Injury and Noninjury Discharges

Injury discharges accounted for 6 percent (1.8 million) of all short-stay hospital discharges in 2001, down from 9 percent (3.3 million) in 1979. From 1979 to 2001 the discharge rate for injuries decreased on average 4.3 percent per year (for a total decrease of 62 percent) to 64.2 per 10,000 population.

Complications of care and adverse effects accounted for 1 percent of all short-stay hospital discharges in 1979 and 2 percent in 2001. The discharge rate for complications of care and adverse effects increased on average 2.4 percent per year (for a total increase of 68 percent) to 28.2 per 10,000 population. All other non-injury discharges decreased on average 2.2 percent per year (for a total decrease of 39 percent) to 1062.2 per 10,000 population.

Complications of care and adverse effects have come under increased scrutiny since 1999 when the Institute of Medicine published its report, To Err Is Human: Building a Safer Health System (1). Numerous research projects focusing on complications of care and adverse effects have been completed or are currently underway (2–6). Throughout the remainder of this report, the State and Territorial Injury Prevention Directors Association (STIPDA) definition of injuries, which excludes complications of care and adverse effects, will be used.

Figure 1. Number of hospital discharges by first-listed diagnosis, 1979-2001

Number of discharges in thousands

1980

1985

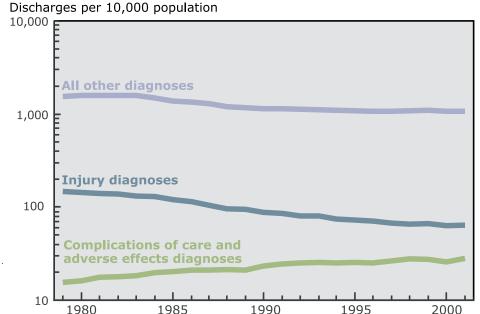
All other diagnoses care and adverse effects diagnoses 20,000 - 1

1990

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- Thomas EJ, Studdert DM, Burstin HR et al. Incidence and types of adverse events and negligent care in Utah and Colorado. Medical Care 38(3):261–71. 2000.
- Agency for Healthcare Research and Quality. HHS Announces \$50 Million Investment to Improve Patient Safety. Press Release, October 11, 2001, Rockville, Maryland. http:// www.ahrq.gov/news/press/pr2001/patsafpr.htm
- Carolyn M Clancy, M.D., Testimony on Patient Safety: Supporting a Culture of Continuous Quality Improvement in Hospitals and Other Health Care Organizations before the Senate Permanent Subcommittee on Investigations, Committee on Governmental Affairs, June 11, 2003.
- Gawande AA, Zinner MJ, Studdert DM, Brennan TA. Analysis of errors reported by surgeons at three teaching hospitals. Surgery 133(6):614–21. 2003.

Figure 2. Hospital discharge rates by first-listed diagnosis, 1979-2001



NOTES: See "Table 1" for the ICD-9-CM codes in each category. See data table for data points graphed and additional notes. Figure 2 data are plotted on the log scale. Discharge rates are age adjusted using the 2000 standard population ("Appendix A," Age adjustment).

2000

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

1995

Data table for figures 1 and 2. Hospital discharges for injury and noninjury diagnoses, 1979-2001

