The Decrease in the Unintentional Injury Mortality Disparity Between American Indians/Alaska Natives and Non–American Indians/Alaska Natives in New Mexico, 1980 to 2009

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Objectives. We tracked the unintentional injury death disparity between American Indians/Alaska Natives and non–American Indians/Alaska Natives in New Mexico, 1980 to 2009.

Methods. We calculated age-adjusted rates and rate ratios for unintentional injury deaths and their external causes among American Indians/Alaska Natives and non–American Indians/Alaska Natives. We tested trend significance with the Mann–Kendall test.

Results. The unintentional injury death rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives declined from 2.9 in 1980–1982 to 1.5 in 2007–2009. The rate among American Indians/Alaska Natives decreased 47.2% from 1980–1982 to 1995–1997. Among non–American Indians/Alaska Natives, the rate declined 25.3% from 1980–1982 to 1992–1994, then increased 31.9% from 1992–1994 to 2007–2009. The motor vehicle traffic and pedestrian death rates decreased 57.8% and 74.6%, respectively, among American Indians/Alaska Natives from 1980–1982 to 2007–2009.

Conclusions. The unintentional injury death rate disparity decreased substantially from 1980–1982 to 2007–2009 largely because of the decrease in motor vehicle crash and pedestrian death rates among American Indians/Alaska Natives and the increase in the poisoning death rate among non–American Indians/Alaska Natives. (*Am J Public Health.* 2013;103:747–754. doi:10.2105/AJPH.2012.300673)

New Mexico had the highest unintentional injury death rate in the nation for the years 2006 through 2008.[1] The unintentional injury death rate in the state, 67.1 deaths per 100 000 population, was 1.7 times higher than the US unintentional injury death rate, 39.7 per 100 000 population. In New Mexico, unintentional injuries are the third leading cause of death for all ages and are the leading cause of death for persons aged 1 to 44 years. From 2007 through 2009, poisoning was the leading cause of unintentional injury death. Motor vehicle crashes and falls were the second and third leading causes of unintentional injury death, respectively. These 3 leading causes of unintentional injury death accounted for 85% of all unintentional injury deaths in the state.

Nationally, the unintentional injury death rate among the American Indian/Alaska Native (AI/AN) population in the Indian Health Service Area from 2004 to 2006 was 2.4 times higher than the rate for all races in the United States in 2005.[2] Whereas American Indians/Alaska Natives in New Mexico have lower rates of death from heart disease, cancer, chronic obstructive pulmonary disease, and stroke than non–American Indian/Alaska Natives, their unintentional injury death rate is higher than the rate among non–American Indians/Alaska Natives.[3] Among New Mexico residents, American Indians had the highest total injury mortality rate from 1958 to 1982.[4] However, the trend in the disparity in the unintentional injury death rate between American Indians/Alaska Natives and non–American Indians/Alaska Natives in New Mexico has not been examined.

The 2007–2009 AI/AN population in New Mexico averaged 201 952, which represented 10.2% of the state's population.[5] The non–AI/AN population averaged 1 786 436, which represented 89.8% of the state's population.[5] By comparison, American Indians/Alaska Natives comprised 1.1% of the US population for 2007 through 2009.[5]

The purpose of this study was to track the disparity in unintentional injury death and external causes of unintentional injury death between the AI/AN population and the non-AI/AN population in New Mexico from 1980 to 2009.

METHODS

We used 2 race categories for the study: American Indian/Alaska Native and non–American Indian/Alaska Native. The non–AI/AN category included all racial groups except for American Indians/Alaska Natives. We used the US Census Bureau intercensal estimate for 1981 as an estimate for the 1980 New Mexico population estimate because the 1980 US Census did not have an AI/AN category. The US Census Bureau intercensal estimates were the source for New Mexico population estimates for American Indians/Alaska Natives and non–American Indians/Alaska Natives for the years 1980 through 1989.[6] Bridged-race population estimates from the US Census Bureau were the source for the population data among American Indians/Alaska Natives and non–American Indians/Alaska Natives for the years 1990 through 2009.[5]

We obtained death certificate data for New Mexico residents for the years 1980 through 2009 from the New Mexico Bureau of Vital Records and Health Statistics. We coded the

cause of death according to the *International Classification of Diseases* (*ICD*), *9th Revision* for the years 1980 through 1998 and the *ICD 10th Revision* for the years 1999 through 2009. We obtained the injury mortality *ICD-10* codes for cause or mechanism of the injury for deaths occurring from 1999 to 2009 from the External Cause of Injury Mortality Matrix for *ICD-10*, developed by the National Center for Health Statistics.[7] We obtained the injury mortality *ICD-9* codes for cause or mechanism of the injury for deaths occurring from 1980 through 1998 from the *ICD-9* framework for presenting injury mortality data, developed by the National Center for Health Statistics.[8] We excluded motor vehicle–related pedestrian deaths from the motor vehicle crash cause of death category because we examined pedestrian deaths as a separate category.

