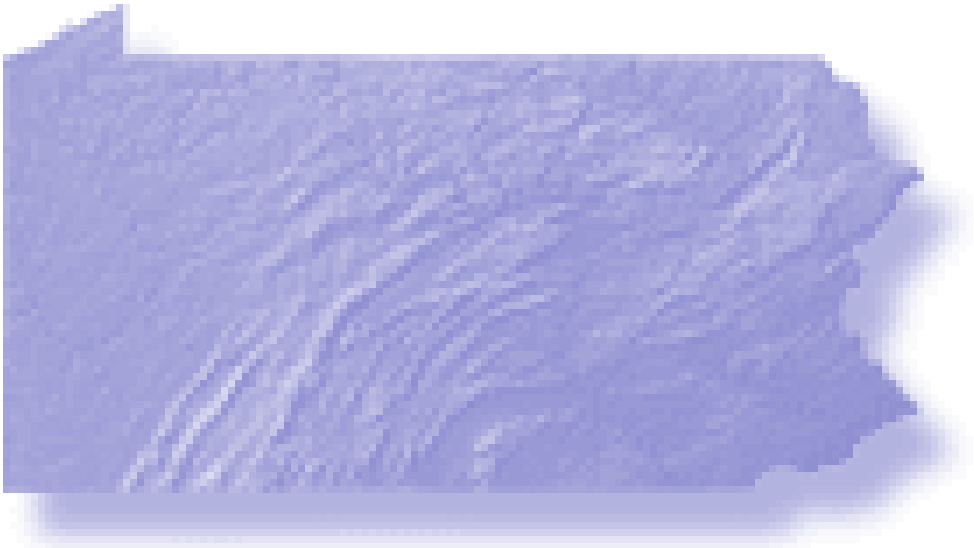
Fall-Related Injuries in Pennsylvania

Deaths, 2001-2005
Hospital Discharges, 2005
BRFSS, 2006

DEPARTMENT OF HEALTH

Fall-Related Injuries in Pennsylvania



An Injury Profile Monograph

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Data used in this report was provided to the Pennsylvania Department of Health by the Pennsylvania Health Care Cost Containment Council. The Pennsylvania Health Care Cost Containment Council specifically disclaims responsibility for any interpretations or conclusions.

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Executive Summary

This monograph reports on fall-related deaths from 2001-2005, those falls discharged from Pennsylvania hospitals during 2005 and 2006 Behavioral Risk Factor Surveillance System (BRFSS) data related to falls. The data are derived from Pennsylvania death certificates, the statewide Hospital Discharge Data compiled by the Pennsylvania Health Care Cost Containment Council from all non-federal hospitals in the state and the 2006 BRFSS survey.

Between 2001 and 2005, 4,408 Pennsylvanians died as a result of fall-related injuries (age-adjusted rate 5.9 per 100,000). The rate of fall deaths increased every year from 2001 to 2004, but showed a slight decrease in 2005. Males consistently had higher age-adjusted death rates due to falls than females. The average age for a fall death was about 75 years (median=80). Approximately 78% of fall deaths occurred to those age 65 or older.

A total of 62,826 hospital discharges for fall-related injuries (age-adjusted rate 420.9 per 100,000 persons) were reported by Pennsylvania hospitals. The mean age of all cases was slightly more than 70 years (median=77). The average length of stay for all patients was 5.5 days (median=4), however the longest hospital stay was 446 days. The most common length of stay was 3 days. Total charges associated with these hospitalizations amounted to over $2.19 billion. Government sources paid for about 80% of these charges, totaling more than $1.78 million.

On the 2006 BRFSS survey, 15% of Pennsylvanians over 45 indicated that they had a fall in past 3 months. Of the 15% who had a fall, 32% had an injury due to a fall in the past 3 months. Household income was the only demographic group for which there were significant differences, with the lowest income group (less than $15,000 household income) experiencing a significantly higher percentage of falls and fall injuries compared to household income groups greater than or equal to $25,000.

Fact Sheet - Fall-Related Injuries and Deaths in Pennsylvania

- A total of 4,408 Pennsylvanians died as the result of falls and fall-related injuries between 2001 and 2005 for an age adjusted rate of 5.9 per 100,000 persons.

- The rate of fall deaths for males was slightly higher than the female rate (7.7 vs. 6.6 per 100,000).

- The highest number and rate of fall deaths occurred in 2004, with 1,025 deaths and an age-adjusted rate of 6.9 per 100,000. The lowest number and rate occurred in 2001 (728 deaths, age-adjusted rate 4.9).

- A total of 62,856 hospital discharges for fall-related injuries were reported in Pennsylvania for an age-adjusted rate of 420.9 per 100,000 persons.

- The rate of fall hospitalizations for females was 1.6 times that of males (618.9 vs. 384.6 per 100,000 persons).

- Falls on the same level were the most common specific mechanism for fall-related hospitalizations in Pennsylvania.

- Fractures were the leading principal diagnosis category for fall hospitalizations (53.4%); hip fractures account for 20.9% of the primary diagnoses.

- Hospitalization stays averaged about 5.5 days/person (median=4) among fall victims.

- The total charge for fall-related injuries in 2005 was over $2.192 billion.

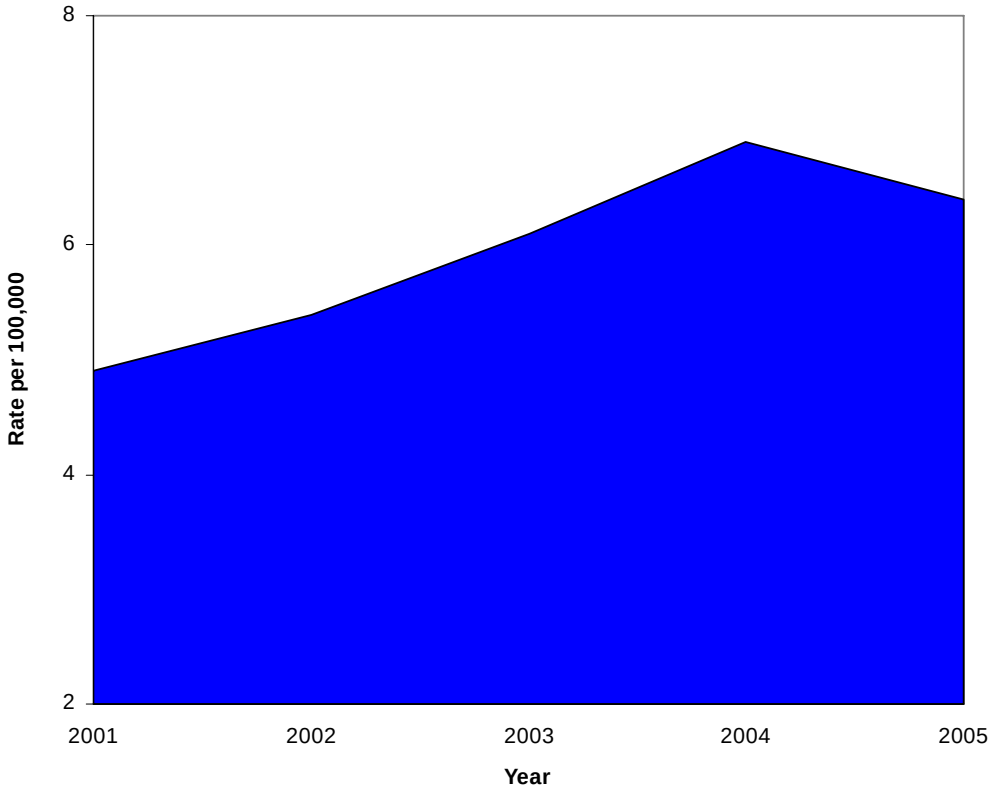
- The average age for a fall death was about 75 years old, while the average age for a fall hospitalization was approximately 70 years old.

- About 15% (95% confidence interval: 14%-16%) of Pennsylvania adults over 45 indicated that they had a fall in the past 3 months on the 2006 BRFSS survey.

Fall-Related Deaths in Pennsylvania

Between 2001 and 2005, a total of 4,408 Pennsylvanians died as the result of falls and fall-related injuries. Falls made up about 12% of all injury deaths occurring in this five year period. 2001 had the lowest number and age-adjusted death rates (728, 4.9 per 100,000) and 2004 contained the highest number and rate (1,025, 6.9 per 100,000) (Table 1).

