable Data File and Documentation). Hyattsville, MD: National Center for Health Statistics, 2001.[14]

[b]National Center for Health Statistics. *1999 National Ambulatory Medical Care Survey Data File Documentation.* Hyattsville, MD: National Center for Health Statistics, 2002.[16]

[c]National Center for Health Statistics. *1999 National Hospital Ambulatory Medical Care Survey Data File and File Documentation.* Hyattsville, MD: National Center for Health Statistics, 2002.[17]

*A long dash indicates that there were too few cases to permit calculation of national estimates (N<30 or national estimates <87,000).

CI, confidence interval.

associated with nonfatal unintentional home injuries. In addition to organizing the data by whether the injury took place in a home environment and mechanism of injury, the numbers and rates of nonfatal unintentional home injury were estimated by gender and age group and determined weighted estimates of days lost from work and/or school. Using the individual weights for each data set, national estimates and rates were computed. To quantify random error associated with rates, 95% confidence intervals were constructed using standard Poisson assumptions.[18]

In order to classify injuries by type, the framework for reporting data that had been developed by the National Center for Health Statistics in collaboration with the National Center for Injury Prevention and Control was adapted.[19] Specifically, the classification formats recommended for the NHAMCS-ED data set were used and adapted for each of the other data sets.[3] These formats include groupings of E-codes sorted by mechanism of injury (Table 2).

For each data set, rates were calculated using, for the denominator, the year-appropriate noninstitutionalized civilian population for the United States, adjusted for under-enumeration.[20] NHIS population estimates were determined by summing the recommended weights, which are further adjusted based on survey design.[14,15] For the other data sets, the population estimates were obtained from the U.S. Census Bureau national population estimates as measured on July 1 for the given year,[21] and adjusted only for under-enumeration.[21] The variance of each rate was adjusted for variance inflation due to sampling design using procedures recommended for each data set.[14–17] Analyses were performed utilizing SAS, version 8 (SAS Institute, Cary NC, 2000) and SUDAAN, version 8.02 (Research Triangle Institute, Research Triangle Park NC, 2001).

Results

Nonfatal Unintentional Home Injuries

The NHAMCS data indicate that nearly 9.8 million emergency department and 1.4 million outpatient hospital visits were made in 1999 for nonfatal, unintentional injuries that took place in a home environment (Table 3). Likewise, self-report data obtained in the NHIS include 12,922,220 nonfatal unintentional home injuries, excluding poisonings, requiring some form of medical advice in the United States in 1998. NHIS data also show that >2.15 million persons aged ≥14 years experienced an injury resulting in at least 1 lost day of work, and ≥750,000 persons aged ≥5 years were reported as missing at least 1 day of school, as a result of an unintentional home injury.

Mechanism of Injury

Each data set identified falls as the most common mechanism of injury by far, accounting for 36.2% to 45.7% of the injuries or visits to healthcare providers for nonfatal unintentional home injury. The national estimates of the numbers and rate of having lost at least 1 day from work or school due to falls were 2,145,044 (rate per 100,000=797, 95% confidence interval

[CI]=664–931) and 757,044 (rate per 100,000=281, 95% CI=211–351). Almost 4 million emergency department visits and 4.2 million office-based physician visits were made because of a fall in 1999 (Table 4). The second most common mechanism of injury varied according to data source. For visits recorded in the NAMCS, NHAMCS-OPD, and NHAMCS-ED data sets, being struck by or against an object was the second most common mechanism indicated, with visit rates per 100,000 at 439, 63, and 591, respectively. In contrast, the NHIS data set identified cuts and piercing injuries as the second most common mechanism; the visit rate was 649 per 100,000. The rate ratio of falls versus the second leading cause of injury for each data set was 3.21 for NHIS (fall rate:cut/pierce rate), and 3.55, 3.03, and 2.43 for NAMCS, NHAMCS-OPD, and NHAMCS-ED, respectively.