On death certificates, the race and ethnicity of the decedent was generally provided by a family member or friend. In some cases, this information was provided based on the observation of the funeral director or other person. On the death certificates used from 1980 to 2005, a single race was entered for the decedent. Beginning in 2006, New Mexico adopted a slightly modified version of the 2003 revision of the US standard death certificate, which provides the ability to collect multiple races and Hispanic origins. For reporting and statistical purposes, when multiple races were checked (< 0.5% of cases), they were bridged by using a hierarchical method, with AI/AN race at the top of the hierarchy. For example, if AI/AN race and any other race were checked, the individual's single race would be AI/AN.

We calculated rates and rate ratios by race for 3-year time periods from 1980 to 2009 for unintentional injury deaths and for the following causes or mechanisms of unintentional injury death: motor vehicle traffic excluding pedestrian, pedestrian, fall, poisoning, drowning, hypothermia, suffocation, and fire or burn. We also examined rates and rate ratios for injury deaths of undetermined intent by race. Rates were age-adjusted to the 2000 US Standard Population.[9]

We performed analyses of trends by using the nonparametric Mann-Kendall test of the death rates Y over time T.[10] The null hypothesis H_0 is that there is no trend. Kendall's S statistic is computed from the Y,T data pairs. H_0 is rejected when S is significantly different from zero. A positive S value indicates an upward trend; a negative S value, a downward trend. In this article, statistically significant trends are reported at $\alpha = 0.05$, 2-tailed test.

RESULTS

The unintentional injury death rates overall and by cause-of-injury death for American Indians/Alaska Natives and non–American Indians/Alaska Natives are presented in Table 1. The unintentional injury death rate had a significantly downward trend from 1980 to 2009 for American Indians/Alaska Natives but no trend for non–American Indians/Alaska Natives (Figure 1). The unintentional injury death rate among American Indians/Alaska Natives decreased 47.2% from 1980–1982 to 1995–1997. The rate was similar from 1995–1997 through 2007–2009. Among non–American Indians/Alaska Natives, the rate declined 25.3% from 1980–1982 to 1992–1994 and then increased 31.9% from 1992–1994 to 2007–2009. The unintentional injury death rate ratio for American Indians/Alaska Natives compared with non–American Indians/Alaska Natives declined from 2.9 in 1980–1982 to 1.5 in 2007–2009, although, from 1995–1997 to 2007–2009, the rate ratio only changed from 1.9 to 1.5.

Motor vehicle traffic and pedestrian injuries were the leading causes of unintentional injury death among American Indians/Alaska Natives in 1980 through 1982. In 2007 through 2009, motor vehicle traffic crashes and poisoning were the leading causes of unintentional injury death among American Indians/Alaska Natives. Motor vehicle traffic crashes were the leading cause of unintentional injury death among non–American Indians/Alaska Natives until 2004–2006, when poisoning became the leading cause of unintentional injury death. The motor vehicle traffic death rate and the pedestrian death rate decreased 57.8% and 74.6%, respectively, among American Indians/Alaska Natives from 1980–1982 to 2007–2009 (Figure 2). Among non–American Indians/Alaska Natives the motor vehicle traffic death rate and the pedestrian death rate decreased 52.1% and 63.5%, respectively, from 1980–1982 to 2007–2009. From 1980–1982 to 2007–2009, we saw significant downward trends for both motor vehicle traffic and pedestrian injury death rates among both American Indians/Alaska Natives and non–American Indians/Alaska Natives. The motor vehicle traffic death rate ratio for American Indians/Alaska Natives compared with non–American Indians/Alaska Natives decreased from 2.0 in 1980–1982 to 1.6 in 2007–2009. Motor vehicle traffic crash deaths among American Indians/Alaska Natives accounted for 38.8% of AI/AN unintentional injury deaths in 1980–1982 and 29.6% of AI/AN unintentional injury deaths in 2007–2009.

Pedestrian deaths among American Indians/Alaska Natives accounted for 25.0% of AI/AN unintentional injury deaths in 1980–1982 and 14.5% of AI/AN unintentional injury deaths in 2007–2009. The rate ratio of AI/AN pedestrian deaths to non–AI/AN pedestrian deaths ranged from 8.9 (1980–1982) to 4.3 (2001–2003). The rate ratio for 2007–2009 was 6.2. Substantial decreases in the motor vehicle traffic and pedestrian death rates accounted for 81.7% of the decrease in the unintentional injury death rate among American Indians/Alaska Natives.

The poisoning death rate among both groups was substantially greater in 2007–2009 than in 1980–1982. The poisoning death rate among American Indians/Alaska Natives fluctuated between 1980–1982 and 1998–2000 (Figure 3). The rate increased 458.3% from 1998–2000 through 2007–2009. The poisoning death rate among non–American Indians/Alaska Natives increased 1421.4% from 1986–1988 through 2007–2009. From 1980–1982 to 2007–2009 there was a significant upward trend among non–American Indians/Alaska Natives. Although the poisoning death rate among American Indians/Alaska Natives was much greater in recent years, there was no significant trend over the 30-year period. The poisoning death rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives was 2.2 in 1980–1982 and 0.9 in 2007–2009. The poisoning death rate among non–American Indians/Alaska Natives was higher than the AI/AN rate from 1989–1991 through 2007–2009.

