

Barell Matrix for Injury Diagnosis Categories

Injury diagnosis categories used in this chartbook are defined by the Barell Matrix. The Barell Matrix is a two-dimensional array of ICD-9-CM injury codes⁵ defined by body region and nature of the injury (1) ([Appendix A, Barell Matrix](#) and [Appendix B](#)). The columns of the matrix are defined by nature-of-injury categories and the rows are the body region categories. The 36 most detailed rows of the matrix can be collapsed for broader groupings of injuries (from 36 rows to 9 rows to 5 rows). For instance, injuries to the knee can be collapsed to lower extremity injuries and then to all extremity injuries. Thus, an injury may be defined by 1 of 12 columns (i.e., nature of injury; e.g., fracture), a row (i.e., body region; e.g., extremity injury), a combination of cells (fracture of the extremities), or a single cell (hip fracture).

The next to last row of the matrix is a category referred to as “system wide” injury. This is not consistent with the other rows or columns in the matrix. It could just as easily have been treated as the last column of the matrix. System wide injuries affect the entire body; they include poisoning, toxic effects, foreign bodies, early complications of trauma, other and unspecified effects of external cause, late effects of injury, poisoning, toxic effects, and other external causes, and child and adult

⁵There were a small number of ICD-9-CM coding changes over the study period and they minimally affected the total number of injury discharges (“[Appendix A, ICD-9-CM addenda affecting injuries](#)”).

maltreatment. The largest category of these systemic injuries includes poisonings and toxic effects.

Injury hospital discharge rates are shown in figures 7 and 8 for two periods, 1979–82 and 1998–2001. Because of the level of detail provided in the cells of the Barell Matrix, rates were calculated using 4 years of data in order to increase the reliability of estimates. If only 1 year of data were used fewer cells with reliable data could be presented.

Examples of how to interpret the cells of the Barell Matrix include: (1) the total traumatic brain injury (TBI) hospital discharge rate decreased from 15.6 per 10,000 population for the period 1979–82 to 5.6 per 10,000 population for the period 1998–2001; (2) hip fracture hospital discharge rates increased from 9.5 per 10,000 population for the period 1979–82 to 11.7 per 10,000 population for the period 1998–2001.

Trends for the leading nature of injury categories are presented in figures 9–13; the body region of the injury categories are presented in figures 14–18, and an example of the intersection of the dimensions of the Barell Matrix (cells) is presented in figure 19.

Reference

1. Barrell V, Aharonson-Daniel L, Fingerhut LA, MacKenzie EJ, et al. An introduction to the Barell body region by nature of injury diagnosis matrix. *Injury Prevention* 8:91-6. 2002.

Figure 7. Barell Matrix: Injury hospital discharge rates by nature of injury and body region, 1979-1982

Body region			Nature of injury														
			Total ¹ 142.5	Fractures 50.9	Dislocation 8.8	Sprains and strains 19.7	Internal 17.3	Open wound 13.7	Amputations 1.2	Blood vessels 0.2	Contusion/ superficial 9.5	Crushing 0.6	Burns 3.9	Nerves 0.8	Un- specified 2.0		
Head and neck	Traumatic brain injury (TBI)	TBI1	5.9	0.7			5.2									--	
		TBI2	9.6	1.6			8.0										
		TBI3	*	*													
		Total TBI	15.6	2.4			13.2										--
	Other head, face, and neck	Other head	1.2					1.2						*	*		--
		Face	7.2	4.4	*	--		2.7						*			
		Eye	1.7					0.9				0.7		*0.1	*		
		Neck	0.3	*		--		0.3					--	*	*		
		Head, face, neck, unspecified	1.8									1.3	*	0.3	--		0.3
		Total other head, face, and neck	12.3	4.4	*	--		5.1				*	2.0	*	0.4	*	0.3
Total head and neck			27.8	6.8	*	--	13.2	5.1		*	2.0	*	0.4	*	0.3		
Spine and back	Spinal cord injury (SCI)	Cervical SCI	0.3	*0.1			0.2										
		Thoracic/dorsal SCI	0.1	*			*0.1										
		Lumbar SCI	*0.1	*			*0.1										
		Sacrum coccyx SCI	*	--			*										
		Spine, back, unspecified SCI	0.1	*			*0.1										
	Total SCI	0.7	0.2			0.5											
	Vertebral column injury (VCI)	Cervical VCI	3.9	0.6	*0.1	3.1											
		Thoracic/dorsal VCI	0.9	0.6	*	0.3											
		Lumbar VCI	3.0	0.9	*	2.1											
		Sacrum coccyx VCI	0.1	*0.1	*	*											
Spine, back, unspecified VCI		*0.1	*0.1	*													
Total VCI	8.0	2.3	0.2	5.5													
Total spine and back			8.7	2.5	0.2	5.5	0.5										
Torso	Torso	Chest/thorax	5.8	2.9	*	*	1.3	0.7		*	0.7	*	*	--			
		Abdomen	3.5				2.1	0.8		*	0.5		*	*			
		Pelvis/urogenital	10.1	2.0	*	7.4	0.2	0.2			*	*0.1	--	*	--		
		Trunk	0.7	*				*			*0.1	*	*	*0.1	*	0.4	
		Back and buttocks	1.8			0.9		0.2			0.6	*	*0.1	*			
Total torso			21.9	5.0	*0.1	8.4	3.6	2.0		*	2.1	*	0.2	*	0.4		
Extremities	Upper	Shoulder and upper arm	6.4	4.3	0.9	0.7		0.2	*		0.2	*	*			*	
		Forearm and elbow	6.7	5.5	0.2	0.2		0.6	*		*0.1	*	*				
		Wrist, hand, and fingers	8.1	2.6	0.3	0.9		2.5	0.9		*0.1	0.3	0.3	0.1	0.6	0.2	
		Other and unspecified	1.2	*				0.3	*		*0.1	*	*	0.1	0.6	*	
	Total upper extremity	22.4	12.5	1.4	1.8		3.6	1.0		*0.1	0.4	0.4	0.4	0.6	0.3		
	Lower	Hip	10.5	9.5	0.3	0.2						0.5	*	--			
		Upper leg and thigh	3.2	2.8	--	--				*		0.2	*	*0.1			
		Knee	9.3	0.9	6.6	1.5						0.3	*	*			
		Lower leg and ankle	10.2	9.2	*0.1	0.7				*		*0.1	*	*0.1			
		Foot and toes	2.8	1.3	0.1	*0.1		0.6	0.1			0.1	*0.1	0.2			
Other and unspecified		3.7	*0.1		0.8		1.8	*			0.4	*	0.3		0.4		
Total lower extremity	39.8	24.0	7.1	3.2		2.4	0.2		*	1.6	0.2	0.7		0.4			
Total extremities			62.2	36.4	8.5	5.0		6.0	1.2	0.1	2.1	0.5	1.1	0.6	0.6		
Unclassifiable by site	Other and unspecified	Other multiple	0.1	*						*			*	*0.1			
		Unspecified sites	7.6	0.1	*	0.7	*	0.7			*	3.2	*	2.1	*	0.7	
		Total other and unspecified	7.8	0.2	*	0.7	*	0.7			*	3.2	*	2.1	0.1	0.7	
		System wide and late effects	14.1														
Total unclassifiable by site			21.9	0.2	*	0.7	*	0.7		*	3.2	*	2.1	0.1	0.7		