								Noninjury diagnoses						
	All discharges Injury diagnoses						Complic and adverse	ations of ca		All other diagnoses				
Year	Number in	Rate	Rate			Number in	Rate	Rate	Number in Rate Rate					
	thousands	Rate	SE	thousands	Kate	SE	thousands	Kate	SE	thousands	Rate	SE		
1979	36,747	1,706.5	61.0	3,303	148.0	6.9	332	15.6	1.0	33,112	1542.8	55.7		
1980	37,832	1,734.3	65.2	3,244	143.7	7.1	349	16.2	1.1	34,239	1574.3	59.8		
1981	38,544	1,746.2	81.6	3,199	140.0	7.9	385	17.8	1.2	34,960	1588.4	74.6		
1982	38,593	1,729.2	61.2	3,171	137.9	6.3	398	18.1	1.1	35,025	1573.2	56.1		
1983	38,783	1,719.2	42.5	3,038	130.9	4.6	412	18.6	0.9	35,333	1569.8	39.2		
1984	37,162	1,630.9	32.9	3,029	129.2	3.7	443	19.8	0.8	33,690	1481.9	30.2		
1985	35,056	1,518.8	31.6	2,847	120.4	3.5	456	20.2	0.8	31,753	1378.2	29.0		
1986	34,256	1,466.6	29.1	2,743	114.7	3.2	482	21.0	0.8	31,031	1330.9	26.8		
1987	33,387	1,412.5	29.4	2,537	104.8	3.1	490	21.2	0.9	30,360	1286.5	27.1		
1988	31,146	1,302.4	40.3	2,320	95.2	3.9	497	21.2	1.2	28,330	1186.0	36.2		
1989	30,947	1,278.6	43.1	2,309	93.9	4.1	497	21.0	1.1	28,140	1163.7	39.1		
1990	30,788	1,249.3	31.7	2,214	88.1	3.3	560	23.3	1.1	28,014	1137.9	28.5		
1991	31,098	1,246.9	34.6	2,168	85.6	3.4	600	24.6	1.1	28,330	1136.7	31.2		
1992	30,951	1,224.9	33.8	2,079	81.1	3.2	622	25.1	1.3	28,250	1118.6	30.3		
1993	30,825	1,203.6	37.6	2,076	80.3	3.6	642	25.6	1.4	28,107	1097.7	33.9		
1994	30,843	1,191.3	35.7	1,965	75.3	3.1	641	25.2	1.3	28,238	1090.9	32.5		
1995	30,722	1,172.4	35.8	1,932	73.2	3.2	659	25.5	1.1	28,131	1073.7	32.6		
1996	30,545	1,152.8	33.8	1,886	70.8	3.0	664	25.3	1.3	27,995	1056.7	30.7		
1997	30,914	1,155.3	33.2	1,821	67.7	2.7	699	26.4	1.2	28,394	1061.2	30.4		
1998	31,827	1,175.7	35.1	1,792	66.0	2.7	748	27.9	1.2	29,286	1081.9	32.4		
1999	32,132	1,176.5	37.4	1,819	66.4	3.3	746	27.5	1.4	29,566	1082.6	33.6		
2000	31,706	1,149.1	44.2	1,757	63.6	3.1	710	25.8	1.2	29,239	1059.7	40.7		
2001	32,653	1,154.6	37.4	1,814	64.2	2.9	799	28.2	1.3	30,040	1062.2	34.3		
	annual change	-2.3			-4.3			2.4			-2.2			
•	percent	-39.8			-62.2			68.5			- 38.7			

NOTES: Discharge rates are age adjusted using the 2000 standard population ("Appendix A," Age adjustment).

See table 1 for the ICD-9-CM 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.

Injury Hospital Discharge Rates by Sex and Race

In 1979 the injury hospital discharge rate for males was 44 percent higher than the rate for females. From 1979 to the early 1990s the rate for males declined faster than the rate for females and by the mid-1990s the differences between the genders were no longer statistically significant.

From 1979 to 2001 injury hospital discharge rates for white and black males and females decreased on average 4.4 to 6.2 percent per year (for a total decrease of 63–75 percent). Black males had the highest injury hospital discharge rate.§

§The National Hospital Discharge Survey (NHDS) data on race of patient are incomplete largely because a number of hospitals providing automated data to NHDS did not include race data for any of their patients (Appendix table 4a). For 1979–2001, coding of race averaged 85 percent. A study of the limitations of the NHDS data on race found that race is more often missing for white persons. NHDS data on race should be interpreted cautiously when the differences among racial groups are small and/or not substantiated by other research (1).

Reference

 Kozak LJ. Underreporting of race in the National Hospital Discharge Survey. Advance data from vital and health statistics; no 265. Hyattsville, Maryland: National Center for Health Statistics. 1995.