The falls death rate fluctuated from 1980–1982 through 1998–2000 among American

TABLE 1—Number and Rate of Unintentional Injury Deaths by Cause and Race: New Mexico, 1980–2009

	American Indian/Alaska Native		Non-American Indian/Alaska Native		
Injury and Timeframe	No.	Rate	No.	Rate	Rate Ratio
Unintentional injury					
1980–1982	467	174.9	2102	60.5	2.9
1983–1985	455	158.0	2021	56.6	2.8
1986–1988	472	150.5	1958	51.2	2.9
1989–1991	447	128.0	1935	48.4	2.6
1992–1994	441	114.9	1927	45.2	2.5
1995–1997	386	92.3	2190	47.9	1.9
1998–2000	408	92.7	2319	48.9	1.9
2001–2003	437	90.5	2683	54.5	1.7
2004–2006	489	94.2	3093	59.6	1.6
2007–2009	490	91.9	3269	59.6	1.5
Motor vehicle crash					
1980–1982	181	57.3	1080	28.0	2.0
1983–1985	201	59.5	942	23.2	2.6
1986–1988	214	60.6	981	23.9	2.5
1989–1991	187	45.8	880	21.2	2.2
1992–1994	183	41.2	795	18.1	2.3
1995–1997	177	37.8	898	19.0	2.0
1998–2000	183	36.4	777	16.0	2.3
2001–2003	205	38.2	769	15.4	2.5
2004–2006	189	33.0	927	17.8	1.9
2007–2009	145	24.2	801	14.9	1.6
Pedestrian					
1980–1982	117	46.5	184	5.2	8.9
1983–1985	109	39.5	202	5.4	7.3
1986–1988	106	32.8	216	5.5	6.0
1989–1991	98	25.2	166	4.0	6.3
1992–1994	98	24.3	146	3.4	7.1
1995–1997	79	17.6	132	2.9	6.1
1998–2000	78	17.8	102	2.1	8.5
2001–2003	70	12.4	145	2.9	4.3
2004–2006	75	13.8	141	2.7	5.1
2007–2009	71	11.8	88	1.9	6.2
Poisoning					
1980–1982	19	6.5	107	2.9	2.2
1983–1985	5	1.9	60	1.6	1.2
1986–1988	8	1.9	53	1.4	1.4
1989–1991	19	4.9	259	6.1	0.8
1992–1994	26	6.1	357	8.0	0.8
1995–1997	17	4.2	449	9.5	0.4
1998–2000	19	3.6	654	13.6	0.3
2001–2003	42	4.2	740	15.3	0.3
2004–2006	61	11.3	880	17.5	0.6
2007–2009	113	20.1	1113	21.3	0.9

Continued

Indians/Alaska Natives. The rate increased 71.9% from 1998–2000 through 2007–2009. Among non–American Indians/Alaska Natives, the falls death rate fluctuated from 1980–1982 through 1992–1994. The rate increased 122.9% from 1992–1994 through 2007–2009. There was a significant upward trend over the 30-year period among non–American Indians/Alaska Natives, but no significant trend among American Indians/Alaska Natives. The falls death rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives ranged from 1.8 in 1980–1982 and 1989–1991 to 1.0 during 1983–1985, 2004–2006, and 2007–2009.

The hypothermia death rate among American Indians/Alaska Natives fluctuated between 1980–1982 and 2007–2009. Among non–American Indians/Alaska Natives the hypothermia death rate was less than 1.0 per 100 000 for the entire 30-year period. No significant trend existed from 1980–1982 to 2007–2009 for either racial group. The hypothermia death rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives ranged from 48.0 in 1980–1982 to 10.2 in 2007–2009.

The drowning rate decreased 67.1% from 1983–1985 through 2007–2009 among American Indians/Alaska Natives. The decrease in drowning deaths was greater among American Indians/Alaska Natives than for non–American Indians/Alaska Natives (48.3% decrease). Rates for both groups had significant downward trends over the 30-year span. The drowning rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives ranged from a high of 3.4 in 1986–1988 to 1.1 in 2004–2006. The rate ratio for 2007–2009 was 1.7.

There was a significant downward trend of the fire or burn death rate for both American Indians/Alaska Natives and non–American Indians/Alaska Natives over the 30-year period. The fire or burn rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives ranged from 3.8 in 1983–1985 to 0.8 in 2007–2009. Fire or burn and drowning death rates accounted for 4.2% and 2.5%, respectively, of the decrease in the unintentional injury death rate among American Indians/Alaska Natives.