-- Quantity zero * Figure does not meet standard of reliability or precision ("Appendix A," Standards of reliability). Empty cells = No diagnosis codes.

¹Nature of injury figures do not add to total because total includes system wide and late effects. The column totals are derived by summing the totals for each body region.

NOTES: Rates per 10,000 civilian residential population. Rates are not age adjusted. Numbers may not add to totals because of rounding. See "Appendix B" for the ICD-9-CM codes in each category.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Figure 8. Barel Matrix: Injury hospital discharge rates by nature of injury and body region, 1998-2001

Body region				Nature of injury														
				Total ¹	Fractures	Dislocation	Sprains and strains	Internal	Open wound	Amputations	Blood vessels	Contusion/superficial	Crushing	Burns	Nerves	Un-specified		
				64.7	35.6	0.8	2.4	7.2	3.5	0.3	0.2	2.1	0.1	2.3	0.1	1.3		
Head and neck	Traumatic brain injury (TBI)	TBI1	3.8	1.0			2.8									--		
		TBI2	1.6	0.3			1.3											
		TBI3	0.2	0.2														
		Total TBI	5.6	1.5			4.1										--	
	Other head, face, and neck	Other head	1.1						0.3						*	*		0.8
		Face	1.8	1.2	*	--			0.6						0.1	*	*	
		Eye	0.3						0.2				0.1		*	*		
		Neck	0.2	*		--			0.1					*	*	*		
		Head, face, neck, unspecified	0.7									*0.0	0.4	*	0.2	*	*	*0.0
		Total other head, face, and neck	4.1	1.2	*	--			1.2			*0.0	0.5	*	0.3	*	*	0.8
Total head and neck			9.7	2.7	*	--	4.1	1.2			*0.0	0.5	*	0.3	*	0.8		
Spine and back	Spinal cord injury (SCI)	Cervical SCI	0.2	0.1			0.1											
		Thoracic/dorsal SCI	0.1	0.1			*											
		Lumbar SCI	*0.0	*0.0			*											
		Sacrum coccyx SCI	*	*			*											
		Spine, back, unspecified SCI	*	*			*											
	Total SCI	0.4	0.2			0.2												
	Vertebral column injury (VCI)	Cervical VCI	0.7	0.5	0.1	0.2												
		Thoracic/dorsal VCI	0.7	0.6	*	*												
		Lumbar VCI	1.4	1.1	*0.0	0.2												
		Sacrum coccyx VCI	0.1	0.1	*	*												
Spine, back, unspecified VCI		*	*	*	*													
Total VCI	2.9	2.3	0.1	0.5														
Total spine and back			3.3	2.5	0.1	0.5	0.2											
Torso	Torso	Chest/thorax	3.3	1.3	*	*	1.4	0.2			*0.0	0.3	*	0.1	--			
		Abdomen	1.9				1.5	0.2			*	0.1		*0.1	*			
		Pelvis/urogenital	2.4	2.0	*	0.2	0.1	0.1			*	*	*	*	*			
		Trunk	0.3	*				*					*0.1	--	*0.1	--		0.2
		Back and buttocks	0.3			*			*0.0				0.1	--	0.1	--		
	Total torso	8.2	3.3	*	0.2	3.0	0.5				0.0	0.6	*	0.3	*		0.2	
Extremities	Upper	Shoulder and upper arm	3.7	2.6	0.1	0.8		0.1		*		*0.1	*	*0.0			*	
		Forearm and elbow	2.6	2.3	*	*		0.2		*		*	*	0.1				
		Wrist, hand, and fingers	1.7	0.5	*0.1	*		0.6	0.2			*0.0	*0.0	0.2			*	
		Other and unspecified	0.3	*				*	*		0.1	*	*	*0.1	0.1		*	
		Total upper extremity	8.4	5.5	0.2	0.8		0.9	0.2		0.1	0.1	*0.0	0.4	0.1		*0.0	
	Lower	Hip	12.2	11.7	0.1	0.1						0.3	*	--				
		Upper leg and thigh	2.2	2.1	--	--				*		0.1	*	0.1				
		Knee	1.1	0.5	0.2	0.3						0.1	*	*				
		Lower leg and ankle	6.9	6.5	*	0.2				*		0.1	*	0.1				
		Foot and toes	1.3	0.8	*	*			0.2	*0.0		*0.0	*	0.2				
Total lower extremity	25.0	21.5	0.4	0.9		0.8	0.0		*0.1	0.6	*0.1	0.5			0.1			
Total extremities			33.3	27.0	0.6	1.6		1.7	0.3	0.2	0.8	0.1	0.9	0.1	0.1	0.1		
Unclassifiable by site	Other and unspecified	Other multiple	*0.0	*							*			*	*			
		Unspecified sites	1.4	*	*	0.1	*	*0.1		*		0.3	--	0.8	*		0.1	
		Total other and unspecified	1.4	*	*	0.1	*	*0.1		*		0.3	--	0.8	*		0.1	
		System wide and late effects	8.7															
Total unclassifiable by site			10.1	*	*	0.1	*	*0.1		*	0.3	--	0.8	*	0.1	0.1		

-- Quantity zero * Figure does not meet standard of reliability or precision ("Appendix A," Standards of reliability). Empty cells = No diagnosis codes.