Gender Differences

Women have similar rates of medical visits for unintentional home injury as compared to men. Male:female rate ratios for visits due to unintentional home injury ranged from 0.65 in NAMCS to 1.09 in NHIS (Table 5). In contrast, the corresponding male:female rate ratios for unintentional injuries known to occur in locations other than the home are 1.57 (NHIS), 1.53 (NHAMCS-ED), 1.55 (NHAMCS-OPD), and 1.28 (NAMCS). As shown in Table 6, females experience substantially higher rates than males for fall injuries, but males' rates for other leading mechanisms of injury (cut/pierce, over-exertion, struck by/against) exceed those of females.

Age Differences

Age patterns of injuries were somewhat consistent across the data sets, with the highest rates of nonfatal unintentional home injury occurring among adults aged ≥65, with especially high rates among those aged >74 (Figure 1). Visit rates in the youngest age group (0 to 14 years) were higher than those for adolescents and young adults (15 to 24 years), and were similar to or higher than those for middle-aged adults (25 to 44 years). Table 7 shows national estimates of the number and rate of unintentional home injury by age group for the four most common mechanisms of injury. Age group–specific rates demonstrate the importance of falls as a source of home injury morbidity across all age groups.

Discussion

These analyses confirm that unintentional injury at home is a significant source of morbidity requiring treatment by healthcare providers and resulting in lost workdays and schooldays, especially among young people and older adults. The results also show the critical importance of falls as a major source of morbidity. Our finding that females have similar rates of nonfatal injury

Table 5. National estimates and rates per 100,000 of nonfatal, unintentional home injuries, by gender, United States, 1998–1999

	Nonfatal, unintentional injury associated with:							
	Use of any medical advice or therapy (NHIS, 1998[a])		Visit to office-based physician (NAMCS, 1999[b])		Visit to hospital outpatient-department (NHAMCS-OPD, 1999[c])		Visit to hospital emergency department (NHAMCS-ED, 1999[c])	
Gender	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)
Male	6,603,764 (51.5%)	5026 (4555–5496)	3,548,396 (38.3%)	2679 (1818–3539)	661,961 (46.1%)	500 (343–656)	4,655,600 (47.4%)	3514 (3060–3968)
Female	6,318,456 (48.9%)	4592 (4161–5022)	5,718,136 (61.7%)	4106 (3031–5180)	774,461 (53.9%)	556 (389–723)	5,167,636 (52.6%)	3710 (3240–4181)
Total	12,922,220 (100%)	4804 (4473–5135)	9,266,532 (100%)	3410 (2673–4147)	1,436,422 (100%)	529 (388–669)	9,823,226 (100%)	3615 (3196–4034)
Male: female rate ratio	1.09		0.65		0.90		0.95	

[a]National Center for Health Statistics, Division of Health Interview Statistics. *Dataset Documentation, National Health Interview Survey, 1999* (Machine Readable Data File and Documentation). Hyattsville, MD: National Center for Health Statistics, 2001.[14]
[b]National Center for Health Statistics. *1999 National Ambulatory Medical Care Survey Data File and File Documentation.* Hyattsville, MD: National Center for Health Statistics, 2002.[16]
[c]National Center for Health Statistics. *1999 National Hospital Ambulatory Medical Care Survey Data File and File Documentation.* Hyattsville, MD: National Center for Health Statistics, 2002.[17]
CI, confidence interval.

Table 6. National estimates and rates per 100,000 for four leading mechanisms of nonfatal unintentional home injury, by gender, United States, 1998[a]

| | Mechanism of injury | | | | | | | |
| | Fall | | Cut/pierce | | Overexertion | | Struck by/against | |
Gender	Estimate (%)	Rate per 100,000 (95% CI)	Estimate (%)	Rate per 100,000 (95% CI)	Estimate (%)	Rate per 100,000 (95% CI)	Estimate (%)	Rate per 100,000 (95% CI)
Male	2,211,080 (39.5%)	1683 (1429–1943)	1,199,896 (58.7%)	913 (712–1114)	914,392 (54.2%)	696 (511–880)	840,576 (54.2%)	640 (486–793)
Female	3,385,620 (60.5%)	2460 (2131–2789)	546,396 (31.3%)	397 (275–519)	773,500 (45.8%)	562 (413–711)	710,668 (45.8%)	516 (372–661)
Total	5,596,700 (100.0%)	2081 (1864–2297)	1,746,292 (100.0%)	649 (537–761)	1,687,892 (100.0%)	627 (509–746)	1,551,244 (100.0%)	577 (476–677)
Male: female rate ratio		0.68		2.30		1.24		1.24