The undetermined intent injury rate ratio of American Indians/Alaska Natives to

TABLE 1—*Continued*

Falls					
1980–1982	24	14.3	189	8.1	1.8
1983–1985	18	10.3	260	10.0	1.0
1986–1988	20	9.1	214	7.0	1.3
1989–1991	28	13.5	244	7.6	1.8
1992–1994	22	9.6	252	7.0	1.4
1995–1997	28	11.0	328	8.2	1.3
1998–2000	25	8.9	416	9.4	0.9
2001–2003	43	13.6	590	12.1	1.1
2004–2006	52	13.9	741	13.9	1.0
2007–2009	56	15.3	919	15.6	1.0
Hypothermia					
1980–1982	8	4.8	3	0.1	48.0
1983–1985	14	6.4	12	0.4	16.0
1986–1988	22	8.1	18	0.6	13.5
1989–1991	36	12.7	27	0.7	18.1
1992–1994	52	17.8	26	0.6	29.7
1995–1997	33	9.8	39	0.9	10.9
1998–2000	40	12.1	20	0.4	30.3
2001–2003	27	7.0	18	0.4	17.5
2004–2006	32	7.1	19	0.4	17.8
2007–2009	29	6.1	33	0.6	10.2
Drowning					
1980–1982	21	4.7	120	2.9	1.6
1983–1985	35	7.9	119	2.9	2.7
1986–1988	30	7.8	98	2.3	3.4
1989–1991	18	4.3	62	1.5	2.9
1992–1994	21	4.2	85	1.6	2.6
1995–1997	14	2.5	67	1.4	1.8
1998–2000	10	1.9	68	1.4	1.4
2001–2003	15	2.6	63	1.3	2.0
2004–2006	10	1.6	78	1.5	1.1
2007–2009	17	2.6	78	1.5	1.7
Suffocation					
1980–1982	15	4.3	30	0.9	4.8
1983–1985	6	2.1	43	1.3	1.6
1986–1988	13	5.8	50	1.5	0.9
1989–1991	19	7.0	43	1.1	6.4
1992–1994	9	2.7	47	1.1	1.6
1995–1997	10	2.1	44	1.0	2.1
1998–2000	12	2.3	46	1.0	2.3
2001–2003	8	1.8	54	1.1	1.6
2004–2006	9	1.7	46	1.0	1.7
2007–2009	20	4.4	62	1.1	4.0

Continued

non–American Indians/Alaska Natives ranged from 3.4 in 1980–1982 to 1.4 in 1992–1994. The undetermined intent injury rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives remained around 2.0 for the majority of the 30-year period. Undetermined death rates had no significant trend for either group. Changes in the undetermined intent injury death rate disparity did not account for the change in the disparity in unintentional injury death rates between the 2 racial groups.

The unintentional injury death rate for each age group among American Indians/Alaska Natives was higher than the rate for each age group for non–American Indians/Alaska Natives except for those aged 85 years or older where the unintentional injury death rate was higher among non–American Indians/Alaska Natives (Table 2). The unintentional injury death rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives among infants decreased from 3.3 in 1980–1982 to 1.3 in 2007–2009. The rate ratio also decreased among those aged 15 to 84 years in the 30-year time period with the largest decrease occurring among those aged 45 to 54 years. The rate ratio among this age group decreased from 5.2 to 1.3. The unintentional injury rate ratio of American Indians/Alaska Natives to non–American Indians/Alaska Natives among those aged 85 years or older was 0.4 in 1980–1982 and 0.7 in 2007–2009.

Males accounted for 69.8% of AI/AN unintentional injury deaths in 2007 through 2009. The unintentional injury death rate among male American Indians/Alaska Natives decreased 51.6% from the 1980–1982 through 2007–2009 and the unintentional injury death rate among male non–American Indians/Alaska Natives decreased 10.5% from 1980–1982 to 2007–2009. The unintentional injury death rate ratio of male American Indians/Alaska Natives to male non–American Indians/Alaska Natives was 3.1 in 1980–1982 and 1.7 in 2007–2009.

The unintentional injury death rate among female American Indians/Alaska Natives decreased 36.7% from 1980–1982 to 2007–2009 and the unintentional injury death rate among female non–American Indians/Alaska Natives increased 21.5% from 1980–1982 to

TABLE 1—*Continued*

Fire or burn					
1980–1982	9	4.2	80	2.5	1.7
1983–1985	13	6.1	52	1.6	3.8
1986–1988	7	3.4	75	2.0	1.7
1989–1991	8	2.8	54	1.4	2.0
1992–1994	10	3.2	61	1.5	2.1
1995–1997	8	2.0	44	1.0	2.0
1998–2000	9	2.8	44	1.0	2.9
2001–2003	8	2.0	56	1.1	1.8
2004–2006	14	2.6	52	1.0	2.6
2007–2009	4	0.7	50	0.9	0.8

2007–2009. The unintentional injury death rate ratio of female American Indians/Alaska Natives to female non–American Indians/Alaska Natives was 2.6 in 1980–1982 and 1.4 in 2007–2009.