¹Nature of injury figures do not add to total because total includes system wide and late effects. The column totals are derived by summing the totals for each body region.

NOTES: Rates per 10,000 civilian residential population. Rates are not age adjusted. Numbers may not add to totals because of rounding. See "Appendix B" for the ICD-9-CM codes in each category.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

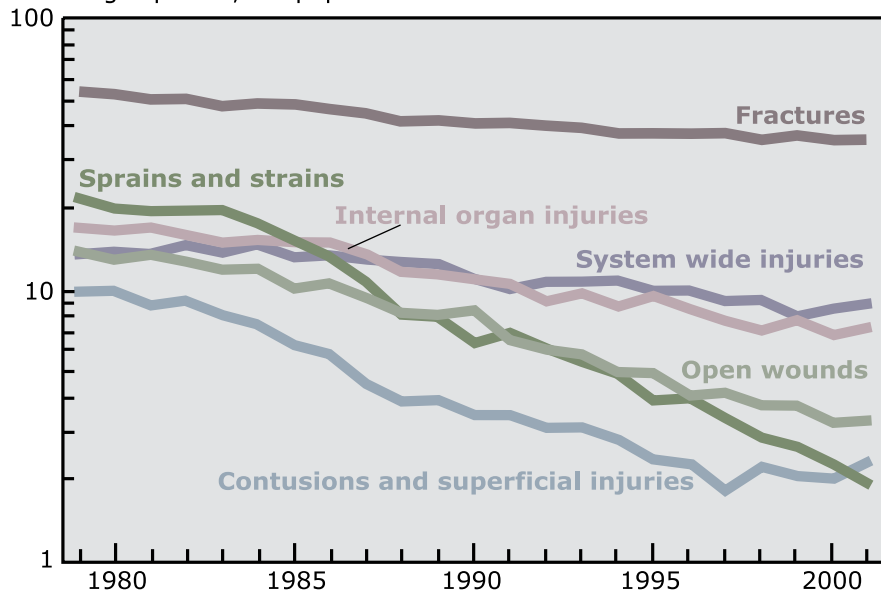
Discharges by Injury Diagnosis

One dimension of the Barell Matrix is the nature of injury. From 1979 to 2001 fractures, sprains and strains, open wounds, internal organ injuries, contusions and superficial injuries, and system wide injuries accounted for the vast majority of injury hospital discharges (87–94 percent). Throughout this time period, fracture discharge rates were higher than the rates for other leading injury diagnoses and declined on average only 2 percent per year (for a total decrease of 36 percent) to a rate of 35.4 per 10,000 population in 2001.

From 1979 to 2001 the rate for sprains and strains decreased more than did the rates for other types of injuries, an average of 11.1 percent per year (for a total decrease of 92 percent) to a rate of 1.9 per 10,000 population in 2001. Open wounds and contusion/superficial injury discharge rates, decreased on average 7.1 and 8.2 percent per year respectively (for total decreases of 80 and 85 percent), to rates of 3.3 and 2.3 per 10,000 population in 2001. System wide and internal organ injury discharge rates decreased on average 2.8 and 4.5 percent per year, respectively (for total decreases of 46 and 64 percent), to 9.0 and 7.3 per 10,000 population in 2001.

Figure 9. Hospital discharge rates by nature of injury diagnosis, 1979-2001

Discharges per 10,000 population



NOTES: Data are plotted on the log scale. See data table for data points graphed and additional notes. Discharge rates are age adjusted using the 2000 standard population (["Appendix A," Age adjustment](#)). System wide injuries include poisoning, toxic effects, foreign bodies, early complications of trauma, other and unspecified effects of external causes, late effects of injury, poisoning, toxic effects, and other external causes, and child and adult maltreatment. See ["Appendix B"](#) for the ICD-9-CM diagnosis codes in each category.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Data table for figure 9. Injury hospital discharges by nature of injury diagnosis, 1979-2001