Figure 3. Injury hospital discharge rates by sex, 1979-2001

Discharges per 10,000 population

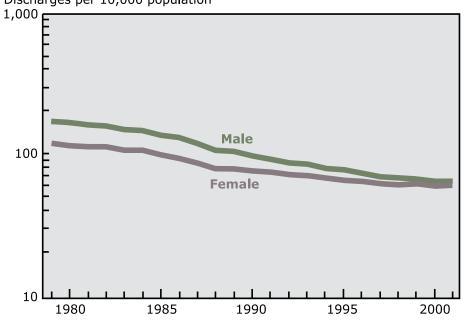
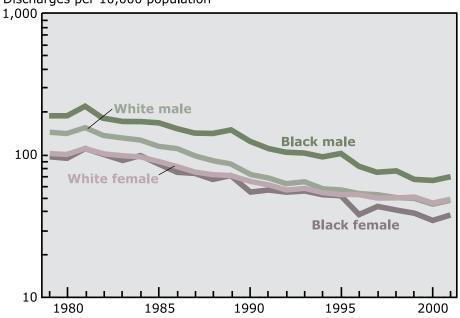


Figure 4. Injury hospital discharge rates by race and sex, 1979-2001

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).

Data table for figure 3. Injury hospital discharges by sex, 1979-2001

			Male		Female					
Year 	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	
1979	3,303	148.0	6.9	1,909	173.8	8.8	1,394	120.3	6.3	
1980	3,244	143.7	7.1	1,869	168.6	9.0	1,375	116.9	6.5	
1981	3,199	140.0	7.9	1,843	164.4	9.7	1,355	113.6	6.9	
1982	3,171	137.9	6.3	1,800	159.6	7.8	1,370	113.9	5.8	
1983	3,038	130.9	4.6	1,719	151.4	5.8	1,319	108.3	4.3	
1984	3,029	129.2	3.7	1,691	147.6	4.6	1,339	108.4	3.5	
1985	2,847	120.4	3.5	1,588	137.7	4.4	1,259	100.7	3.4	
1986	2,743	114.7	3.2	1,547	132.7	4.1	1,196	94.6	3.1	
1987	2,537	104.8	3.1	1,420	120.5	3.9	1,117	87.1	3.0	
1988	2,320	95.2	3.9	1,286	108.4	5.3	1,034	80.0	2.9	
1989	2,309	93.9	4.1	1,258	105.2	5.0	1,052	80.1	3.6	
1990	2,214	88.1	3.3	1,195	97.5	3.8	1,019	76.1	3.1	
1991	2,168	85.6	3.4	1,144	93.2	4.0	1,024	75.6	3.2	
1992	2,079	81.1	3.2	1,088	87.8	3.8	991	72.2	3.0	
1993	2,076	80.3	3.6	1,077	86.4	4.3	999	71.6	3.3	
1994	1,965	75.3	3.1	1,000	79.6	3.3	964	68.4	3.2	
1995	1,932	73.2	3.2	993	78.3	3.7	939	65.8	3.0	
1996	1,886	70.8	3.0	944	73.8	3.5	942	65.0	2.9	
1997	1,821	67.7	2.7	903	70.0	3.2	919	62.9	2.6	
1998	1,792	66.0	2.7	882	68.0	3.2	909	61.8	2.5	
1999	1,819	66.4	3.3	883	67.3	3.6	936	63.0	3.4	
2000	1,757	63.6	3.1	855	64.7	3.4	902	60.1	3.2	
2001	1,814	64.2	2.9	873	64.7	3.1	940	61.2	3.0	
Average		- 4.3			-5.1			-3.5		
Average percent change		-62.2			-68.1			-54.6		

NOTES: Discharge rates are age adjusted using the 2000 standard population ("Appendix A", Age adjustment). 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.