DISCUSSION

The unintentional injury death rate disparity between American Indians/Alaska Natives and non–American Indians/Alaska Natives had a significant downward trend from 1980–1982 to 2007–2009. Most of the decrease in the unintentional injury death rate disparity between the 2 groups occurred from 1980–1982 to 1995–1997. There was a significant downward trend over that period. The disparity had no significant trend from 1995–1997 through 2007–2009. The unintentional injury death rate disparity between the groups decreased substantially because the unintentional injury death rate among American Indians/Alaska Natives decreased significantly from 1980–1982 to 1995–1997 and remained stable from 1995–1997 through 2007–2009, while the decrease in the unintentional injury death rate among non–American Indians/Alaska Natives was less than the decrease among American Indians/Alaska Natives from 1980–1982 until 1992–1994. The non-AI/AN unintentional injury death rate then increased from 1992–1994 through 2007–2009.

Possible Reasons for Findings

Motor vehicle traffic and pedestrian death rates among American Indians/Alaska Natives decreased more than the rates among non–American Indians/Alaska Natives decreased, accounting for most of the decrease in the unintentional injury death rate disparity between the 2 groups during this 30-year time period. The motor vehicle traffic crash death rate among American Indians/Alaska Natives decreased 32% from 1986–1988 to 1989–1991. The Navajo Nation enacted a motor vehicle primary enforcement seat-belt use law and a child restraint law in 1988.[11] Driving while intoxicated (DWI) prevention measures expanded on tribal lands in New Mexico in the 1980s and 1990s, including stiffer sentencing, police vehicle–mounted video cameras, and portable office-based breathalyzer equipment. Mothers Against Drunk Driving and Students Against Destructive Decisions chapters were started on tribal lands in the 1980s and 1990s. The Navajo Nation Community Traffic Safety Program was established after the passage of the 1988 seat-belt law by the Navajo Nation Tribal Council.[12] The program provided educational materials on using seat belts. Child safety seat programs were expanded by the Navajo Nation after passage of the 1988 seat-belt law. Before the Navajo Nation seat-belt law in 1988, seat-belt use on the Navajo Reservation was 8% and the child safety seat usage was 0%. In 1995, the seat-belt use was 78% and the child safety seat usage was 45%.

The New Mexico Pedestrian Project initiative, implemented after the 1988 Indian Health Service Prevention Study,[13] led to placing street lighting at one of the most notorious pedestrian fatality sites in New Mexico on what was formerly called US Highway 666 north of Gallup.[14] The street lighting substantially reduced nighttime fatal pedestrian motor vehicle crashes.

The increase in the unintentional injury death rate among non–American Indians/Alaska Natives from 1992–1994 through 2007–2009 was attributable to increases in the poisoning and falls death rates in this group. The poisoning death rate among non–American Indians/Alaska Natives had a greater increase in the 30-year period than the falls death rate. About 90% of unintentional poisoning deaths in New Mexico are caused by drug overdoses. The majority of the recent increase in the drug overdose death rate has

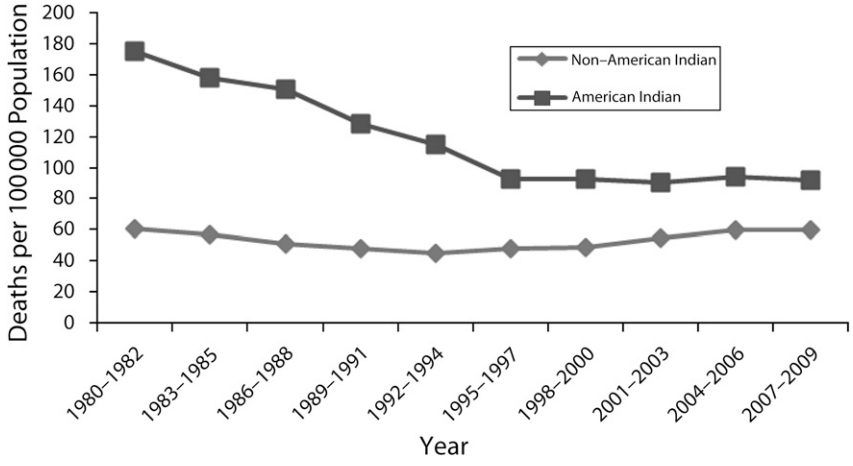

FIGURE 1—Unintentional injury death rates by race: New Mexico, 1980–2009.

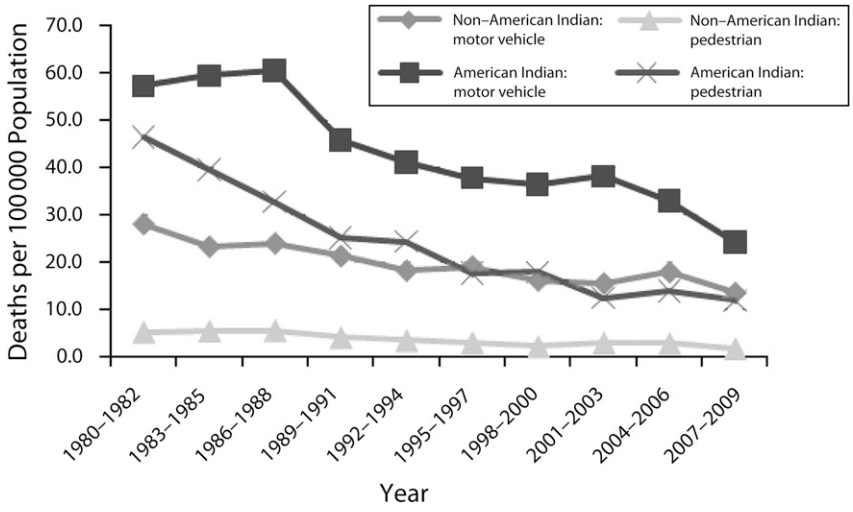

FIGURE 2—Motor vehicle traffic crash and pedestrian death rates by race: New Mexico, 1980–2009.

