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Children's Safety on American Indian Farms: Information and Recommendations

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ABSTRACT. It is estimated that 1.2 million youth younger than age 20 live on farms; American Indian children constitute an important but understudied subset of this at-risk group. Despite documented risks of injuries and death among children who live and work on farms and a descending trend in the overall reported fatalities among youth who live and/or work on farms, very little is known about the agriculture-related injury and fatality experience of American Indian youth. Limited data indicate that drowning, motor vehicles, and poisonings are leading causes of unintentional mortality and morbidity for this group, although the attribution to agricultural exposure is not evident. The scant available data indicate a need to look more closely at agricultural work, bystander exposures, and other farm events that put American Indian youth at risk of illness, injury, or death compared to factors more fully reported for majority youth in the agriculture population, in order to guide intervention and prevention programs that are appropriate and acceptable to this vulnerable population.

KEYWORDS. American Indians, children, farms, injuries, safety

BACKGROUND

American Indian (AI) people constitute less than 1% of the total United States (US) population. In comparison to the general US population, the AI population is proportionately younger (34% aged 0–19 as compared to 27% aged 0–19 US total population) and growing (18.2% increase over 2000 compared to 9.7% for the general population).¹

The US Department of Agriculture (USDA) 2007 Census of Agriculture indicated a total of 79,703 (3.8% of total farm operators) American Indian farm operators on 61,472 (2.8% of total farms and ranches) farms and ranches across the United States. An Online Highlights Fact Sheet published by the USDA summarizes the results of the 2007 Census of Agriculture for American Indian Farmers. The Fact Sheet reports that states with the highest percentage of American

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Indian farm operators are Arizona (53.9%), New Mexico (21.5%), and Nevada (12.5%) (numbers are not provided).² Approximately 10% of the total American Indian farm operators live on Indian reservations.³ The farmland for this group encompasses 56.8 million acres (6% of US farmland).

Currently, about 56.2 million acres, representing 326 Indian land areas, are administered as federal Indian tribal nations. The Navajo Nation, located in Arizona, New Mexico, and Utah, comprising 16 million acres, is the largest. Many of the smaller tribal nations have less than 1000 acres.⁴ Each tribal nation has an area of land reserved by treaty as permanent tribal Homelands. The United States Constitution considers American Indian nations to be sovereign with separate governments.⁵ Each of the nations have their own laws, and their governments have the authority to impose taxes, promulgate their own laws, and implement their own legal system. Many American Indian nations have adopted constitutions, have branches of government, and have clear separation of powers. Others are governed by a Tribal Council, which is led by a Tribal Chair.

There are 565 federally recognized tribes. Table 1 shows the number and percentage distribution of the American Indian/Alaska Native (sole or mixed race) population by region in 2006.⁶

More than 25% of the AI population overall is living in poverty; some tribal groups report having more than 44% of their population below the federal poverty level; families with children experience even higher rates of poverty.⁷ The Indian Health Service, an agency within the Department of Health and Human Services, provides comprehensive health care services to Native communities.⁸ According

to the Indian Health Service (IHS) Injury Prevention Program, “injuries are the leading cause of death for American Indians . . . from ages 1–44 years, and the third leading cause of death overall. Unintentional injury mortality rates for Indian people are approximately three times higher than the combined all-U.S. rates.”⁹

DATA ON CHILDHOOD AGRICULTURE-RELATED MORBIDITY AND MORTALITY

Data on agriculture-related childhood injuries and mortality for American Indians are difficult to find. In 2005 the Centers for Disease Control and Prevention (CDC) produced the *Atlas of Injury Mortality among American Indian and Alaska Native Children and Youth*. This document included data from 1989 to 1998. Findings show that injuries and violence are the leading killers of AI children and youth (0–19 years old), accounting for 75% of all deaths in this population. Drowning rates were highest among American Indian 1–4 years of age and drowning was listed among the top six causes of death among males aged 15–19. However, none of the drowning incidents were linked to agriculture.¹⁰ Special queries of the CDC Web-based Injury Statistics Query and Reporting System (WISQARS) showed that for 2008, state- and county-level death data from the National Vital Statistics System, the crude rates for fatal drowning among American Indian children aged 0–19 were higher in children aged 0–4 and 15–19 than for whites and blacks of the same ages.¹¹

The Youth Risk Behavior Surveillance System includes a national school-based survey (YRBS) administered to 9–12th grade students.

TABLE 1. Status and Trends in the Education of American Indians and the Alaska Natives, 2008⁶

Region	Number	Percent	States
Total	4,330,000	100%	
West	1,862,000	43%	AK, AZ, CA, CO, HI, ID, MT, NV, MN, OR, UT, WA, WY
South	767,000	17.7%	AL, AR, DE, FL, GA, KY, LA, MD, MS, NC, OK, SC, TN, TX, VA, WV, DC
Midwest	1,353,000	31.3%	IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI
Northeast	347,000	8%	CT, ME, MA, NH, NJ, NY, PA, RI, VT

This survey is administered every 2 years and provides data representative of every child in public and private schools in the United States. The survey is administered by CDC together with state, territorial, tribal governments, and local education and health agencies. The survey is designed to monitor six types of health-risk behaviors that contribute to the leading causes of death and disability among youth, including behaviors that contribute to unintentional injuries and violence.¹² The data currently available for different ethnic groups do not include a breakdown for American Indian children.