Year	Fractures			System wide injuries			Sprains and strains			Internal organ injuries			Open wounds			Contusions and superficial injuries		
	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	1,180	54.2	2.9	309	13.6	0.9	469	21.8	1.4	395	16.8	1.1	322	13.9	0.9	222	10.0	0.7
1980	1,163	52.6	3.0	319	13.9	1.0	438	20.0	1.3	386	16.4	1.1	304	13.0	0.9	221	9.8	0.7
1981	1,138	50.9	3.1	310	13.4	1.0	433	19.5	1.3	408	17.1	1.2	316	13.5	1.0	202	8.7	0.7
1982	1,132	50.2	2.6	339	14.6	0.9	444	19.7	1.2	380	15.9	1.0	302	12.7	0.8	212	9.2	0.6
1983	1,090	47.8	2.0	323	13.8	0.7	444	19.5	1.0	358	14.9	0.8	287	12.0	0.6	187	8.1	0.5
1984	1,114	48.4	1.6	346	14.7	0.6	406	17.6	0.7	368	15.2	0.6	290	12.0	0.5	173	7.4	0.4
1985	1,129	48.5	1.7	316	13.3	0.6	355	15.2	0.7	361	14.9	0.6	246	10.1	0.5	148	6.3	0.3
1986	1,100	46.8	1.5	323	13.4	0.6	310	13.1	0.6	369	15.0	0.6	257	10.4	0.5	138	5.7	0.3
1987	1,062	44.6	1.5	317	13.0	0.6	257	10.7	0.5	337	13.6	0.6	230	9.2	0.4	110	4.5	0.2
1988	1,014	42.1	2.1	314	12.8	0.6	192	8.0	0.6	289	11.7	0.7	205	8.2	0.5	96	3.9	0.3
1989	1,021	42.0	2.1	308	12.4	0.6	189	7.8	0.7	288	11.5	0.6	204	8.1	0.5	96	3.9	0.3
1990	1,017	41.1	1.9	281	11.0	0.5	160	6.5	0.4	278	10.9	0.6	217	8.3	0.5	87	3.5	0.3
1991	1,034	41.3	2.0	259	10.0	0.5	171	6.9	0.5	269	10.4	0.8	170	6.5	0.4	88	3.5	0.3
1992	1,016	40.0	2.1	279	10.7	0.6	154	6.2	0.4	238	9.2	0.5	158	6.0	0.3	80	3.1	0.3
1993	1,017	39.5	2.3	281	10.8	0.5	140	5.5	0.4	250	9.6	0.7	152	5.8	0.5	80	3.1	0.3
1994	987	38.0	1.9	282	10.7	0.6	124	4.9	0.4	230	8.8	0.5	133	5.0	0.3	73	2.8	0.3
1995	988	37.6	1.9	267	10.0	0.5	102	3.9	0.3	250	9.4	0.6	131	4.9	0.4	63	2.4	0.3
1996	1,012	38.2	1.8	266	9.8	0.5	104	4.0	0.4	228	8.5	0.6	111	4.1	0.3	61	2.3	0.2
1997	1,008	37.6	1.8	248	9.1	0.4	89	3.4	0.3	210	7.8	0.5	113	4.2	0.3	49	1.8	0.2
1998	966	35.7	1.6	250	9.1	0.6	77	2.8	0.3	195	7.2	0.5	102	3.7	0.3	60	2.2	0.2
1999	1,002	36.8	2.1	224	8.1	0.4	72	2.6	0.3	214	7.8	0.5	104	3.8	0.3	57	2.1	0.2
2000	982	35.7	2.0	239	8.6	0.5	64	2.3	0.2	189	6.8	0.5	89	3.2	0.3	55	2.0	0.2
2001	999	35.4	1.9	255	9.0	0.5	55	1.9	0.2	207	7.3	0.5	94	3.3	0.3	66	2.3	0.3
Average annual percent change		-2.0			-2.8			-11.1			-4.5			-7.1			-8.2	
Average percent change		-35.6			-45.9			-92.5			-63.8			-80.3			-84.9	

SE is standard error.

NOTES: Discharge rates are age adjusted using the 2000 standard population ("[Appendix A](#)", [Age adjustment](#)). These rates exclude all other injuries. See Appendix table 9a for number of all other injury discharges.

System wide injuries include poisoning, toxic effects, foreign bodies, early complications of trauma, other and unspecified effects of external causes, late effects of injury, poisoning, toxic effects, and other external causes, and child and adult maltreatment.

See "[Appendix B](#)" for the ICD-9-CM diagnosis codes in each category.

Average annual percent change is from 1979-2001 ("[Appendix A](#)," [Test of trend](#)).

Average percent change is for 1979-2001 ("[Appendix A](#)," [Average percent change over time](#)).

Rate per 10,000 civilian resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Appendix table 9a. Percent distribution of injury hospital discharges by nature of injury diagnosis, 1979-2001

Year	Fractures			System wide injuries			Sprains and strains			Internal organ injuries			Open wounds			All other injuries		
	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE
1979	1,180	35.7	1.0	309	9.4	0.5	469	14.2	0.6	395	12.0	0.5	322	9.8	0.5	627	19.0	0.7
1980	1,163	35.9	1.0	319	9.8	0.5	438	13.5	0.6	386	11.9	0.6	304	9.4	0.5	634	19.6	0.8
1981	1,138	35.6	0.9	310	9.7	0.4	433	13.5	0.5	408	12.8	0.5	316	9.9	0.4	594	18.6	0.7
1982	1,132	35.7	0.9	339	10.7	0.5	444	14.0	0.5	380	12.0	0.5	302	9.5	0.4	574	18.1	0.6
1983	1,090	35.9	0.8	323	10.6	0.4	444	14.6	0.5	358	11.8	0.4	287	9.4	0.4	537	17.7	0.6
1984	1,114	36.8	0.7	346	11.4	0.4	406	13.4	0.4	368	12.1	0.4	290	9.6	0.3	506	16.7	0.5
1985	1,129	39.7	0.7	316	11.1	0.4	355	12.5	0.4	361	12.7	0.4	246	8.6	0.3	440	15.5	0.4
1986	1,100	40.1	0.7	323	11.8	0.4	310	11.3	0.4	369	13.4	0.4	257	9.4	0.3	384	14.0	0.4
1987	1,062	41.9	0.7	317	12.5	0.4	257	10.1	0.4	337	13.3	0.4	230	9.1	0.3	334	13.2	0.4
1988	1,014	43.7	0.8	314	13.5	0.6	192	8.3	0.4	289	12.5	0.6	205	8.8	0.4	305	13.2	0.5
1989	1,021	44.2	0.7	308	13.3	0.5	189	8.2	0.5	288	12.5	0.5	204	8.8	0.4	299	13.0	0.5
1990	1,017	45.9	0.9	281	12.7	0.5	160	7.2	0.3	278	12.5	0.6	217	9.8	0.4	262	11.8	0.6
1991	1,034	47.7	1.1	259	12.0	0.5	171	7.9	0.5	269	12.4	0.8	170	7.9	0.4	264	12.2	0.5
1992	1,016	48.9	1.1	279	13.4	0.6	154	7.4	0.4	238	11.4	0.5	158	7.6	0.4	234	11.2	0.6
1993	1,017	49.0	1.1	281	13.5	0.6	140	6.7	0.4	250	12.1	0.6	152	7.3	0.6	236	11.4	0.6
1994	987	50.3	0.9	282	14.4	0.6	124	6.3	0.4	230	11.7	0.6	133	6.8	0.3	208	10.6	0.5
1995	988	51.1	1.0	267	13.8	0.5	102	5.3	0.4	250	12.9	0.7	131	6.8	0.4	195	10.1	0.6
1996	1,012	53.7	0.8	266	14.1	0.5	104	5.5	0.4	228	12.1	0.6	111	5.9	0.4	165	8.7	0.5
1997	1,008	55.3	1.0	248	13.6	0.5	89	4.9	0.4	210	11.5	0.6	113	6.2	0.4	153	8.4	0.5
1998	966	53.9	1.1	250	14.0	0.6	77	4.3	0.4	195	10.9	0.7	102	5.7	0.3	201	11.2	1.0
1999	1,002	55.1	1.3	224	12.3	0.6	72	4.0	0.4	214	11.8	0.6	104	5.7	0.4	202	11.1	1.1
2000	982	55.9	1.2	239	13.6	0.7	64	3.6	0.3	189	10.7	0.5	89	5.1	0.4	193	11.0	1.0
2001	999	55.1	1.5	255	14.1	0.6	55	3.0	0.2	207	11.4	0.6	94	5.2	0.5	205	11.3	1.2
Average annual percent change	2.6			1.7			-6.7			-0.4			-2.8			-4.0		
Average percent change	74.2			44.1			-78.4			-8.4			-47.0			-59.1		