[a]Injuries were defined as those occurring within the 3 months before the interview, for which any medical advice or therapy was sought. Data from National Center for Health Statistics, Division of Health Interview Statistics. *Dataset Documentation, National Health Interview Survey, 1999* (Machine Readable Data File and Documentation). Hyattsville, MD: National Center for Health Statistics, 2001.[14]
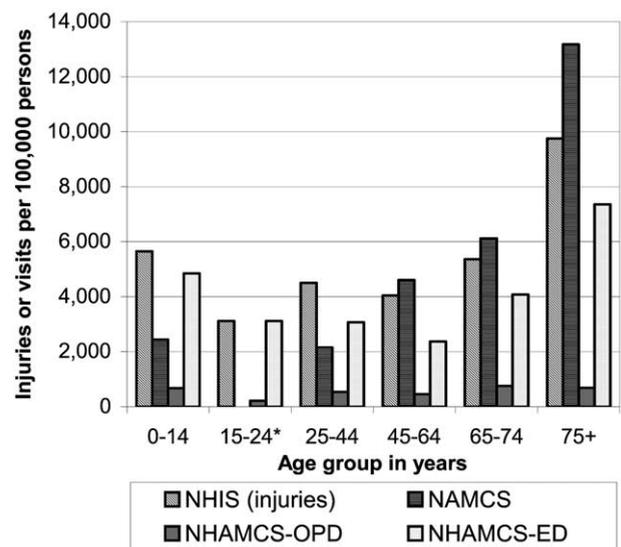
CI, confidence interval.

Figure 1. National estimates of the rate of nonfatal unintentional home injuries,[a] or injury visits,[b,c] by age group, United States, 1998–1999. *The number of injury visits in the NAMCS for those aged 15 to 24 was not sufficiently large to allow for a national estimate. NAMCS, National Ambulatory Medical Care Survey, 1999; NHAMCS-ED, National Hospital Ambulatory Medical Care Survey-Emergency Department, 1999; NHAMCS-OPD, National Hospital Ambulatory Medical Care Survey-Outpatient Department, 1999; NHIS, National Health Interview Survey, 1998.
[a]Data come from: National Center for Health Statistics, Division of Health Interview Statistics. *Dataset Documentation, National Health Interview Survey, 1999* (Machine Readable Data File and Documentation). Hyattsville, MD: National Center for Health Statistics, 2001.[14]
[b]Data come from: National Center for Health Statistics. *1999 National Ambulatory Medical Care Survey Data File and File Documentation.* Hyattsville, MD: National Center for Health Statistics, 2002[16]
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rates to males is curious, given that the male:female rate ratio of unintentional home injury deaths is 1.70:1,[12] and that there are higher rates for males of nonfatal injuries occurring in settings other than the home. We were unable to determine if the circumstances of home injuries for males are actually different from those of females, or if the observed differences reflect variations in patterns of use of healthcare services or survival patterns once injuries occur. The higher rates of nonfatal unintentional home injuries recorded among the oldest and youngest age groups may reflect variations in amount of exposure to the home environment, but may also indicate different vulnerabilities to experiencing injuries that result in health care.

Data Quality

Although all the data sets used in this study met the inclusion criteria, remaining differences in data collec-

Table 7. National estimates and rates for four leading mechanisms of nonfatal, unintentional home injury, by age group, United States, 1998[a]

	Mechanism of injury							
	Fall		Cut/pierce		Overexertion		Struck by/against	
Age group, years	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)	National estimate (%)	Rate per 100,000 (95% CI)
0–14	1,520,728 (27.2%)	2541 (2060–3021)	355,928 (20.4%)	595 (383–807)	—[b]	—	614,264 (39.6%)	1026 (736–1317)
15–24	—	—	—	—	—	—	—	—
25–44	1,237,064 (22.1%)	1491 (1127–1856)	673,524 (38.6%)	812 (602–1022)	609,500 (36.1%)	735 (513–957)	390,788 (25.2%)	471 (301–641)
45–64	908,480 (16.2%)	1603 (1245–1960)	395,068 (22.6%)	697 (467–927)	539,292 (32.0%)	951 (662–1241)	—	—
65–74	522,156 (9.3%)	2902 (1991–3812)	—	—	—	—	—	—
≥75	1,090,768 (19.5%)	7669 (5986–9351)	—	—	—	—	—	—
Total	5,596,700 (100.0%)	2,081 (1864–2297)	1,746,292 (100.0%)	649 (537–761)	1,687,892 (100.0%)	627 (509–746)	1,551,244 (100.0%)	577 (476–677)