been attributed to prescription drugs.[15] Prescription opioids are being prescribed more often by health care providers for chronic pain management.[15] From 1998–2000 to 2007–2009, the poisoning death rate among American Indians/Alaska Natives had a greater increase than the falls death rate. From 2004–2006 to 2007–2009, the unintentional drug overdose death rate increased 68% among American Indians/Alaska Natives compared with a 15% increase among non–American Indians/Alaska Natives.

The falls death rate increased dramatically with age. In New Mexico, adults aged 65 years and older account for 86% of fall deaths. Falls are the leading cause of unintentional injury death among adults aged 65 years and older. The falls death rate has been increasing in New Mexico and the United States and the increase may be linked to increased life expectancy that results in a larger proportion of older adults living with chronic diseases that cause them to be at increased risk and vulnerability to fall-related injuries.[16]

Limitations

Limitations of this study include possible misclassification of race on death certificates. In a survey of funeral homes located in 5 locations around the United States, including Albuquerque, NM, 58% of respondents said they "sometimes" or "often" determined race by knowledge of the decedent's family instead of by asking the informant; 43% said they "sometimes" or "often" determined race by observation of the decedent.[17] An evaluation of race and Hispanic origin reporting on death certificates examined classification of race and ethnicity, nationwide, over 2 periods: 1979–1989 and 1990–1998. The authors found that only about 55% of decedents who self-identified as AI/AN on the Current Population Survey were correctly classified on the death certificate in both periods, considerably less than the near-100% agreement for both the White and Black populations.[18] However, a linkage of records from cancer registries with Indian Health Service (IHS) records found that underreporting of AI/AN race is far less in the IHS Southwest region, of which New Mexico is part, than in any other IHS region, except Alaska.[19]

Another limitation is the revision of code definitions and coding rules between *ICD-9* codes (1998 data and earlier) and *ICD-10* codes starting in 1999, which can create a discontinuity in injury mortality trend data. Misclassification of the intent of the injury is another limitation, especially for poisoning. Determining the intent of a person who took a drug is often difficult for a medical examiner. Some of the drug poisoning deaths might have been suicides but could have been classified as unintentional, resulting in inflated unintentional injury death rates, whereas some poisoning deaths categorized as suicides or undetermined intent might have been unintentional and, therefore, were not analyzed in this study. Furthermore, because the New Mexico Office of the Medical Investigator (OMI) has jurisdiction to investigate deaths on tribal lands only upon request, there were differences between the AI/AN and non-AI/AN populations in the proportion of unintentional injury deaths certified by OMI pathologists. For example, in 2009, the OMI certified approximately 95% of non–AI/AN unintentional injury deaths compared with 83% of AI/AN unintentional injury deaths. Variations in death certification by OMI, local attending physicians, and tribal authorities may have led to differences in

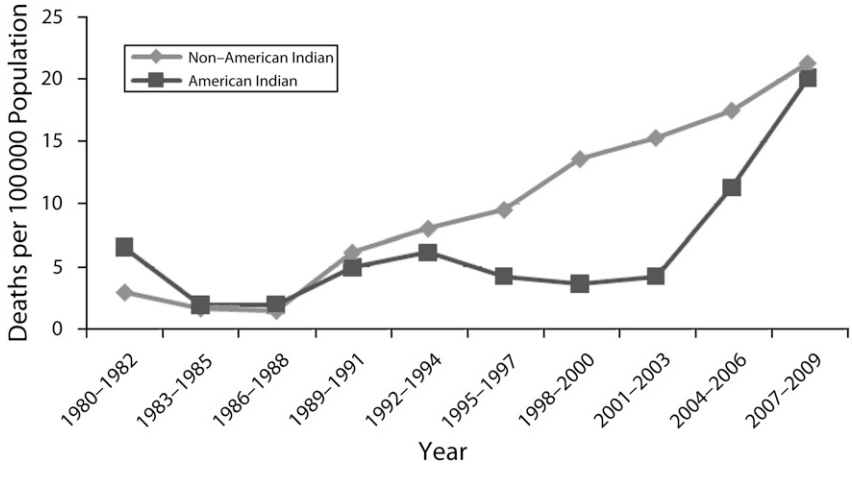

FIGURE 3—Unintentional poisoning death rates by race: New Mexico, 1980–2009.