SE is standard error.

NOTES: System wide injuries include poisoning, toxic effects, foreign bodies, early complications of trauma, other and unspecified effects of external causes, late effects of injury, poisoning, toxic effects, and other external causes, and child and adult maltreatment.

See "Appendix B" for the ICD-9-CM diagnosis codes in each category.

Average annual percent change is from 1979-2001 ("Appendix A," Test of trend).

Average percent change is for 1979-2001 ("Appendix A," Average percent change).

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Appendix table 9b. Internal organ injury hospital discharges among males by age, 1979-2001

Year	Under 15 years			15-24 years			25-44 years			45-64 years			65 years and over		
	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	64	24.5	2.2	85	41.2	3.6	65	21.9	2.0	26	12.5	1.4	13	12.8	1.7
1980	57	21.7	2.1	76	36.6	3.4	64	20.8	2.0	28	13.4	1.5	18	17.4	2.2
1981	54	20.7	1.9	93	45.4	3.8	63	20.1	1.8	30	14.2	1.4	20	19.4	2.0
1982	58	22.1	1.3	73	35.9	2.9	74	22.7	1.9	24	11.4	1.2	16	15.3	1.7
1983	55	21.0	1.7	69	34.8	2.6	64	18.9	1.4	27	12.6	1.2	17	15.4	1.7
1984	53	19.9	1.3	67	33.9	2.1	68	19.7	1.2	21	9.9	0.8	18	16.0	1.4
1985	46	17.6	1.2	64	32.8	2.1	67	18.8	1.2	32	14.9	1.1	21	18.2	1.6
1986	50	19.0	1.2	73	37.7	2.2	72	19.6	1.2	25	11.6	0.9	19	16.2	1.4
1987	48	18.2	1.2	69	36.0	2.2	73	19.5	1.2	23	10.7	0.9	17	14.7	1.3
1988	36	13.4	1.7	54	28.8	3.4	53	14.0	1.1	26	11.7	1.5	16	13.3	2.1
1989	38	14.1	2.3	49	26.5	2.4	62	16.0	1.6	16	7.3	0.9	23	18.3	2.3
1990	28	9.9	1.4	48	25.6	2.3	64	15.9	1.6	23	10.2	1.2	17	13.8	1.9
1991	24	8.3	1.1	42	22.4	2.2	65	16.0	1.8	24	10.5	1.4	20	16.0	2.4
1992	26	8.8	1.2	41	22.2	2.0	48	11.6	1.1	21	9.2	1.2	21	16.3	2.2
1993	26	8.6	1.4	42	22.9	3.6	51	12.4	1.2	21	8.7	1.1	29	22.2	3.3
1994	23	7.8	1.2	34	18.5	1.8	51	12.4	1.4	24	9.8	1.2	23	17.5	2.5
1995	26	8.4	1.5	36	19.4	2.0	51	12.2	1.3	27	10.6	1.7	25	18.0	2.8
1996	21	6.8	1.0	31	16.7	2.1	46	11.0	1.2	25	9.4	1.2	31	22.6	3.4
1997	16	5.2	0.9	33	17.2	2.3	44	10.5	1.3	28	10.3	1.1	20	14.0	1.8
1998	16	5.1	1.0	29	14.8	2.0	37	8.9	1.0	23	8.4	1.3	20	14.1	2.0
1999	14	4.7	0.8	30	15.1	1.8	44	10.6	1.2	23	8.2	1.1	24	17.2	2.0
2000	18	5.8	1.1	27	13.4	1.8	39	9.5	1.2	18	6.0	0.8	23	15.9	2.0
2001	14	4.5	0.8	29	14.4	1.8	37	8.9	1.0	26	8.3	1.0	28	19.0	2.1
Average annual percent change		-7.9			-5.3			-4.4			-2.5			**0.4	
Average percent change		-83.5			-69.8			-62.5			-42.5			**8.0	

SE is standard error.

**Not significant.

NOTES: See "Appendix B" for the ICD-9-CM diagnosis codes.

Average annual percent change is from 1979-2001 ("Appendix A," Test of trend).

Average percent change is for 1979-2001 ("Appendix A," Average percent change over time).