[a]Injuries were defined as those occurring within 3 months before the interview, for which any medical advice or therapy was sought. Data from National Health Interview Survey.[14]
[b]Long dashes indicate that there were too few cases to permit calculation of national estimates n < 30 or national estimates <87,000).

tion should be taken into account when interpreting results on unintentional injuries at home. The three ambulatory medical care surveys (NHAMCS-ED, NHAMCS-OPD, and NAMCS) have substantial gaps in recording E-codes, limiting the ability to classify either type or intentionality of injury, and thus potentially under-counting unintentional home injuries. These same data sets, unlike the NHIS, include a substantial proportion of cases for which information about location was missing or coded as unknown (Table 3). On the other hand, NHIS E-Code data were mostly complete, with poisonings accounting for the vast majority of missing information concerning the injury's location and intent.

As noted previously, inclusion criteria as to sample and definition of "home" vary across these databases as well, further complicating comparisons. Dormitories pose a particular challenge. Injuries taking place in college dorms can conceivably be categorized as school, home, or other. The NHIS defines college dorms as home, which is consistent with the civilian noninstitutionalized population assumptions. Although <3% of the overall U.S. population lives in group (e.g., dorms, military quarters) or institutional (e.g., jails, nursing homes) quarters, there may be some interesting differences in patterns of injury associated with these dwellings that warrant closer attention.[22]

Conclusions

As helpful as these findings are in beginning to understand the problem of unintentional injury at home, the available data contain significant gaps. More careful consideration needs to be given concerning surveillance of home injury given that this is where people spend a substantial amount of time and are, therefore, exposed for long periods of time to the hazards present in the home. The collection of morbidity data, including development of consistent definitions for "home injury" and guidelines for recording this information more consistently in medical records and other data systems are steps toward improving surveillance. Ultimately this will permit more complete assessment of the problem, and will improve our ability to compare information across locales, time and data systems. The expansion of the National Electronic Injury Surveillance system to include all injuries—that is, extending beyond consumer product injuires—will also enhance capacity to monitor injuries in the home environment.

Conspicuous by its absence from the data used in these analyses is the National Hospital Discharge data set. We did not include this data set because it does not permit differentiation of injuries that occur at home versus other locations. As a result, the analysis of morbidity is surely incomplete and does not fully represent the distribution of nonfatal injuries. Also interesting was that fire/burns did not emerge as a

leading cause of home injury. This was likely due to the fact that burns and scalds may be triaged directly to burn units or inpatient care and not appear in data from emergency departments or other outpatient facilities.[23]

Although improvements in federal data sets are needed to help understand the problem at a national level, local data (e.g., hospital data, emergency medical services data, emergency department data) may be better in some locales. This would afford opportunities for local or regional surveillance and creation of locally focused interventions that address specific population groups (e.g., clinical populations) or that rely on local or state policy-level strategies such as housing ordinances, building codes, and insurance incentives. In addition, as with any health problem, attention to preventive strategies need not wait until all surveillance data systems are improved and compiled. In the case of home injury, immediate attention should be directed to the mechanisms by which nonfatal unintentional injuries occur in the home environment, with particular attention to discovering the hazards associated with falls occurring among different age and gender groups. Consistent with recognized injury prevention principles,[24–26] however, a focus on fall prevention should aim primarily to identify opportunities to improve designs of homes and products to make homes safer universally, and secondarily, to address specific risk behaviors (e.g., use of ladders) and risk groups (e.g., older adults with balance problems). Injury problems often involve complex interplays of multiple risk and protective factors, and thus necessitate multifaceted approaches to prevention. Finally, it is important to remember that because of the large numbers of people affected by safety in the home environment, even relatively moderately successful interventions can have large impacts at the population level.[27]

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