TABLE 2—Number and Rate of Unintentional Injury Deaths by Age Group, Gender, and Race: New Mexico, 1980–1982 and 2007–2009

	American Indian/Alaska Native		Non-American Indian/Alaska Native		
Year and Characteristic	No.	Rate	No.	Rate	Rate Ratio
1980–1982					
Age group, y					
0	10	113.5	22	34.1	3.3
1–4	19	53.9	85	32.9	1.6
5–14	26	35.4	89	14.8	2.4
15–24	140	189.5	551	79.4	2.4
25–34	89	176.1	418	65.6	2.7
35–44	64	205.5	215	50.0	4.1
45–54	53	255.7	174	49.4	5.2
55–64	26	180.8	161	50.8	3.6
65–74	26	256.3	128	57.0	4.5
75–84	11	250.8	134	132.8	1.9
≥ 85	3	203.7	125	464.8	0.4
Gender					
Male	347	279.1	1560	90.4	3.1
Female	120	84.4	542	32.1	2.6
2007–2009					
Age group, y					
0	3	23.9	15	19.1	1.3
1–4	12	24.3	34	11.0	2.2
5–14	13	12.7	35	4.9	2.6
15–24	87	78.4	337	44.9	1.7
25–34	93	102.0	371	51.4	2.0
35–44	96	124.4	429	64.1	1.9
45–54	75	102.1	592	77.7	1.3
55–64	37	80.7	316	49.8	1.6
65–74	32	126.7	210	55.1	2.3
75–84	23	175.3	398	162.5	1.1
≥ 85	19	410.5	532	556.0	0.7
Gender					
Male	342	135.1	2088	80.9	1.7
Female	148	53.4	1181	39.0	1.4

assigning underlying and contributing causes of death for unintentional injuries between the AI/AN and non–AI/AN populations throughout the study period.

Implications and Recommendations for Prevention and Intervention

The unintentional injury death rate disparity decreased between American Indians/Alaska Natives and non–American Indians/Alaska Natives because of the substantial decrease in the motor vehicle crash and pedestrian death rates among American Indians/Alaska Natives. The disparity also decreased because of the increase in the unintentional injury death rate, starting in 1995–1997, among non–American Indians/Alaska Natives as a result of the increase in the poisoning and falls death rates. However, the unintentional injury death rate disparity has not changed from 1995–1997 to 2007–2009. The disparity in motor vehicle traffic and pedestrian death rates between the 2 groups continues to exist with the motor vehicle traffic death rate among American Indians/Alaska Natives 1.6 times higher and the pedestrian death rate among American Indians/Alaska Natives 6.2 times higher than the non–AI/AN motor vehicle traffic and pedestrian death rates in 2007 through 2009. To further reduce the unintentional injury death rate disparity between the 2 groups, recommendations include implementing programs to increase the use of child safety seats and seat-belt use among American Indians/Alaska Natives to higher than 90% and engaging in activities to reduce alcohol-impaired driving, including aggressively enforcing DWI laws, utilizing DWI checkpoints, and using community-based approaches to alcohol control and DWI prevention. American Indian communities in New Mexico should develop pedestrian safety interventions that are tailored specifically to their community, including education and traffic engineering strategies.

Drug treatment services to reduce drug overdose deaths should be increased, including opioid replacement therapy, such as the use of methadone or buprenorphine, and providing options for prescription naloxone to opioid drug users.[20–22] It is also important to raise awareness about the risk of overdose among users of illicit or prescription drugs. Other recommendations to prevent prescription drug overdoses include prescription drug monitoring programs, which are state-run electronic databases used to track the prescribing and dispensing of controlled prescription drugs to patients, and laws to prevent prescription drug abuse.[23]

Recommendations to reduce fall deaths include expansion of exercise programs offered to senior citizens that increase leg strength and balance such as Tai Chi, review by physicians of medicines taken by older adults that may cause dizziness or drowsiness, eye examinations at least once a year, and home safety improvements, including removing or reducing tripping hazards such as loose rugs, adding grab bars and railings, and improving the lighting in homes.[16,24]

Conclusions

Although the unintentional injury death disparity between American Indians/Alaska Natives and non–American Indians/Alaska Natives decreased during the 30-year period, it is anticipated that the disparity between the 2 groups in New Mexico will only decrease further with successful implementation of

proven measures to reduce unintentional injury death. More studies are needed to determine effective AI/AN community-based strategies to prevent unintentional injuries. Because the unintentional injury death rate is higher among American Indians/Alaska Natives nationally, other states could benefit by using the recommendations to reduce unintentional injury deaths among American Indians/Alaska Natives. ■

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This article was accepted January 21, 2012.

Contributors

G. Hubbard completed half of the analysis of the death data and is the primary author of the article. P. Pokhrel completed half of the analysis of the death data and substantially contributed to the article by helping to revise the original draft. L. Nielsen provided the vital records death data and the US Census Bureau population estimates for 1980 through 1989 and substantially contributed to the article by helping to revise the original draft. M. Landen originated and supervised the study and substantially contributed to the article by helping to revise the original draft.

Acknowledgments

The authors wish to thank Jerry Lee of the Albuquerque Area Indian Health Service for his contribution.

Human Participant Protection

Institutional review board approval was not needed because the death data did not contain personal identifiers and no research was conducted on human participants.