Data table for figure 4. Injury hospital discharges by race and sex, 1979-2001

	White male			ВІ	ack male		Whi	te female		Black female			
Year	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	1,381	144.5	7.6	224	190.6	13.6	1,038	102.4	5.7	130	98.0	7.8	
1980	1,357	141.2	7.8	226	189.6	14.2	1,037	101.2	5.9	127	94.6	7.9	
1981	1,506	155.4	9.3	267	219.9	28.7	1,159	111.6	6.9	152	110.7	15.4	
1982	1,343	138.3	7.0	227	183.0	18.8	1,075	102.8	5.4	138	100.3	11.2	
1983	1,285	131.9	3.9	217	171.0	9.8	1,046	98.8	3.0	126	91.6	5.9	
1984	1,247	127.4	3.0	225	171.5	8.0	1,051	98.0	2.4	142	98.4	5.1	
1985	1,136	115.4	2.8	216	168.0	8.0	974	89.9	2.3	127	87.4	4.7	
1986	1,100	111.0	2.7	207	154.3	7.1	915	83.6	2.1	112	76.5	4.0	
1987	991	99.2	2.6	197	141.6	6.9	837	75.7	2.0	110	73.7	4.1	
1988	923	92.0	5.3	198	142.7	16.4	817	73.4	3.5	104	67.9	5.3	
1989	874	86.7	4.8	209	151.0	17.0	806	71.3	3.8	109	70.9	5.7	
1990	753	73.4	3.4	186	124.2	12.0	750	64.9	3.4	89	54.8	5.2	
1991	707	69.0	3.8	165	110.8	11.4	720	61.7	3.4	92	57.2	5.3	
1992	651	62.8	3.8	162	104.9	9.5	677	57.4	3.5	92	55.1	5.6	
1993	678	65.0	4.1	156	103.1	11.3	699	58.0	3.5	93	56.3	5.2	
1994	604	57.5	3.2	152	96.9	10.9	668	55.1	3.5	88	52.6	5.0	
1995	597	56.4	3.7	165	102.9	10.7	647	52.7	3.3	88	51.5	4.7	
1996	573	53.6	3.3	135	82.6	9.9	660	53.0	2.8	66	38.0	3.6	
1997	572	53.0	3.2	123	76.0	9.0	624	49.7	2.8	75	43.4	3.7	
1998	552	50.9	3.0	123	77.9	7.4	625	49.7	2.7	72	41.5	4.1	
1999	546	49.9	3.3	111	67.4	7.3	644	50.6	3.4	69	38.9	4.0	
2000	497	45.3	3.0	107	65.8	7.2	596	46.5	3.1	60	34.6	4.1	
2001	532	47.9	2.9	114	70.7	7.8	627	48.4	2.7	67	38.1	3.6	
	e annual change	- 6.2			- 5.2			-4.4			- 5.2		
•	e percent	- 75.5			-69.0			- 62.9			- 68.9		

NOTES: Discharge rates are age adjusted using the 2000 standard population ("Appendix A," Age adjustment). Discharges for races other than white or black, or with race not stated, are not included in this table. 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.

Appendix table 4a. Number and percent reporting race among injury hospital discharges, 1979-2001

Year	Number reporting race in thousands	Percent reporting race	Percent SE
1979	2,774	84.0	0.9
1980	2,823	87.0	0.8
1981	3,199	100.0 ¹	
1982	2,871	90.5	0.6
1983	2,761	90.9	0.5
1984	2,758	91.1	0.4
1985	2,536	89.1	0.5
1986	2,424	88.4	0.5
1987	2,241	88.3	0.5
1988	2,126	91.7	1.6
1989	2,064	89.4	1.6
1990	1,843	83.2	2.1
1991	1,753	80.9	2.4
1992	1,644	79.1	2.6
1993	1,698	81.8	2.4
1994	1,588	80.8	2.7
1995	1,570	81.2	2.7
1996	1,517	80.4	2.7
1997	1,468	80.6	2.9
1998	1,456	81.3	2.5
1999	1,461	80.3	2.7
2000	1,317	75.0	3.0
2001	1,406	77.5	3.0

SE is standard error.

NOTE: The National Hospital Discharge Survey data on race are incomplete largely because a number of hospitals providing automated data to the National Hospital Discharge Survey did not include race data for any of their patients.

⁻⁻⁻ Category not applicable

 $^{^1\}mathrm{In}$ 1981 "not stated" values were imputed for approximately 11 percent of total records so there are no "race not stated" cases that year.

Injury Hospital Discharge Rates by Sex and Age

From 1979 to 2001 injury hospital discharge rates for all age groups under 65 years of age decreased on average from 4.7 to 6.5 percent per year (for a total decrease of 66–77 percent) for males and females, while the rate for those 65 years and over decreased on average only 1.1 percent per year for males and 0.6 percent per year for females (for a total decrease of 21 and 13 percent, respectively).