Figure 1: Age-Adjusted Death Rates for Fall-Related Injuries, Pennsylvania, 2001- 2005

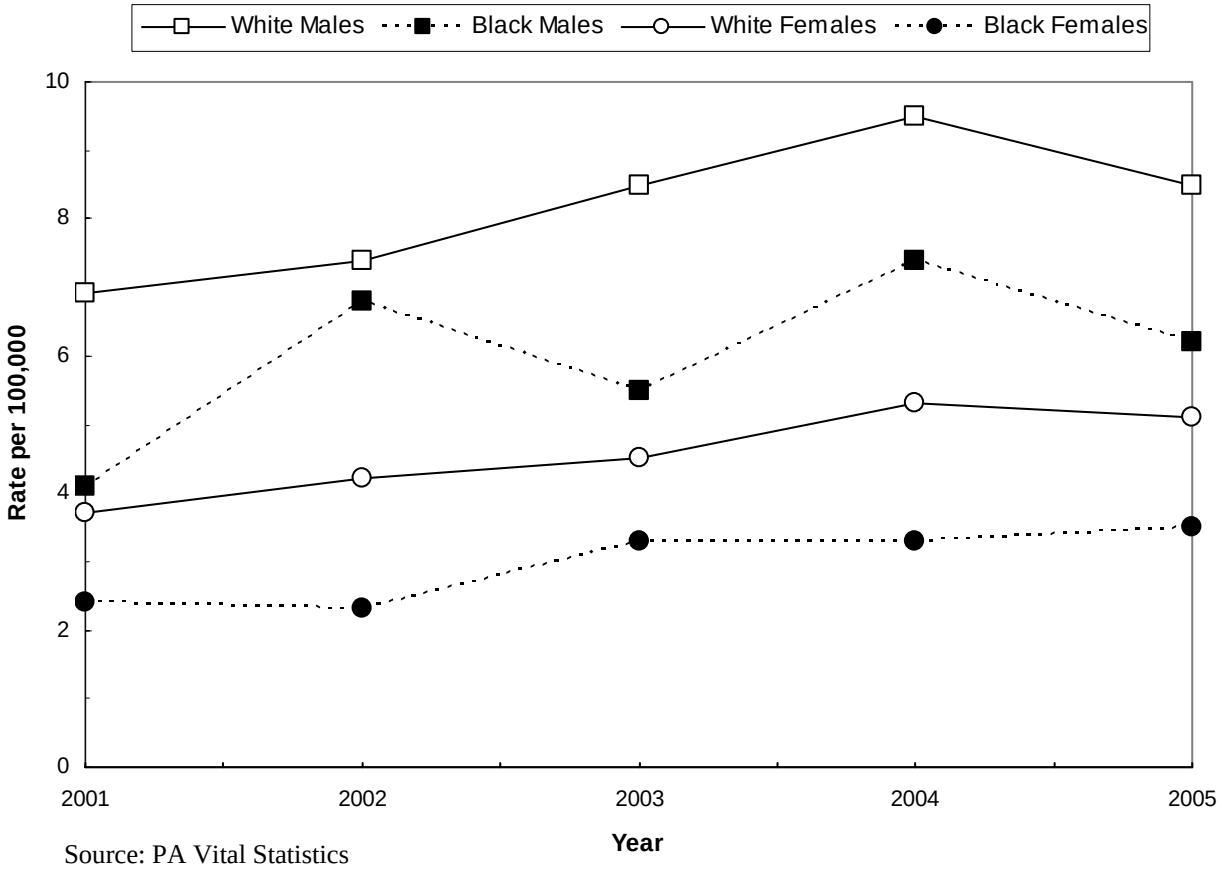


Source: PA Vital Statistics

Males consistently had higher age-adjusted death rates due to falls than females. Additionally, white males and white females had higher rates than black males and black females, respectively. Males made up about 52% of the total fall deaths and 94% of fall deaths occurred to whites (Table 2).

The average age for a fall death was 74.8 years (median=80 years). Approximately 78% of fall deaths occurred to those age 65 or older, while less than 1% were under age 20 (Table 3).

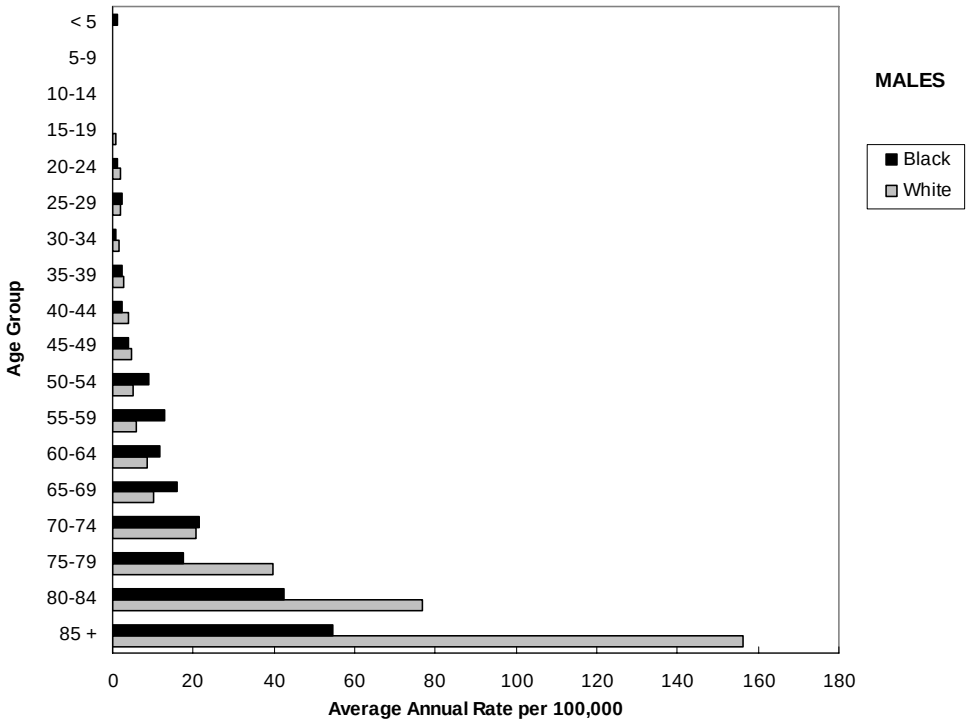
Figure 2: Age-Adjusted Death Rates for Fall-Related Injuries by Sex and Race, Pennsylvania, 2001- 2005

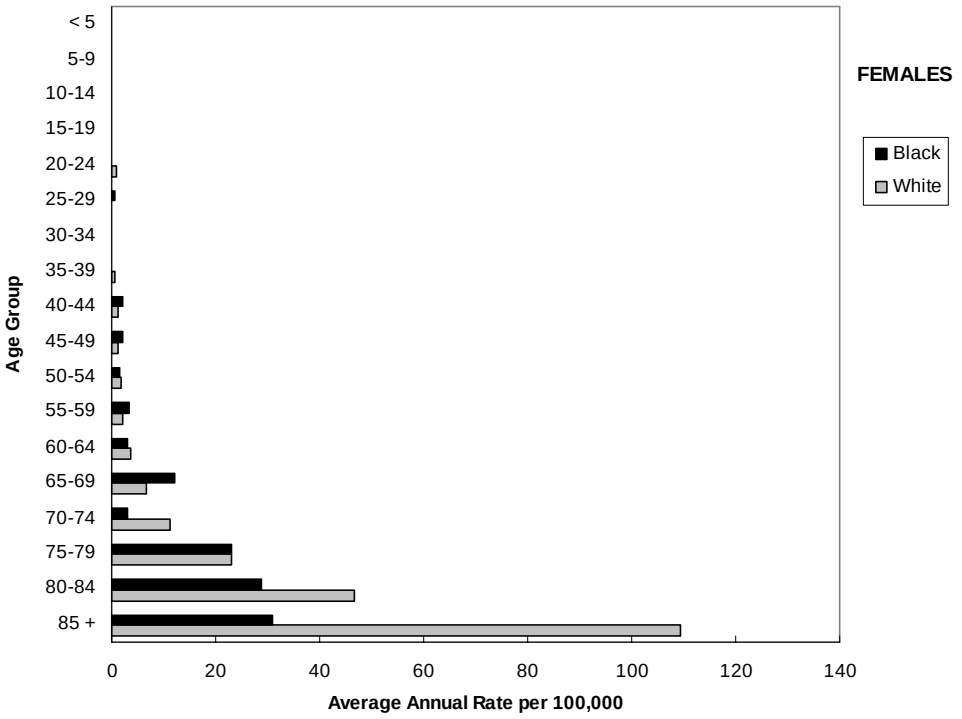


Source: PA Vital Statistics

The age-specific death rates rose sharply with the increase of age among all four sex/race groups, though the rate of increase was greatest for whites over the age of 75 (Figure 3). Even though the age-specific death rates were higher for males aged 80 and older than for females, the number of female deaths for these ages were much higher than for males. This is due to the fact that there are many more elderly women than men (Table 3).

Figure 3: Age-Specific Death Rates for Fall-Related Injuries by Sex and Race, Pennsylvania, 2001- 2005