References

1. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS). Available at: http://www.cdc.gov/ncipc/wisqars. Accessed December 6, 2011.

2. Indian Health Service. Indian health disparities [fact sheet]. 2011. Available at: http://www.ihs.gov/PublicAffairs/IHSBrochure/Disparities.asp. Accessed July 26, 2011.

3. *New Mexico Selected Health Statistics Annual Report.* Santa Fe, NM: New Mexico Bureau of Vital Records and Health Statistics; 2007: 2.

4. Sewell CM, Becker TM, Wiggins CL, Key CR, Hull HF, Samet JM. Injury mortality in New Mexico's American Indians, Hispanics, and non-Hispanic Whites, 1958 to 1982. *West J Med.* 1989;150(6):708–713.

5. Centers for Disease Control and Prevention, National Center for Health Statistics. Bridged-race population estimates, United States, July 1st resident population by state, county, age, sex, bridged-race, and Hispanic origin, on CDC WONDER online database. Available at: http://wonder.cdc.gov/Bridged-Race-v2009.HTML. Accessed May 10, 2010.

6. US Census Bureau. Archived intercensal population estimates. 1981–1989. Available at: http://www.census.gov/popest/data/national/totals/1990s/tables/nat-total.txt. Accessed May 20, 2010.

7. National Center for Health Statistics. *International Classification of Diseases–10*: External cause of injury mortality matrix. Available at: http://www.cdc.gov/nchs/injury/ice/matrix10.htm. Accessed June 18, 2010.

8. Centers for Disease Control and Prevention. Recommended framework for presenting injury mortality data. *MMWR Recomm Rep.* 1997;46(RR-14):1–30. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/00049162.htm. Accessed June 18, 2010.

9. Anderson RN, Rosenberg HM. Age standardization of death rates: implementation of the year 2000 standard. *Natl Vital Stat Rep.* 1998;47(3). Hyattsville, MD: National Center for Health Statistics.

10. Helsel DR, Hirsch RM. *Statistical Methods in Water Resources.* New York, NY: Elsevier Publishers; 1992: 522

11. Phelan KJ, Khoury J, Grossman DC, et al. Pediatric motor vehicle related injuries in the Navajo Nation: the impact of the 1988 child occupant restraint laws. *Inj Prev.* 2002;8(3):216–220.

12. National Highway Traffic Safety Administration. *Traffic Safety Digest – Summer '96 – Navajo Nation.* Available at: http://www.nhtsa.gov/people/outreach/safedige/Summer96/OccProt/Navajo_Nation.html. Accessed February 22, 2011.

13. Bill N. Pedestrian fatalities on US highway 666 in New Mexico. Available at: http://www.ihs.gov/MedicalPrograms/InjuryPrevention/documents/NBill.pdf. Accessed July 27, 2011.

14. Indian Health Service. CDR Nancy M. Bill, IHS Injury Prevention Program Manager. Available at: http://www.ihs.gov/MedicalPrograms/InjuryPrevention/documents/Nancy%20Bio.pdf. Accessed July 27, 2011.

15. Shah N. Unintentional illicit and prescription drug overdose death trends. *The New Mexico Epidemiology Report*. 2008;(Nov):9.

16. Centers for Disease Control and Prevention. Fatalities and injuries for falls among older adults—United States, 1993–2003 and 2001–2005. *MMWR Morb Mortal Wkly Rep.* 2006;55(45):1221–1224.

17. Hahn RA, Wetterhall SF, Gay GA, et al. The recording of demographic information on death certificates: a national survey of funeral directors. *Public Health Rep.* 2002;117(1):37–43.

18. Arias E, Schauman WS, Eschback K, Sorley PD, Backlund E. The validity of race and Hispanic origin reporting on death certificates in the United States. *Vital Health Stat 2.* 2008;(148):1–23.

19. Espey DK, Wiggins CL, Jim MA, Miller BA, Johnson CJ, Becker TM. Methods for improving cancer surveillance data in American Indian and Alaska Native populations. *Cancer.* 2008;113(5 Suppl):1120–1130.

20. Shah NG, Celentano DD, Vlahov D, et al. Correlates of enrollment in methadone maintenance programs differ by HIV-serostatus. *AIDS.* 2000;14(13):2035–2043.

21. Strathdee SA, Celentano DD, Shah N, et al. Needle exchange and health care utilization promote entry into detoxification. *J Urban Health.* 1999;76(4):448–460.

22. Des Jarlais DC, McKnight C, Goldblatt C, Purchase D. Doing harm reduction better: syringe exchange in the United States. *Addiction.* 2009;104(9):1441–1446.

23. Centers for Disease Control and Prevention. *Policy Impact: Prescription Pain Killer Overdoses.* 2011. Available at: http://www.cdc.gov/homeandrecreationalsafety/pdf/PolicyImpact-PrescriptionPainkillerOD.pdf. Accessed November 7, 2011.

24. Falls Free. *A National Falls Prevention Action Plan.* Available at: http://www.healthyagingprograms.org/content.asp?sectionid=69&ElementID=220. Accessed July 27, 2011.