Rate per 10,000 civilian resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Appendix table 9c. Internal organ injury hospital discharges among females by age, 1979-2001

Year	Under 15 years			15-24 years			25-44 years			45-64 years			65 years and over		
	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	34	13.3	1.4	38	18.0	1.9	34	11.0	1.2	19	8.2	1.0	17	11.4	1.4
1980	31	12.4	1.4	38	17.9	1.9	39	12.1	1.3	18	7.6	1.0	19	12.2	1.6
1981	40	16.0	1.5	34	16.4	1.6	31	9.3	0.9	18	7.9	0.8	24	15.0	1.5
1982	26	10.3	1.0	31	15.3	1.5	37	10.9	1.0	17	7.5	0.8	22	14.0	1.5
1983	23	9.3	0.9	30	15.0	1.4	33	9.5	0.9	18	7.8	0.8	21	13.0	1.3
1984	27	10.6	0.8	37	18.4	1.3	35	9.6	0.7	18	7.6	0.7	26	15.4	1.2
1985	27	10.7	0.9	31	15.7	1.2	34	9.3	0.7	16	6.8	0.6	24	14.0	1.2
1986	20	8.0	0.7	29	14.8	1.1	34	9.0	0.6	18	7.7	0.7	29	16.9	1.3
1987	20	7.8	0.7	25	13.2	1.1	27	7.1	0.6	13	5.4	0.5	22	12.2	1.0
1988	18	7.1	1.1	26	14.2	2.0	26	6.5	0.9	16	6.7	1.0	18	9.9	1.4
1989	24	9.1	1.3	20	11.1	1.5	28	7.0	1.0	13	5.6	0.9	15	8.3	1.2
1990	12	4.3	0.7	22	12.0	1.5	26	6.4	0.8	14	5.7	1.0	23	12.6	1.4
1991	13	4.8	0.9	17	9.1	1.5	32	7.8	1.5	10	4.2	0.7	22	11.5	1.5
1992	11	3.9	0.7	15	8.3	1.3	17	4.1	0.6	10	3.9	0.7	28	14.6	1.6
1993	13	4.7	0.9	12	6.7	1.0	18	4.2	0.7	15	5.9	0.8	22	11.5	1.5
1994	*7	*2.4	*0.5	12	6.5	1.2	19	4.4	0.6	13	4.8	0.9	24	12.4	1.8
1995	10	3.4	0.6	17	9.5	2.1	22	5.3	0.8	11	4.0	0.7	26	13.3	1.4
1996	*9	*3.0	*0.5	12	6.5	1.0	18	4.2	0.6	9	3.3	0.6	27	13.5	1.6
1997	*7	*2.3	*0.5	12	6.4	1.0	13	3.2	0.5	11	3.7	0.7	27	13.8	1.8
1998	*9	*3.0	*0.8	10	5.4	1.0	14	3.3	0.5	12	3.9	0.7	27	13.3	1.6
1999	*8	*2.8	*0.5	10	5.1	0.8	21	5.0	0.7	11	3.5	0.6	29	14.6	1.9
2000	*7	*2.3	*0.6	*7	*3.6	*0.7	10	2.4	0.4	10	3.3	0.6	30	15.0	2.0
2001	*7	*2.5	*0.6	10	5.1	1.5	15	3.5	0.5	11	3.4	0.6	30	14.5	1.5
Average annual percent change		-8.8			-6.5			-6.2			-4.4			**0.0	
Average percent change		-86.8			-77.2			-75.6			-63.2			**0.0	

SE is standard error.

*Figure does not meet standard of reliability or precision (["Appendix A," Standards of reliability](#)).

**Not significant.

NOTES: See ["Appendix B"](#) for the ICD-9-CM diagnosis codes.

Average annual percent change is from 1979-2001 (["Appendix A," Test of trend](#)).

Average percent change is for 1979-2001 (["Appendix A," Average percent change over time](#)).

Rate per 10,000 civilian resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Appendix table 9d. Percent distribution of system wide injury hospital discharges by diagnosis, 1979-2001

Year	Poisoning			Toxic Effects			Foreign Body			Other system wide injuries		
	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE	Number in thousands	Percent	Percent SE
1979	155	50.1	1.8	55	17.6	1.2	35	11.4	0.9	65	20.9	1.3
1980	148	46.4	1.9	55	17.3	1.2	36	11.2	0.9	80	25.0	1.5
1981	145	46.7	1.5	45	14.4	0.9	37	11.9	0.8	84	27.1	1.2
1982	166	49.0	1.6	53	15.5	0.7	34	10.2	0.7	86	25.3	1.2
1983	151	46.8	1.5	55	16.9	1.0	40	12.3	0.8	77	23.9	1.2
1984	169	48.7	1.3	60	17.3	0.8	44	12.7	0.7	74	21.3	0.9
1985	175	55.4	1.3	52	16.4	0.8	36	11.5	0.7	53	16.7	0.8
1986	185	57.3	1.3	54	16.7	0.8	36	11.1	0.6	48	14.9	0.8
1987	192	60.5	1.2	48	15.1	0.8	32	10.0	0.6	46	14.4	0.8
1988	190	60.5	2.4	36	11.3	1.1	29	9.3	1.1	59	18.9	2.4
1989	200	65.0	1.8	38	12.3	1.0	27	8.7	1.0	43	14.0	1.3
1990	176	62.4	1.8	42	14.9	1.1	30	10.7	1.0	34	12.0	1.1
1991	164	63.3	1.9	40	15.6	1.4	21	8.0	0.9	34	13.1	1.1
1992	179	64.1	2.1	40	14.3	1.9	24	8.7	1.0	36	13.0	1.1
1993	191	68.0	1.8	32	11.3	1.2	18	6.6	1.0	39	14.1	1.4
1994	193	68.4	2.1	33	11.8	1.7	21	7.6	1.0	34	12.2	1.3
1995	186	69.5	1.8	30	11.3	1.2	23	8.5	1.1	28	10.6	1.2
1996	176	66.3	2.3	32	12.2	1.5	19	7.2	1.0	38	14.3	1.6
1997	167	67.3	1.7	30	12.0	1.1	18	7.4	0.7	33	13.3	1.6
1998	172	68.8	2.0	26	10.3	1.2	17	6.8	0.8	35	14.1	1.4
1999	158	70.6	1.7	24	10.7	1.1	16	7.2	0.9	26	11.5	1.2
2000	170	71.0	1.7	22	9.4	1.2	20	8.5	1.0	27	11.1	1.2
2001	178	69.9	2.1	28	11.2	1.4	19	7.5	1.2	29	11.5	1.3
Average annual percent change		2.0			-2.3			-2.7			-4.3	
Average percent change		54.9			-40.6			-45.0			-62.1	

SE is standard error.

NOTES: See "Appendix B" for ICD-9-CM diagnosis codes in each category.
 Average annual percent change is from 1979-2001 ("Appendix A," Test of trend).
 Average percent change is for 1979-2001 ("Appendix A," Average percent change).