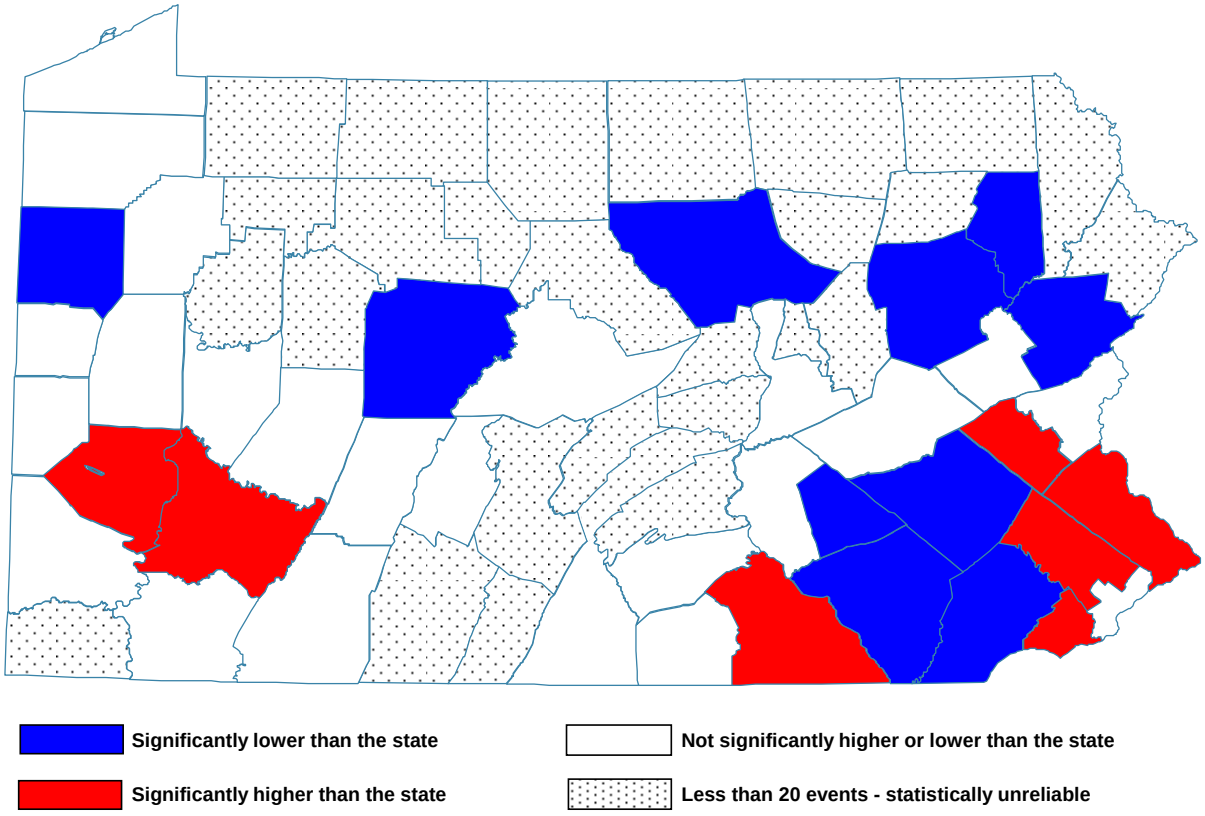




Source: PA Vital Statistics

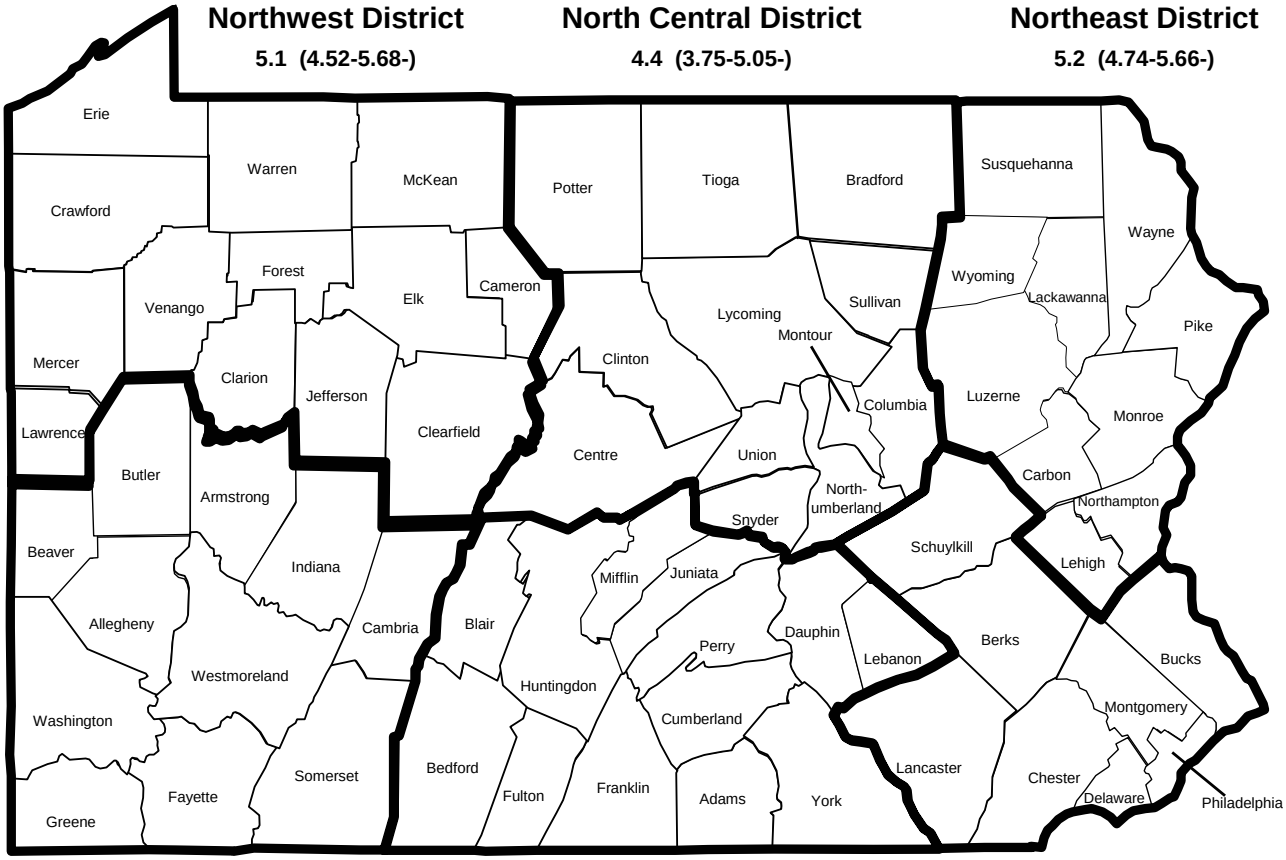
Seven counties (Allegheny, Bucks, Delaware, Lehigh, Montgomery, Westmoreland, and York) had average annual age-adjusted death rates which were significantly higher than the corresponding state rate. Ten counties (Berks, Chester, Clearfield, Lackawanna, Lancaster, Lebanon, Luzerne, Lycoming, Mercer, and Monroe) had average annual age-adjusted death rates which were significantly lower than the corresponding state rate (Table 4).

Figure 4: Average Annual Age-Adjusted Death Rates Significance Test Results for Fall-Related Injuries by County, Pennsylvania, 2001- 2005



Source: PA Vital Statistics

Figure 5: Average Annual Age-Adjusted Death Rates Significance Test Results for Fall-Related Injuries by District, Pennsylvania, 2001- 2005



NOTE: A + or - after the confidence interval (CI) denotes if the county rate was significantly higher or lower than the state rate. No + or - after a CI denotes no significant difference.
Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Hospitalized Fall-Related Injuries in Pennsylvania

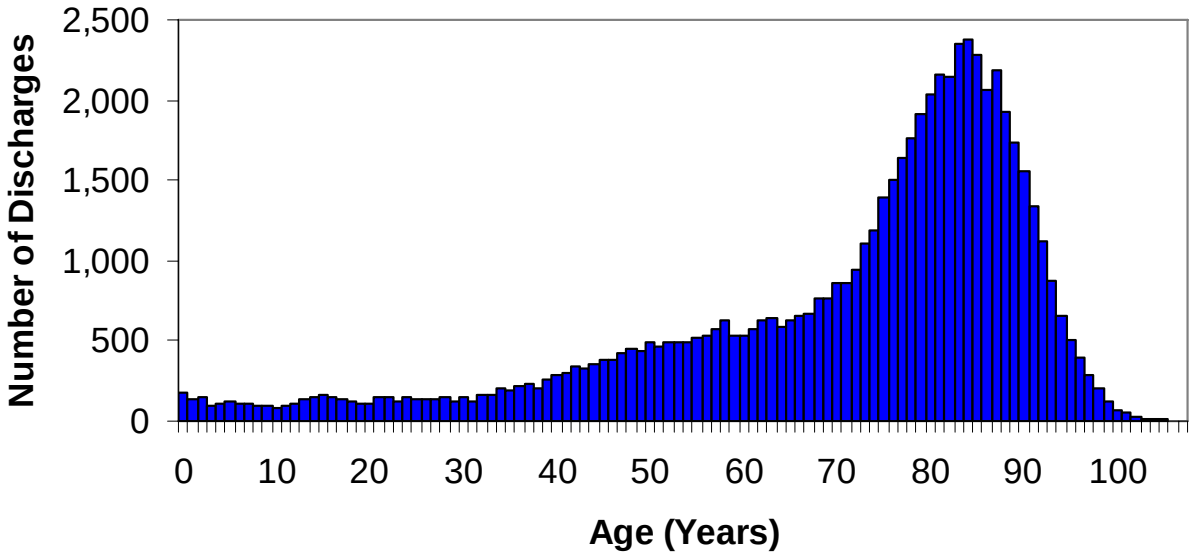
This section describes the distribution of demographics, fall types, diagnoses, and hospital charges for fall-related injuries treated and discharged from Pennsylvania hospitals during 2005. It covers fall-related injuries from: stairs, steps, ladders, scaffolding, buildings, or other structures; into a hole or other opening in surface; from one level to another; on the same level from slipping, tripping, or stumbling; and from collision, pushing, or shoving.

Demographics

In 2005, a total of 62,826 Pennsylvanians (age-adjusted rate=420.9 per 100,000 persons) were discharged from Pennsylvania hospitals due to injuries sustained from a fall. Falls comprised 45.7% of all injury-related hospital discharges. Females comprised 63.15% of the cases and 89.58% were whites. The average age of those discharged for fall-related hospitalizations was 70.87 (median=78) (Table 11).