Injury hospital discharge rates were generally higher for males than for females under 65 years of age; however, females 65 years of age and over had higher injury discharge rates than males.

In 1979 the injury hospital discharge rates were higher for males aged 15–24 years (266.0 per 10,000) and females 65 years of age and over (283.8 per 10,000 population) than for others. From 1979 to 2001 the injury discharge rates for males 15–24 declined on average 6.5 percent per year (for a total decrease of 77 percent) to 70.3 per 10,000 in 2001;

meanwhile the rates for females 65 years and over decreased only 0.6 percent per year (for a total decrease of 13 percent) to 248.0 per 10,000 population. By 2001 discharge rates for females 65 years and over were 2 to 10 times the rates for other age-sex groups.

For both males and females, those under 15 years of age generally had the lowest rates of injury hospitalization. The injury discharge rates for males under 15 years of age were higher than the rates for females under 15 years of age from 1979 to 1991, but after that time the rates for males and females under 15 years of age were generally similar.

Figure 5. Injury hospital discharge rates among males by age, 1979-2001

Discharges per 10,000 population



Figure 6. Injury hospital discharge rates among females by age, 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.

Data table for figure 5. Injury hospital discharges among males by age, 1979-2001

	Under 15 years			15-24 years			25-	44 years		45-	64 years		65 years and over		
Year	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	297	112.8	7.7	549	266.0	16.3	594	201.3	12.2	301	143.0	9.7	168	165.8	12.5
1980	276	105.3	7.6	517	250.3	16.2	617	202.0	12.7	286	135.3	9.7	173	166.5	13.1
1981	282	107.4	7.7	500	243.5	16.4	609	192.7	12.7	289	136.4	9.8	165	156.4	12.0
1982	273	104.1	6.7	470	231.8	13.7	594	182.0	10.4	290	137.1	8.8	173	161.2	11.2
1983	263	99.8	5.5	432	216.1	10.7	576	171.3	8.0	260	122.7	6.8	188	171.6	10.1
1984	264	100.0	4.5	404	204.7	8.4	589	170.0	6.5	247	116.3	5.3	187	167.5	8.1
1985	223	84.6	4.0	382	195.1	8.2	550	154.5	6.1	259	121.9	5.6	174	152.9	7.6
1986	232	88.0	4.0	364	187.8	7.7	530	144.8	5.5	235	110.5	4.9	185	158.9	7.5
1987	205	77.2	3.7	331	173.4	7.7	507	135.4	5.4	207	96.8	4.7	170	142.8	7.2
1988	190	70.6	5.8	295	157.2	10.6	447	117.3	7.1	194	89.2	5.8	160	132.1	8.6
1989	191	70.0	7.0	273	148.1	8.7	447	115.3	7.2	188	85.5	5.1	159	128.9	9.4
1990	144	50.1	4.8	266	141.0	7.1	442	109.6	4.9	178	79.9	4.8	166	132.9	6.7
1991	157	54.0	4.7	237	127.1	6.2	390	95.2	5.1	180	80.0	5.4	180	141.3	9.6
1992	152	51.2	4.8	211	114.0	6.0	375	91.1	4.9	171	73.3	4.0	180	138.9	9.8
1993	118	39.5	3.5	213	115.1	9.4	376	91.0	5.4	173	72.6	4.7	196	148.1	10.3
1994	131	43.3	4.1	186	100.8	6.4	326	78.4	4.1	179	72.8	4.2	178	133.1	7.3
1995	122	40.0	4.5	177	95.5	5.5	338	81.0	4.9	165	65.6	4.3	191	140.2	9.0
1996	117	38.4	4.0	160	85.2	6.3	304	72.4	4.5	173	66.8	5.0	189	136.7	7.6
1997	104	34.1	3.4	149	78.5	5.1	292	69.5	4.2	168	62.8	3.6	189	135.5	8.0
1998	112	36.6	5.0	145	75.4	4.9	262	62.9	4.1	171	61.9	4.1	192	135.6	8.2
1999	113	36.7	5.7	143	73.2	4.9	276	66.5	4.3	159	55.4	3.8	193	135.4	8.7
2000	118	38.2	5.7	143	71.9	5.0	241	58.3	4.1	155	52.6	3.3	198	137.8	9.4
2001	116	37.4	5.3	141	70.3	5.2	239	57.1	3.3	175	55.8	3.5	203	138.9	8.9
Average percent		-6.5			-6.5			-6.2			-4.7			-1.1	
Average change	percent	-77.1			- 77.3			-75.4			-65.6			-21.0	

NOTES: 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.