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Fractures

From 1979 to 2001 fracture hospital discharge rates for all male and female age groups under 65 years of age declined, with average decreases ranging from 2.2 to 5.6 percent per year (for total declines ranging from 39 to 72 percent). Neither the rates for males or females 65 and over changed significantly over the 22 years.

For persons 45–64 years of age, the fracture hospital discharge rates were similar for males and females. For persons under 45 years of age, males generally had higher discharge rates for fractures than females. Females 65 years of age and over had the highest discharge rates for fractures.

Figure 10. Fracture hospital discharge rates among males by age, 1979-2001

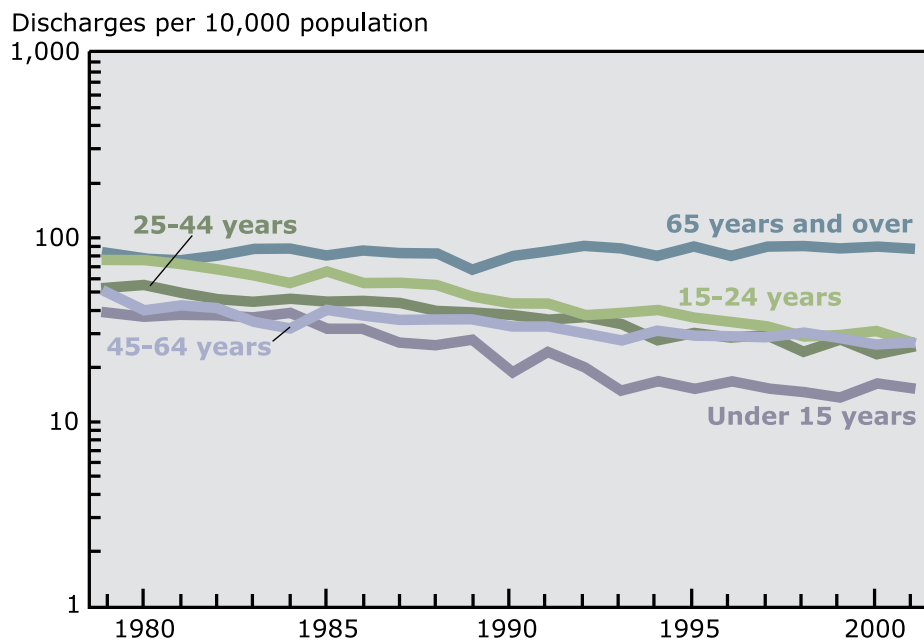
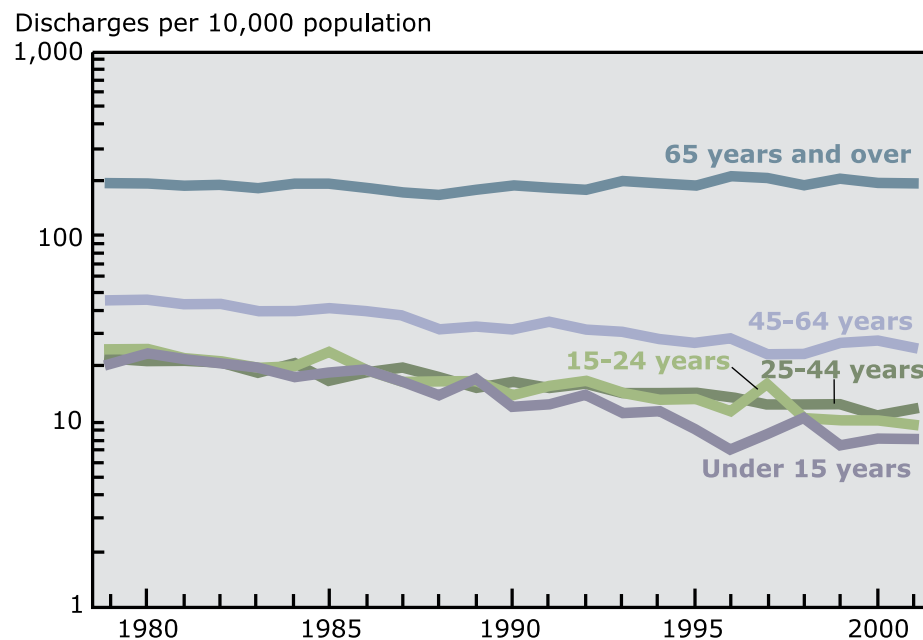


Figure 11. Fracture hospital discharge rates among females by age, 1979-2001



NOTES: Data are plotted on the log scale. See data table for data points graphed and additional notes. See "Appendix B" for the ICD-9-CM diagnosis codes for fractures.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Data table for figure 10. Fracture hospital discharges among males by age, 1979-2001