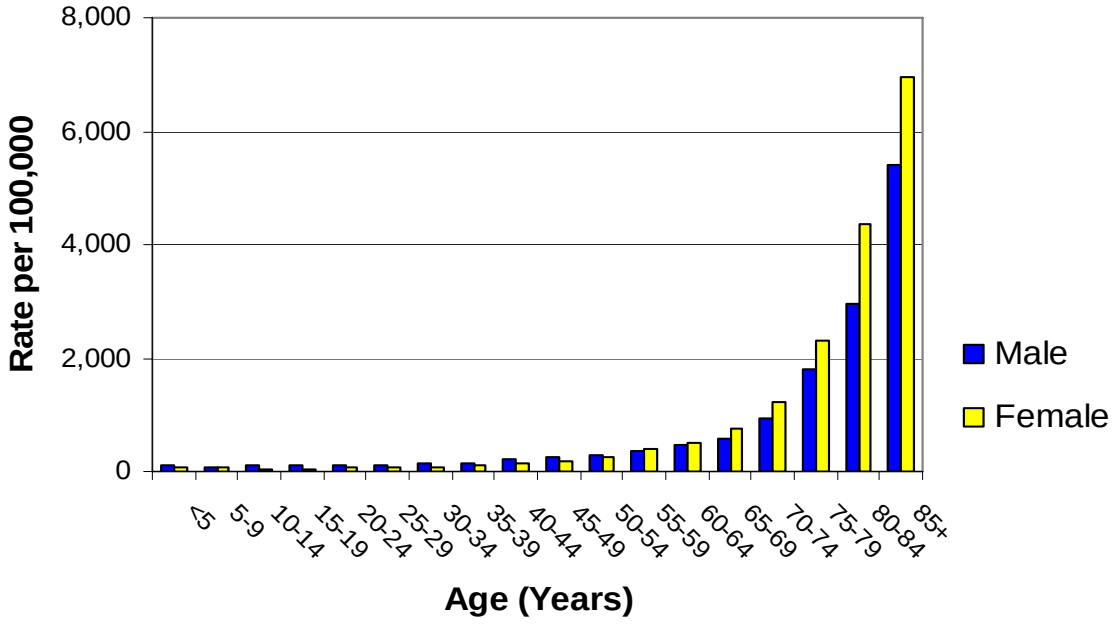
For the general population, hospital discharges by age follow a unimodal pattern with one major peak among persons age 65 or older (Figure 6).

Figure 6: Hospital Discharges for Fall-Related Injuries by Age, Pennsylvania, 2005



Source: PHC4

Figure 7: Rates of Hospital Discharges for Fall-Related Injuries by Gender and Age Group, Pennsylvania, 2005



Source: PHC4

The hospital discharge rate for females was 618.9 per 100,000 persons compared to 384.6 per 100,000 persons for males (Table 6). The overall rate for whites was 523.8 per 100,000 persons (Table 7) while for blacks the overall rate was 319.4 per 100,000 persons (Table 8).

Fall specific mechanism

Falls on the same level were the most common specific cause of fall-related injury accounting for 30.3% of all falls, while 23.8% of the falls were related to stairs or height. Nearly one half (44.7%) of the cases were classified as other or unspecified falls (Figure 8).

Falls on the same level

This group includes falls on the same level from: slipping, tripping, or stumbling; and from collision, pushing, or shoving, by or with another person. There were 19,021 hospital discharges in this category in Pennsylvania in 2005. Whites comprised 91.5% and blacks 5.5%. Females accounted for 67.6%. More than 74% of the fall-related injuries in this category involved persons aged 65 or older. All cases were reported as unintentional. The average length of stay at the hospital for discharges from falls on the same level was 5.1 days (median=4) (Table 11).

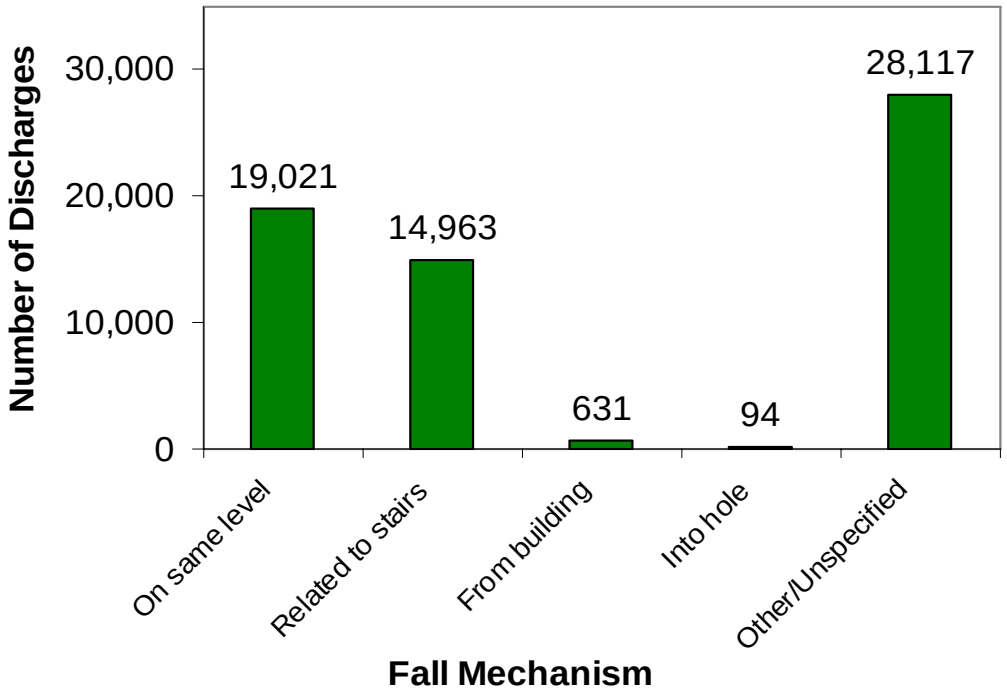
The average charge for a hospital stay due to a fall on the same level was $31,562 (median=$19,978). Charges totaled more than $600 million. The average charge per day for injuries from falls on the same level was $6,167. The major payer source for injuries due to falls on the same level was Medicare (Table 11).

Falls related to stairs or height

This group includes falls on or from stairs or steps, on or from ladders or scaffolding, falls from one level to another, suicide and self-inflicted injuries by jumping from a high place, pushing from a high place, falling from a high place, and undetermined whether the fall was accidentally or purposely inflicted. In 2005, there were 14,963 (23.8%) (Figure 8) hospital discharges in Pennsylvania resulting from fall-related injuries related to stairs or height. Most patients were female (55.2%) and white (85.9%) (Table 11). Slightly more than 57% of the hospital discharges were people aged 65 or older.

The average length of stay at the hospital for discharges from falls related to stairs or height was 5.3 days (median=4). The average hospital charge was $40,072 (median=$20,518), and the total charges were approximately $600 million (Table 11). The average charge per day was $7,584. Medicare was the major payment source for hospital stays due to falls from stairs or height.

Figure 8: Hospital Discharges for Fall-Related Injuries by Specific Mechanism, Pennsylvania, 2005



Source: PHC4

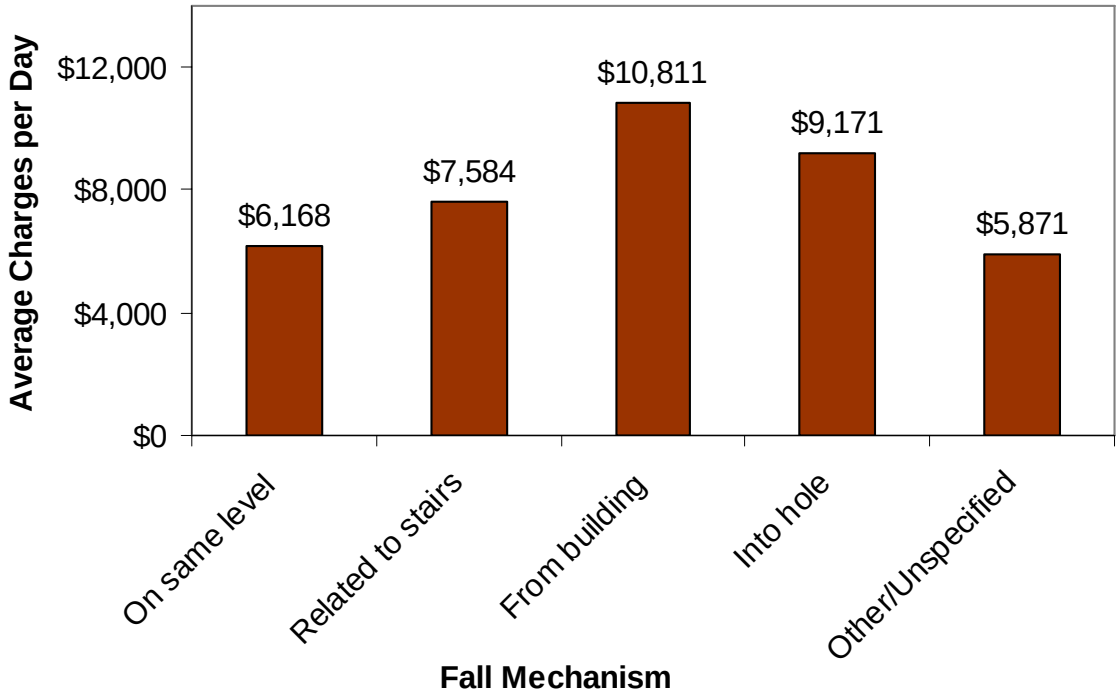
Hospital length of stay

Overall, patients stayed at the hospital an average of 5.5 days (median=4) for a total of 342,594 hospital days (Table 11). The most common length of stay was 3 days while the longest hospital stay was for 446 days. The average length of stay for children under five years of age was 1.9 days (median=1) compared to an average of 5.8 days (median=5) for persons 65 years of age or older.