Data table for figure 6. Injury hospital discharges among females by age, 1979-2001

	Under 15 years			15-24 years			25-	-44 years	5	45-	64 years		65 years and over		
Year 	Number in thousands	Rate	Rate SE	Number ir thousands		Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE	Number in thousands	Rate	Rate SE
1979	158	62.8	4.8	230	109.9	7.8	308	99.6	6.7	272	116.9	8.1	425	283.8	18.1
1980	169	67.6	5.3	214	101.9	7.7	306	95.7	6.8	252	108.2	7.9	434	282.7	18.9
1981	162	64.7	5.0	214	103.1	7.7	298	90.4	6.5	242	103.7	7.6	439	280.2	19.1
1982	152	60.8	4.3	189	91.9	6.3	328	96.4	6.0	247	106.1	7.0	454	283.4	16.9
1983	144	57.4	3.6	172	85.0	5.1	307	87.6	4.7	235	101.1	5.7	462	281.8	13.8
1984	137	54.6	2.8	184	92.4	4.5	306	85.0	3.7	235	100.8	4.6	477	285.7	11.3
1985	140	55.5	2.9	174	88.8	4.4	269	72.7	3.3	217	93.0	4.4	460	270.0	11.0
1986	126	50.1	2.6	161	83.2	4.1	254	66.9	2.9	206	88.4	4.1	449	258.7	10.1
1987	117	46.1	2.5	147	77.0	4.0	251	64.8	3.0	181	77.2	3.8	422	238.1	10.3
1988	119	46.7	4.4	138	74.2	4.4	209	53.3	3.0	170	72.0	3.8	397	220.2	10.3
1989	117	45.1	4.4	122	67.2	4.8	212	53.1	3.3	165	69.2	4.9	434	236.8	12.9
1990	86	31.3	3.1	108	58.6	3.3	219	53.2	2.7	157	65.6	4.2	449	243.8	13.0
1991	88	31.7	3.1	110	60.2	3.6	221	52.8	3.3	154	64.0	3.6	451	240.8	13.4
1992	98	34.7	3.6	108	59.8	4.2	188	44.8	2.5	151	60.7	3.3	446	234.6	13.4
1993	84	29.3	3.1	95	52.5	3.6	172	41.0	2.7	157	61.5	3.7	491	254.8	15.2
1994	84	29.0	2.8	88	48.6	3.8	179	42.6	2.5	147	56.0	3.4	467	239.9	14.8
1995	79	27.2	2.8	95	52.4	3.9	163	38.6	2.7	131	48.8	3.1	471	240.2	13.6
1996	63	21.6	2.5	79	43.5	3.6	155	36.4	2.1	130	47.2	3.1	516	261.1	14.3
1997	66	22.7	3.0	86	47.3	4.4	140	33.1	2.1	121	42.5	2.4	505	254.4	12.8
1998	74	25.2	3.2	68	36.5	3.5	159	37.5	2.3	131	44.4	2.8	478	239.3	10.2
1999	72	24.4	3.8	64	34.1	3.3	143	33.8	2.5	142	46.8	4.0	515	257.3	15.5
2000	64	21.6	3.2	61	31.8	2.9	126	30.1	2.3	144	45.7	3.4	507	252.4	15.5
2001	71	24.2	3.7	67	34.8	3.2	139	32.9	2.3	149	45.1	3.0	514	248.0	13.6
Average percent		- 5.7			- 5.4			- 5.8			- 5.0			-0.6	
Average change	percent	- 72.8			-70.8			- 72.8			-67.6			-13.3	

NOTES: 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.