Year	Under 15 years			15-24 years			25-44 years			45-64 years			65 years and over		
	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	103	39.1	3.2	156	75.6	5.8	159	53.8	4.1	107	50.9	4.2	84	83.0	7.2
1980	97	36.8	3.2	154	74.4	6.0	167	54.6	4.3	85	40.4	3.6	80	77.3	7.1
1981	101	38.4	3.2	146	71.3	5.6	158	49.9	3.9	89	42.3	3.5	80	76.0	6.5
1982	101	38.3	2.9	138	67.9	4.9	152	46.5	3.3	89	42.0	3.3	86	80.2	6.4
1983	98	37.1	2.6	124	62.1	4.0	152	45.3	2.8	74	34.9	2.6	95	86.2	6.0
1984	102	38.7	2.2	111	56.3	3.1	162	46.7	2.3	68	32.3	2.0	98	87.8	4.9
1985	85	32.2	1.9	128	65.4	3.5	161	45.4	2.3	85	39.9	2.4	91	79.9	4.6
1986	86	32.5	1.8	109	56.3	3.0	165	45.0	2.2	81	37.9	2.2	99	85.2	4.7
1987	72	27.0	1.7	109	56.9	3.2	165	44.1	2.2	76	35.6	2.2	97	81.5	4.7
1988	71	26.6	2.9	104	55.3	5.7	154	40.3	3.4	79	36.2	3.0	98	81.2	7.1
1989	77	28.1	3.2	88	47.6	4.0	153	39.4	3.1	80	36.3	3.1	83	67.6	6.3
1990	54	18.9	2.0	83	44.1	2.9	155	38.5	2.2	74	33.4	3.1	99	79.2	5.4
1991	70	24.0	2.4	82	44.1	3.4	148	36.0	2.5	75	33.3	3.3	107	83.8	6.8
1992	59	20.0	2.2	70	37.8	3.1	150	36.5	2.5	71	30.5	2.2	115	88.4	8.0
1993	45	14.8	1.6	73	39.7	3.5	142	34.4	2.8	66	27.8	2.8	114	85.9	8.1
1994	50	16.6	1.8	74	40.1	3.6	117	28.1	2.0	77	31.2	2.4	108	80.4	5.7
1995	47	15.3	2.4	69	37.1	3.1	127	30.3	2.5	74	29.5	2.2	122	89.9	7.3
1996	51	16.6	2.0	65	34.7	3.1	120	28.6	2.0	76	29.4	2.6	109	78.6	4.8
1997	47	15.3	1.9	63	33.1	2.9	122	29.1	2.4	76	28.3	2.4	126	90.4	6.6
1998	45	14.6	1.8	57	29.8	2.4	101	24.2	1.8	84	30.2	3.0	127	89.9	7.0
1999	42	13.6	2.0	58	29.6	2.8	115	27.7	2.2	81	28.4	2.6	123	86.5	6.5
2000	50	16.3	2.8	62	31.1	3.3	97	23.5	2.0	77	26.0	1.9	128	88.6	7.0
2001	48	15.5	2.0	54	27.0	2.6	108	25.9	2.0	85	27.2	2.5	127	87.2	7.1
Average annual percent change		-5.6			-4.7			-3.7			-2.2			**0.3	
Average percent change		-72.1			-65.0			-57.0			-39.2			**7.8	

SE is standard error.

** Not significant.

NOTES: See "Appendix B" for the ICD-9-CM diagnosis codes.
 Average annual percent change is from 1979-2001 ("Appendix A," Test of trend).
 Average percent change is for 1979-2001 ("Appendix A," Average percent change over time).
 Rate per 10,000 civilian resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.

Data table for figure 11. Fracture hospital discharges among females by age, 1979-2001

Year	Under 15 years			15-24 years			25-44 years			45-64 years			65 years and over		
	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	53	20.9	2.0	52	24.8	2.4	68	21.9	2.0	108	46.3	3.8	291	194.4	13.3
1980	59	23.5	2.3	52	24.7	2.5	67	21.1	2.0	107	46.0	4.0	295	192.3	13.7
1981	54	21.6	1.9	46	22.0	2.0	70	21.1	1.8	102	43.6	3.6	292	186.6	13.4
1982	52	20.8	1.7	44	21.5	1.9	70	20.7	1.7	100	42.9	3.3	300	187.4	11.9
1983	49	19.7	1.6	39	19.5	1.7	64	18.3	1.4	93	40.0	2.8	302	184.1	9.8
1984	44	17.6	1.2	40	20.2	1.4	74	20.6	1.2	92	39.7	2.3	321	192.5	8.3
1985	47	18.5	1.3	47	23.7	1.6	62	16.7	1.1	96	41.2	2.4	328	192.6	8.4
1986	48	19.1	1.3	36	18.7	1.3	71	18.6	1.1	92	39.5	2.2	314	180.5	7.6
1987	42	16.4	1.2	32	16.7	1.3	76	19.6	1.2	87	37.4	2.2	307	173.2	7.7
1988	35	13.7	1.4	31	16.5	1.9	68	17.3	1.7	75	31.6	2.2	300	166.3	8.3
1989	44	16.8	2.4	30	16.5	2.1	61	15.2	1.4	78	32.6	3.6	329	179.2	9.1
1990	33	12.1	1.4	26	13.9	1.5	68	16.4	1.4	75	31.5	2.8	350	189.6	10.5
1991	34	12.3	1.6	28	15.4	1.7	63	15.0	1.4	83	34.4	2.6	346	184.5	10.7
1992	39	13.7	1.7	30	16.3	1.9	67	16.0	1.5	78	31.2	2.4	339	178.1	10.8
1993	32	11.2	1.7	26	14.4	1.6	61	14.5	1.2	78	30.5	2.6	381	197.5	13.4
1994	33	11.6	1.4	24	13.1	1.8	60	14.2	1.4	73	28.0	2.0	372	191.3	12.7
1995	27	9.1	1.2	24	13.2	1.7	60	14.1	1.3	72	27.0	2.3	366	186.8	11.2
1996	21	7.1	1.1	20	11.3	1.4	57	13.5	1.2	78	28.3	2.2	415	209.9	12.4
1997	25	8.6	1.5	29	16.2	2.6	53	12.4	1.1	65	23.0	1.6	401	202.3	11.8
1998	31	10.6	1.4	20	10.6	1.6	53	12.6	1.0	68	23.0	1.9	381	190.5	8.8
1999	22	7.4	1.1	19	10.3	1.4	53	12.5	1.3	81	26.5	3.1	408	204.1	13.5
2000	24	8.1	1.4	20	10.3	1.5	45	10.7	1.1	87	27.6	2.7	394	196.0	12.9
2001	24	8.2	1.3	19	9.7	1.7	49	11.7	1.4	83	24.9	2.1	401	193.6	11.9
Average annual percent change		-5.2			-4.1			-3.0			-3.2			**0.3	
Average percent change		-68.8			-60.0			-48.9			-51.2			**7.1	

SE is standard error.

**Not significant.

NOTES: See "Appendix B" for the ICD-9-CM diagnosis codes.

Average annual percent change is from 1979-2001 ("Appendix A," Test of trend).

Average percent change is for 1979-2001 ("Appendix A," Average percent change over time).

Rate per 10,000 civilian resident population.

SOURCE: Centers for Disease Control and Prevention, National Center for Health Statistics, National Hospital Discharge Survey.