Hospital charges

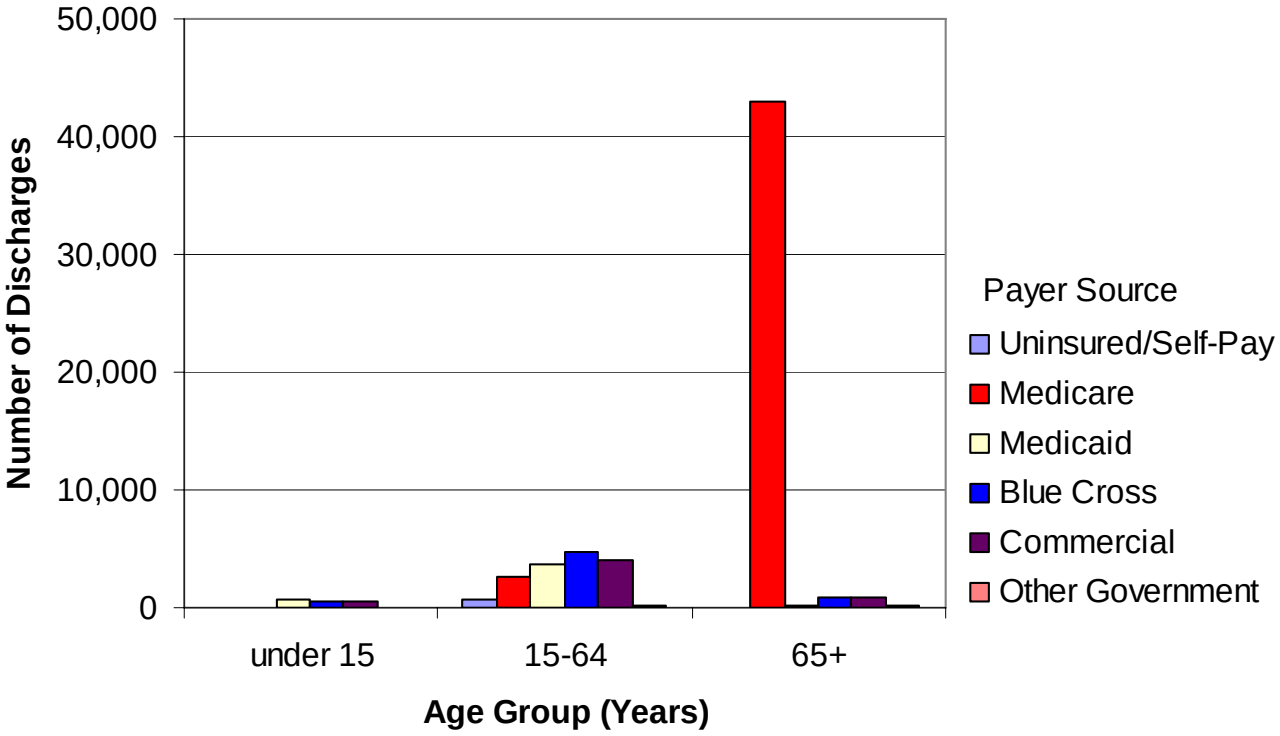
Charges associated with fall-related hospitalizations totaled more than $2.192 billion (Table 11). The average charge for a fall-related injury was $34,904 per case. The maximum amount paid for a single case was over $4.7 million. The average charge per hospital day, an indicator of the intensity of the treatment, was $6,400. Not surprising was that the charges per day for falls from a building or other structure were highest, at $10,811 (Figure 9). The major payer was the government (Medicare, Medicaid, other government sources) (80.2% of the cases) which was charged more than $1.78 billion for all fall-related injuries, predominantly in the older age-groups (Figure 10).

Figure 9: Average Charges Per Hospital Day for Fall-Related Injuries by Specific Mechanism, Pennsylvania, 2005



Source: PHC4

Figure 10: Hospital Discharges for Fall-Related Injuries by Payer Source and Age Group, Pennsylvania, 2005



Source: PHC4

Diagnoses

The leading principal diagnosis category among fall patients was fractures (53.4%) (Table 10). The average length of stay for hip fractures was 6.2 days (median=5) and the mean cost for each case was $38,140 (median=$26,112) (Table 11). The total charges for all hip fractures were over $501 million, which was 22.8% of the total hospital charges of all the fall-related injuries.

Behavioral Risk Factor Surveillance System- Falls and Fall Injuries

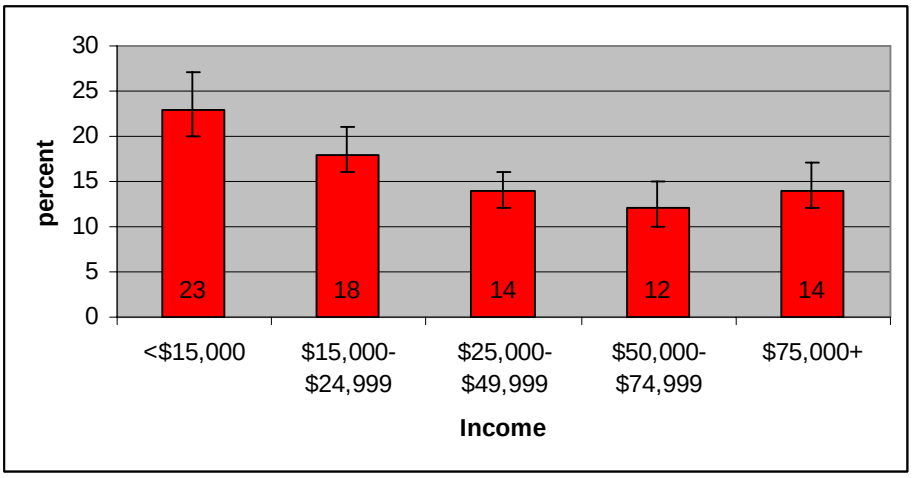
Had a fall in the past 3 months:

In 2006, 15% (95% confidence interval: 14%-16%) of all Pennsylvania adults, age 45+, indicated that they had fallen in the past 3 months. Adults in this age group with household incomes of less than $15,000 had a significantly higher percentage of falls in the past 3 months (23%) compared to adults with household incomes of $25,000+ ($25,000-$49,999, 14%; $50,000-$74,999, 12%; $75,000+, 14%). Additionally adults over 45 with a household income of $15,000-$24,999 had a significantly higher percentage of falls (18%) compared to adults over 45 with household incomes of $50,000-$74,999. No significant differences were seen for sex, age, education level, or race/ethnicity.

Injured by a fall in the past 3 months:

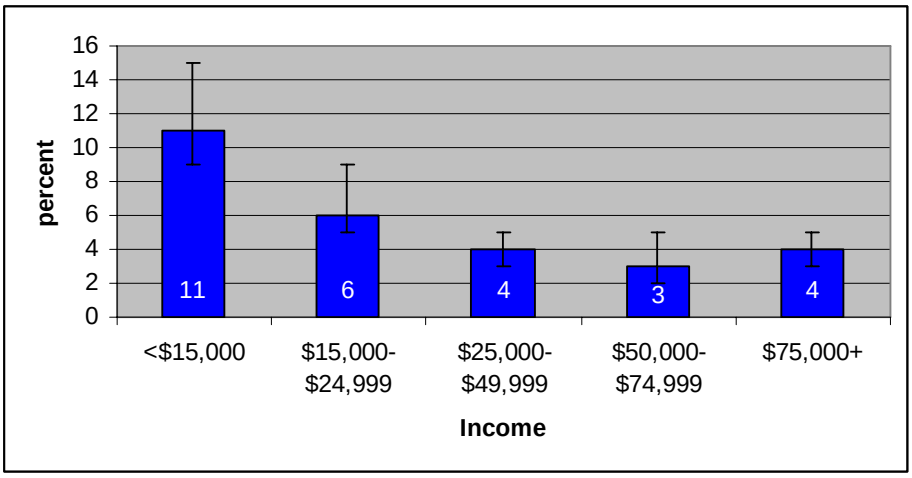
Of those adults over 45 who indicated that they had fallen in the past 3 months, 32% (95% confidence interval: 29%-36%) also said that they had been injured by a fall in the past 3 months. Out of the adults who fell in the past 3 months, those with household incomes of less than $15,000 had a significantly higher percentage of falls resulting in injury in the past 3 months (48%) compared to adults with household incomes of $25,000+ ($25,000-$49,999, 30%; $50,000-$74,999, 27%; $75,000+, 27%). No significant differences were seen among any other demographic group.

Figure 11: Percent Who Had at Least One Fall in the Past 3 Months
Pennsylvania Adults Age 45+, 2006



Source: 2006 BRFSS

Figure 12: Percent Who Had at Least One Injury due to a Fall in the Past 3 Months
Pennsylvania Adults Age 45+, 2006



Source: 2006 BRFSS

Appendix

Table 1: Fall-related Deaths, Number and Age-Adjusted Rate, Pennsylvania, 2001-2005

YEAR	NO.	RATE
2001	728	4.9
2002	786	5.4
2003	896	6.1
2004	1,025	6.9
2005	973	6.4

NOTES: Age-adjusted rates are computed by the direct method using the 2000 standard million population. Rates are per 100,000.
Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Table 2: Fall-related Deaths, Number and Age-Adjusted Rate by Sex and Race, Pennsylvania, 2001-2005

	MALES						FEMALES					
	ALL RACES		WHITE		BLACK		ALL RACES		WHITE		BLACK	
YEAR	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE
2001	385	6.6	364	6.9	17	3.6	343	3.6	327	3.7	15	2.4
2002	408	7.4	376	7.4	27	5.9	378	4.1	360	4.2	14	2.3
2003	471	8.3	440	8.5	27	4.7	425	4.5	401	4.5	21	3.3
2004	541	9.3	505	9.5	32	6.9	484	5.1	462	5.3	21	3.3
2005	490	8.4	457	8.5	26	6.2	483	4.9	460	5.1	22	3.5

NOTES: Age-Adjusted rates are computed by the direct method using the 2000 U.S. standard million population. Rates are per 100,000.
Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Table 3: Fall-related Deaths, Number and Average Annual Age-Specific Rate by Sex and Race, Pennsylvania, 2001-2005

AGE	ALL DEATHS		MALES						FEMALES					
			ALL RACES		WHITE		BLACK		ALL RACES		WHITE		BLACK	
GROUP	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE	NO.	RATE
TOTAL***	4,408	7.1	2,295	7.7	2,142	8.3	129	4.3	2,113	6.6	2,010	7.3	93	2.8
< 5	13	0.4	8	0.4	5	0.3	3	1.2	5	0.3	5	0.3	0	-
5-9	2	0.1	2	0.1	2	0.1	0	-	0	-	0	-	0	-
10-14	6	0.1	3	0.1	3	0.2	0	-	3	0.1	2	0.1	1	0.4
15-19	20	0.4	16	0.7	14	0.7	1	0.3	4	0.2	4	0.2	0	-
20-24	53	1.3	38	1.9	34	2.0	3	1.2	15	0.7	14	0.8	1	0.4
25-29	44	1.2	38	2.1	30	2.0	5	2.3	6	0.3	5	0.3	1	0.5
30-34	32	0.8	28	1.4	25	1.5	2	0.9	4	0.2	3	0.2	1	0.4
35-39	75	1.7	59	2.7	53	2.8	5	2.3	16	0.7	14	0.7	1	0.4
40-44	117	2.4	88	3.7	79	3.8	5	2.3	29	1.2	24	1.1	5	2.0
45-49	138	3.0	107	4.6	96	4.7	8	4.0	31	1.3	25	1.2	5	2.2
50-54	152	3.6	111	5.3	95	5.1	15	9.1	41	1.9	37	1.9	3	1.5
55-59	151	4.3	111	6.5	93	6.0	16	12.7	40	2.2	35	2.2	5	3.2
60-64	169	5.9	116	8.6	103	8.4	11	11.5	53	3.5	49	3.6	4	3.1
65-69	215	8.7	119	10.6	106	10.3	12	16.0	96	7.1	83	6.8	13	12.1
70-74	344	14.9	205	20.6	190	20.6	13	21.4	139	10.6	134	11.2	3	3.1
75-79	590	29.1	312	38.3	304	39.9	8	17.4	278	22.9	260	23.1	18	22.9
80-84	820	56.0	400	74.2	388	76.8	12	42.3	420	45.4	402	46.7	16	28.7
85 +	1,466	117.2	533	149.6	521	156.1	10	54.6	933	104.3	914	109.5	16	30.8

*** Unknown age included in totals.

NOTES: Rates are per 100,000 population (2001-2005) for each specified group.
Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Table 4: Fall-related Deaths, Number and Average Annual Age-Adjusted Rate, 95% Confidence Interval and Significance Test Results by County, Pennsylvania, 2001-2005

County	No.	Rate	CI (95%)	
Adams	24	4.7	2.82-6.58	
Allegheny	**568**	**6.6**	**6.06-7.14**	+
Armstrong	26	5.3	3.26-7.34	
Beaver	57	4.8	3.55-6.05	
Bedford	18	5.7		
Berks	97	4.4	3.52-5.28	-
Blair	58	6.7	4.98-8.42	
Bradford	8	2.1		
Bucks	**204**	**7.0**	**6.04-7.96**	+
Butler	53	5.1	3.73-6.47	
Cambria	80	7.3	5.70-8.90	
Cameron	2	5.1		
Carbon	21	5.2	2.98-7.42	
Centre	33	5.6	3.69-7.51	
Chester	94	4.4	3.51-5.29	-
Clarion	14	5.9		
Clearfield	20	3.7	2.08-5.32	-
Clinton	3	1.2		
Columbia	19	5.1		
Crawford	31	5.8	3.76-7.84	
Cumberland	65	5.3	4.01-6.59	
Dauphin	77	5.5	4.27-6.73	
Delaware	**251**	**7.5**	**6.57-8.43**	+
Elk	12	5.5		
Erie	92	5.7	4.54-6.86	
Fayette	50	5.2	3.76-6.64	
Forest	1	2.3		
Franklin	51	6.3	4.57-8.03	
Fulton	6	7.6		
Greene	10	4.1		
Huntingdon	14	5.6		
Indiana	37	6.8	4.61-8.99	
Jefferson	11	3.8		
Juniata	7	5.1		

County	No.	Rate	CI (95%)	
Lackawanna	65	4.6	3.48-5.72	-
Lancaster	105	3.9	3.15-4.65	-
Lawrence	35	5.5	3.68-7.32	
Lebanon	27	3.5	2.18-4.82	-
Lehigh	**173**	**8.9**	**7.57-10.23**	+
Luzerne	71	3.2	2.46-3.94	-
Lycoming	31	4.3	2.79-5.81	-
McKean	17	5.8		
Mercer	29	3.7	2.35-5.05	-
Mifflin	15	4.9		
Monroe	31	4.3	2.79-5.81	-
Montgomery	**357**	**7.8**	**6.99-8.61**	+
Montour	9	7.1		
Northampton	86	5.0	3.94-6.06	
Northumberland	35	5.3	3.54-7.06	
Perry	8	3.8		
Philadelphia	476	5.9	5.37-6.43	
Pike	9	3.7		
Potter	10	7.8		
Schuylkill	62	5.7	4.28-7.12	
Snyder	6	2.9		
Somerset	31	5.7	3.69-7.71	
Sullivan	0	0.0		
Susquehanna	14	5.6		
Tioga	11	4.0		
Union	9	4.0		
Venango	21	6.0	3.43-8.57	
Warren	17	6.1		
Washington	93	6.9	5.50-8.30	
Wayne	17	5.8		
Westmoreland	**200**	**7.7**	**6.63-8.77**	+
Wyoming	5	3.4		
York	**219**	**10.5**	**9.11-11.89**	+
Pennsylvania	4,408	5.9	5.73-6.07	

NOTE: A+ or - after the confidence interval (CI) denotes if the county rate was significantly higher or lower than the state rate. No + or - after a CI denotes no significant difference. CIs were not calculated for rates based on less than 20 events due to unreliability.

Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Table 5: Fall-related Deaths, Number by Age Group and County, Pennsylvania, 2001-2005

COUNTY	TOTAL DEATHS*	AGE AT DEATH (IN YEARS) < 20	20-64	65+
Pennsylvania	4,408	41	931	3,435
Adams	24	1	4	19
Allegheny	568	4	117	447
Armstrong	26	0	5	21
Beaver	57	1	12	44
Bedford	18	1	3	14
Berks	97	1	24	72
Blair	58	0	9	49
Bradford	8	0	1	7
Bucks	204	2	35	167
Butler	53	1	11	41
Cambria	80	0	19	61
Cameron	2	0	1	1
Carbon	21	0	3	17
Centre	33	1	8	24
Chester	94	2	29	63
Clarion	14	0	3	11
Clearfield	20	0	7	13
Clinton	3	0	0	3
Columbia	19	0	8	11
Crawford	31	1	9	21
Cumberland	65	1	13	51
Dauphin	77	1	24	52
Delaware	251	2	51	198
Elk	12	0	4	8
Erie	92	0	16	76
Fayette	50	0	16	34
Forest	1	0	0	1
Franklin	51	0	8	43
Fulton	6	0	0	6
Greene	10	0	4	6
Huntingdon	14	0	3	11
Indiana	37	0	6	31
Jefferson	11	1	2	8
Juniata	7	0	1	6
Lackawanna	65	1	20	44
Lancaster	105	2	26	77
Lawrence	35	1	9	25
Lebanon	27	1	3	23
Lehigh	173	0	38	135
Luzerne	71	1	24	46
Lycoming	31	1	5	25
McKean	17	0	4	13
Mercer	29	0	7	22
Mifflin	15	0	3	12
Monroe	31	1	9	21
Montgomery	357	2	43	312
Montour	9	0	1	8
Northampton	86	0	13	73
Northumberland	35	1	5	29
Perry	8	1	1	6
Philadelphia	476	6	147	323
Pike	9	0	3	6
Potter	10	0	0	10
Schuylkill	62	0	11	51
Snyder	6	0	1	5
Somerset	31	0	7	24
Sullivan	0	0	0	0
Susquehanna	14	0	4	10
Tioga	11	0	1	10
Union	9	0	3	6
Venango	21	0	6	15
Warren	17	0	2	15
Washington	93	2	16	75
Wayne	17	0	8	9
Westmoreland	200	0	22	178
Wyoming	5	0	1	4
York	219	1	32	186

* Unknown age included in totals.

NOTE: Data for 2001-2005 based on ICD-10 cause of death codes.

Source: PA Vital Statistics

Table 6: Hospital Discharges for Fall-Related Injuries by Age Group and Gender, Number and Rate, Pennsylvania, 2005

	Gender					
	Male		Female		Total	
	Number	Rate*	Number	Rate*	Number	Rate*
Under 5	415	111.0	261	73.0	676	92.5
5-9	308	78.1	212	56.2	520	67.4
10-14	405	96.2	176	43.7	581	70.5
15-19	465	99.5	218	47.7	683	73.9
20-24	446	103.4	254	60.5	700	82.2
25-29	402	110.7	272	77.7	674	94.5
30-34	495	130.6	337	88.7	832	109.7
35-39	675	160.6	428	100.2	1,103	130.2
40-44	994	217.3	631	135.0	1,625	175.7
45-49	1,237	267.6	847	178.3	2,084	222.4
50-54	1,299	303.9	1,135	254.9	2,435	279.0
55-59	1,298	355.8	1,480	379.5	2,778	368.0
60-64	1,315	451.1	1,650	511.6	2,965	482.9
65-69	1,345	586.7	2,138	768.5	3,483	686.4
70-74	1,807	934.2	3,166	1239.9	4,973	1108.2
75-79	2,822	1799.9	5,379	2293.9	8,202	2096.2
80-84	3,193	2965.1	7,879	4366.8	11,074	3843.6
85+	4,226	5414.3	13,212	6954.5	17,438	6506.0
Total/Rate	23,147	384.6	39,675	618.9	62,826	505.5

Source: PHC4
*Crude Rate per 100,000 population

Table 7: Hospital Discharges for Fall-Related Injuries by Age Group and Gender, White Race, Number and Rate, Pennsylvania, 2005

	Gender					
	Male		Female		Total	
	Number	Rate*	Number	Rate*	Number	Rate*
Under 5	255	82.8	167	56.8	422	70.1
5-9	211	65.0	161	52.1	372	58.7
10-14	310	89.2	138	41.7	448	66.0
15-19	385	99.2	151	39.7	536	69.8
20-24	327	91.0	186	53.3	513	72.5
25-29	310	102.3	185	63.6	495	83.4
30-34	374	116.1	239	74.8	613	95.6
35-39	510	140.5	334	91.8	844	116.1
40-44	776	193.9	497	123.0	1,273	158.3
45-49	943	230.2	694	167.1	1,637	198.4
50-54	1,031	269.3	962	244.8	1,993	256.9
55-59	1,063	322.7	1,284	370.5	2,347	347.2
60-64	1,140	430.7	1,453	503.4	2,593	468.6
65-69	1,161	550.7	1,922	759.7	3,083	664.7
70-74	1,608	896.8	2,879	1229.7	4,487	1085.3
75-79	2,591	1769.1	5,014	2306.3	7,606	2090.3
80-84	3,003	2983.6	7,446	4452.0	10,451	3901.1
85+	4,032	5526.0	12,535	7095.6	16,567	6636.8
Total/Rate	20,030	384.3	36,247	655.0	56,280	523.8

Source: PHC4
*Crude Rate per 100,000 population

Table 8: Hospital Discharges for Fall-Related Injuries by Age Group and Gender, Black Race, Number and Rate, Pennsylvania, 2005

	Gender					
	Male		Female		Total	
	Number	Rate*	Number	Rate*	Number	Rate*
Under 5	86	171.9	54	111.0	140	141.8
5-9	55	102.7	24	46.3	79	75.0
10-14	66	115.3	23	41.3	89	78.8
15-19	42	69.5	38	65.1	80	67.3
20-24	70	128.6	47	87.0	117	107.9
25-29	46	99.5	57	125.7	103	112.5
30-34	66	155.5	65	143.3	131	149.2
35-39	105	241.7	66	136.4	171	186.2
40-44	135	306.1	92	185.6	227	242.3
45-49	178	430.5	120	252.9	298	335.6
50-54	204	582.4	118	283.3	322	419.9
55-59	158	572.1	133	386.8	291	469.3
60-64	116	563.0	142	521.2	258	539.2
65-69	120	787.7	147	679.2	267	724.0
70-74	131	1097.8	196	1047.2	327	1066.9
75-79	140	1575.5	229	1495.9	369	1525.1
80-84	119	2051.4	267	2339.4	386	2242.4
85+	102	2447.8	424	3726.5	526	3383.7
Total/Rate	1,939	311.5	2,242	326.6	4,181	319.4

Source: PHC4
*Crude Rate per 100,000 population

Table 9: Hospital Discharges for Fall-Related Injuries by Age Group, Gender, Race and Specific Mechanism, Number and Percentages, Pennsylvania, 2005

			Fall on same level		Fall related to stairs or height		Fall from building/other structure		Fall into hole or other opening		Other and unspecified falls		Row total
			Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count	Row %	Count
Males	White	Under 5 yrs	35	13.7%	161	63.1%	10	3.9%	0	0.0%	49	19.2%	255
		5-14 yrs	204	39.2%	214	41.1%	7	1.3%	2	0.4%	94	18.0%	521
		15-24 yrs	255	35.8%	252	35.4%	45	6.3%	11	1.5%	149	20.9%	712
		25-44 yrs	403	20.5%	859	43.6%	165	8.4%	12	0.6%	531	27.0%	1,970
		45-64 yrs	1,013	24.3%	1,539	36.8%	125	3.0%	17	0.4%	1,483	35.5%	4,177
		65-74 yrs	794	28.7%	771	27.8%	14	0.5%	3	0.1%	1,187	42.9%	2,769
		75+ yrs	2,781	28.9%	1,782	18.5%	16	0.2%	3	0.0%	5,044	52.4%	9,626
		Group Total	5,485	27.4%	5,578	27.8%	382	1.9%	48	0.2%	8,537	42.6%	20,030
	Black	Under 5 yrs	10	11.6%	57	66.3%	7	8.1%	0	0.0%	12	14.0%	86
		5-14 yrs	42	34.7%	45	37.2%	6	5.0%	0	0.0%	28	23.1%	121
		15-24 yrs	29	25.9%	37	33.0%	4	3.6%	0	0.0%	42	37.5%	112
		25-44 yrs	76	21.6%	124	35.2%	30	8.5%	2	0.6%	120	34.1%	352
		45-64 yrs	130	19.8%	218	33.2%	17	2.6%	1	0.2%	290	44.2%	656
		65-74 yrs	58	23.1%	74	29.5%	1	0.4%	0	0.0%	118	47.0%	251
		75+ yrs	104	28.8%	96	26.6%	0	0.0%	0	0.0%	161	44.6%	361
		Group Total	449	23.2%	651	33.6%	65	3.4%	3	0.2%	771	39.8%	1,939
Females	White	Under 5 yrs	18	10.8%	115	68.9%	6	3.6%	0	0.0%	28	16.8%	167
		5-14 yrs	81	27.1%	150	50.2%	5	1.7%	0	0.0%	63	21.1%	299
		15-24 yrs	102	30.3%	118	35.0%	17	5.0%	3	0.9%	97	28.8%	337
		25-44 yrs	428	34.1%	427	34.0%	19	1.5%	5	0.4%	376	30.0%	1,255
		45-64 yrs	1,553	35.4%	1,181	26.9%	13	0.3%	11	0.3%	1,635	37.2%	4,393
		65-74 yrs	1,628	33.9%	998	20.8%	5	0.1%	3	0.1%	2,167	45.1%	4,801
		75+ yrs	8,110	32.4%	4,281	17.1%	10	0.0%	6	0.0%	12,588	50.4%	24,995
		Group Total	11,920	32.9%	7,270	20.1%	75	0.2%	28	0.1%	16,954	46.8%	36,247
	Black	Under 5 yrs	3	5.6%	41	75.9%	4	7.4%	0	0.0%	6	11.1%	54
		5-14 yrs	9	19.1%	26	55.3%	3	6.4%	0	0.0%	9	19.1%	47
		15-24 yrs	21	24.7%	29	34.1%	3	3.5%	1	1.2%	31	36.5%	85
		25-44 yrs	83	29.6%	92	32.9%	9	3.2%	1	0.4%	95	33.9%	280
		45-64 yrs	138	26.9%	168	32.7%	4	0.8%	1	0.2%	202	39.4%	513
		65-74 yrs	88	25.7%	100	29.2%	1	0.3%	0	0.0%	154	44.9%	343
		75+ yrs	253	27.5%	214	23.3%	0	0.0%	0	0.0%	453	49.2%	920
		Group Total	595	26.5%	670	29.9%	24	1.1%	3	0.1%	950	42.4%	2,242
Table Total			18,449	30.5%	14,169	23.4%	546	0.9%	82	0.1%	27,212	45.0%	60,458

Source: PHC4

Table 10: Hospital Discharges for Fall-Related Injuries by Primary Diagnosis, Number and Percentages, Pennsylvania, 2005

Primary Diagnosis (ICD-9-CM Codes)	Number	Percent
Other Fractures (800-829 excluding 820.0-820.9)	20,405	32.48%
Non-injury diagnoses (outside 800-995)	19,099	30.40%
Hip Fractures (820.0-820.9)	13,144	20.92%
Intracranial Injury (850-854)	4,657	7.41%
Superficial, Contusion & Crushing Injury (910-929)	1,603	2.55%
Sprains & Strains (840-848)	1,093	1.74%
Internal Injury to Chest, Abdomen & Pelvis (860-869)	894	1.42%
Open Wound (870-897)	696	1.11%
Traumatic Complications (958-959)	649	1.03%
Dislocations (830-839)	315	0.50%
Injury to Nerves & Spinal Cord (950-957)	152	0.24%
Injury to Blood Vessels (900-904)	38	0.06%
Other & Unspecified Effects (990-995)	31	0.05%
Poisonings (960-979)	24	0.04%
Toxic Effects of Non-Medicinals (980-989)	12	0.02%
Burns (940-949)	8	0.01%
Foreign Bodies (930-939)	5	0.01%
Late Effects (905-909)	1	0.00%
Total	62,826	100.00%

Source: PHC4

Table 11: Hospital Discharges for Fall Injuries by Selected Variables and Specific Mechanism, Number and Percentages, Pennsylvania, 2005

	Fall Mechanism						
Variable	On same level	Related to stairs or height	From building/other structure	Into hole or other opening	Other & Unspecified Falls	Total	Hip Fractures
Number	19,021	14,963	631	94	28,117	62,826	13,144
	Demographics						
Average Age (years)	71.88	63.34	38.16	44.65	75.03	70.87	80.77
Median Age (years)	78	71	39	46	80	78	83
% Females	67.61	55.19	17.43	36.17	65.48	63.15	73.53
% Male	32.37	44.81	82.57	63.83	34.51	36.84	26.47
% White	91.51	85.87	72.42	80.85	90.67	89.58	94.98
% Black	5.49	8.83	14.10	6.38	6.12	6.65	3.10
% 65 years or older	74.15	57.29	7.93	18.08	79.75	71.90	91.76
	Length of Stay						
Total No. Hospital Days	97,334	79,061	3,229	984	162,586	342,594	81,884
Average LOS (days)	5.12	5.28	5.12	4.09	5.78	5.45	6.23
Median LOS (days)	4	4	3	3	4	4	5
Longest LOS (days)	146	446	69	23	303	446	120
	Economic Impact						
Average Charge	$31,562.00	$40,072.00	$55,325.00	$37,465.00	$33,947.00	$34,904.00	$38,140.00
Median Charge	$19,978.00	$20,518.00	$27,468.00	$18,582.00	$18,947.00	$19,687.00	$26,112.00
Average charge/day	$6,167.85	$7,583.93	$10,811.39	$3,578.97	$5,870.72	$6,400.77	$6,122.28
Total Charges (millions)	$600.34	$599.59	$34.91	$3.52	$954.50	$2,192.86	$501.32
% Paid by Medicare*	73.65	58.64	11.57	17.02	80.74	72.54	89.89

Source: PHC4 % Denotes percentage within mechanism

*Excludes Missing data

Table 12: Hospital Discharges for Fall-Related Injuries by County of Residence, Number and Rate, Pennsylvania, 2005

County	Number	Rate*		County	Number	Rate*
Adams	323	323.8		Lackawanna	1,474	703.5
Allegheny	7,893	638.7		Lancaster	1,936	394.6
Armstrong	412	583.7		Lawrence	652	702.5
Beaver	912	514.2		Lebanon	546	434.8
Bedford	161	321.4		Lehigh	1,964	594.4
Berks	1,668	420.9		Luzerne	2,057	657.5
Blair	614	484.2		Lycoming	460	388.5
Bradford	267	426.9		McKean	230	518.4
Bucks	2,815	453.1		Mercer	722	603.7
Butler	989	543.1		Mifflin	226	488.8
Cambria	939	634.1		Monroe	342	209.5
Cameron	45	798.0		Montgomery	3,968	511.4
Carbon	398	642.4		Montour	63	349.4
Centre	416	296.0		Northampton	1,430	496.9
Chester	1,733	365.6		Northumberland	508	548.5
Clarion	197	485.4		Perry	169	377.8
Clearfield	404	488.0		Philadelphia	7,314	499.8
Clinton	151	403.3		Pike	91	161.5
Columbia	234	360.3		Potter	71	398.1
Crawford	450	503.1		Schuylkill	960	651.1
Cumberland	906	406.1		Snyder	105	274.8
Dauphin	998	392.9		Somerset	475	602.0
Delaware	3,510	631.7		Sullivan	30	469.4
Elk	169	503.3		Susquehanna	187	443.9
Erie	1,261	449.6		Tioga	99	237.7
Fayette	889	608.3		Union	203	470.7
Forest	30	522.7		Venango	279	498.9
Franklin	618	449.8		Warren	172	409.2
Fulton	57	388.5		Washington	1,331	644.8
Greene	149	374.3		Wayne	270	538.8
Huntingdon	194	422.2		Westmoreland	2,119	576.4
Indiana	416	469.0		Wyoming	162	575.3
Jefferson	228	498.3		York	1,663	406.8
Juniata	102	433.9		**Total**	**62,826**	**505.5**

Source: PHC4

*Crude Rate per 100,000 population

Table 13: Behavioral Risk Factor Surveillance System - Falls Age 45+, Percentage and 95% Confidence Intervals by selected demographics, Pennsylvania, 2006

	Fall in Past 3 Months		Injury Due to Fall in Past 3 Months*	
	%	CI	%	CI
All Adults, age 45+	15	14-16	32	29-36
Male, age 45+	15	13-16	28	23-34
Female, age 45+	16	15-17	35	31-40
Age:				
45-64	16	14-17	34	29-38
65-74	13	11-15	27	20-36
75+	17	15-20	32	25-40
Education:				
<High School, age 45+	18	15-22	34	25-46
High School, age 45+	15	13-16	33	27-38
Some College, age 45+	17	15-20	32	26-40
College Degree, age 45+	14	12-16	31	25-38
Income:				
<$15,000	23	20-27	48	39-58
$15,000-$24,999	18	16-21	36	28-44
$25,000-$49,999	14	12-16	30	24-38
$50,000-$74,999	12	10-15	27	19-38
$75,000+	14	12-17	27	20-35
Race/Ethnicity:				
White, non-Hispanic, age 45+	15	14-16	31	28-35
Black, non-Hispanic, age 45+	16	12-21	NSR	NSR
Hispanic, age 45+	19	11-31	NSR	NSR

* Denominator is adults who have fallen in the past 3 months.
Note: "NSR" indicates a result that was not reported because it was statistically unreliable

Technical Notes

Definitions

Age-Adjusted Rate – Age-specific rates for a selected population are applied to a standard population (in this report 2000 United States standard million population was used) to calculate what rate would be expected if the selected population had the same age distribution as the standard population. Use of age-adjusted rates allows comparison between populations which may otherwise be biased by dissimilar age distributions. Age-adjusted rates are artificial measurements and should never be compared with any other type or rate or used to calculate the actual number of events.

Age-Specific Rate – Number of events for a specified age group per 100,000 population in the same age group.

Falls and Fall-related Deaths- Falls and fall-related deaths are defined as any mortality record with an ICD-10 Underlying cause of death code as specified below. Excludes falls from animals and burning structures and falls into water where drowning is the primary cause of death.

ICD-10 Categories (Deaths)

Mechanism of injury	Unintentional	Self Inflicted	Assault	Other/Unknown
Fall	W00-W19	X80	Y01	Y30

Falls and Fall-Related Injury Hospitalizations - A fall-related injury hospitalization is defined as any hospital discharge with an ICD-9-CM E-code as specified below. These include: falls on/from stairs or steps; falls on/from ladders or scaffolding; falls from/out of buildings or other structures; falls into holes or other openings in surfaces; other falls from one level to another; falls on the same level from slipping, tripping, or stumbling, from collision, pushing, or shoving; and fractures.

ICD-9-CM Categories (Hospitalizations)

Mechanism of injury	Unintentional	Self Inflicted	Assault	Other/Unknown
Fall	E880.0-E886.9; E888	E957.0-E957.9	E968.1	E987.0-E987.9

The specific mechanism of fall hospitalization is defined based on the following E-codes:

Fall on the same level	E885; E886.(0,9)
Fall related to stairs or height	E880.(0,1,9); E881.(0,1); E884.(0,1,2,3,4,5,6,9); E957.(0,1,2,9); E968.1; E987.(0,1,2,9)
Fall from building/other structure	E882
Fall into hole or other opening	E883.(0,1,2,9)
Other and unspecified falls	E804.(0,1,2,3,8,9); E833.(0,1,2,3,4,5,6,8,9); E834.(0,1,2,3,4,5,6,8,9); E835.(0,1,2,3,4,5,6,7,8,9); E843.(0,1,2,3,4,5,6,7,8,9); E888; E988.0

Hospital charges – Hospital charges associated with the hospital stay. Because actual payments were made after the hospital discharge, the payer source was actually the expected source (not all charges were actually collected).

Mean – The mean is equal to the sum of all the observations divided by the total number of observations. The mean is sometimes referred to as the average.

Median – In a sample of *n* observations ordered from lowest to highest, if *n* is odd the median is the middle observation and if *n* is even the median is the average (or mean) of the two middle observations. Half of the observations are less than or equal to the median and half of the observations are greater than or equal to the median.

Mode – The mode is the observation which appears most frequently in a sample of observations.

Limitations

There is a cut-off date of March 1 of the following year for compiling annual mortality files, e.g., the cut-off date for 2005 death certificates was March 1, 2006. Data pertaining to a 2005 death for which a certificate was filed after the March 1, 2006 deadline are not included in this report. Files are updated on an annual basis after the cut-off date. Data from certificates received after a cut-off date or corrections to previously filed records are made at these times. Therefore, it is possible that injury mortality data previously obtained from or published by the Bureau of Health Statistics and Research may differ from the data which appear in this report.

The 2005 hospital discharge database included those persons discharged in the year under study. Persons may have been injured in 2005 but not discharged until later; conversely, some persons may have been injured prior to 2005, but discharged in 2005.

The coding of "Other and Unspecified Falls," although it counts for 44.7% of all hospitalizations, is not informative as to the type of fall. Failure to code the fall mechanism with more specific codes limits the mechanism-specific analyses.

The hospital discharge database included persons who may have been admitted to one hospital and discharged to another hospital and discharged again in the same calendar year. This double counting may result in an inflation of the incidence rates.

Because the data was derived from hospital billing data, there was no information on the injured person's health status and no information about the medications that the person was taking.

Information regarding Hispanic origin was available, but the numbers were too small for conclusive comparative analysis. Similarly, among racial categories, frequencies were small and inappropriate for analytical use except in the cases of the white and black race categories.

For more information, see References

References

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