The National Institute of Occupational Safety and Health (NIOSH) has conducted the USDA-sponsored Childhood Agricultural Injury Survey (CAIS) since 1997¹³ and as part of this initiative, they have administered the Minority Farm Operator Childhood Agricultural Injury Survey (M-CAIS) in 2000, 2003, and 2008. The M-CAIS is a regionally stratified telephone survey of 50,000 minority operated farm households across the United States. The telephone survey data were expanded by including in-person field visits. A significant finding from the M-CAIS in 2000, which held true in subsequent surveys, is that household youths on American Indian farming operations have the highest farm-related injury rate of all minority-owned farm household youths (except mixed race).¹⁴ Data from 2008 reveal that an estimated 310 injuries occurred to youth less than 20 years of age (including household youth, workers, and visitors) on American Indian operated farms, representing 60% of the total youth injuries on racial-minority farms. Youth living on American Indian farms incurred 166 injuries for an injury rate of 7.86/1000 American Indian household youth, as compared to 5.15 for black household youth, 15.29 multiracial youth, 5.5 Hispanic youth, and 7.8 in the total racial-minority household youth population. (Data were provided by Kitty Hendricks at CDC/NIOSH.) Data on M-CAIS 2008 work-related injury estimates for youth on AI-operated farms by source and injury type are found in Table 2 (comparisons between these data and those reported on the CAIS for 2008 were calculated by John Myers at CDC/NIOSH and are included in the table). The data suggest that AI children

TABLE 2. Comparisons Between the M-CAIS Data and CAIS Data

Source of injuries	2008 M-CAIS*	2009 CAIS
Machinery	3% (\pm 2.2%)	3% (\pm 2.3%)
Parts and materials	16% (\pm 11.9%)	4% (\pm 4.5%)
Persons, plants, animals and minerals	27% (\pm 12.3%)	18% (\pm 7.7%)
Structures and surfaces	30% (\pm 10.3%)	25% (\pm 8.2%)
Tools, instruments and equipment	4% (\pm 3.7%)	12% (\pm 6.6%)
Vehicles (ATVs and other)	10% (\pm 5.3%)	29% (\pm 9.1%)
Other sources (including chemicals, containers and other sources)	10% (\pm 7.0%)	9% (\pm 6.2%)
Type of injuries	2008 M-CAIS	2009 CAIS
Scrapes/abrasions	7% (\pm 5.2%)	7% (\pm 5.4%)
Bruises/contusions	10% (\pm 6.3%)	11% (\pm 5.6%)
Sprain/strain	13% (\pm 6.1%)	11% (\pm 6.6%)
Fractures	22% (\pm 8.8%)	32% (\pm 9.6%)
Cut/laceration	23% (\pm 12.4%)	18% (\pm 6.9%)
Other injuries**	21% (\pm 12.2%)	20% (\pm 7.8%)
Unknown	3% (–)	2% (–)

Note. Data courtesy of J. Myers, CDC/NIOSH.

*AI/AN only.

**Other injuries include dislocations, traumatic ruptures, amputations, burns, and other injuries.

experience significantly fewer injuries from vehicles (all-terrain vehicle [ATVs] and other) than the general youth farm population. The table shows that there are no significant differences between AI children and the general youth farm population for any other source of injury and no significant differences between AI farm youth and the general farm youth population in any type of injury.

A report of Fatal Injuries Among Children by Race and Ethnicity US 1999–2002¹⁵ stated AI children aged 1–9 experienced deaths at 1.5–2 times the rate of white children for motor vehicle traffic (7.0 vs. 3.1) and drowning (3.0 vs. 1.9). WISQARS special queries of 2008 data show that while rates for all accidents decreased for all age and racial groups from 2002, crude rates among AI remained 2.5 times higher for motor vehicle traffic (4.71 vs. 1.86) and 1.17 times higher for drowning (1.85 vs. 1.58) than for white children. For children 10–19 years, the pattern in 2002 was similar: mechanisms of death were experienced

by AI almost 2 times the rate of white children for motor vehicle deaths (27.6 vs. 16.7), poisoning (2.1 vs. 1.2), and drowning (2.2 vs. 0.9). 2008 data show the same proportionate risks: AI children experience 1.5x the rate of motor vehicle deaths (16.17 vs. 10.91), poisoning (4.65 vs. 3.13), and drowning (1.55 vs. 0.87). However, it is not possible to discern whether any of these deaths were related to agricultural injury.¹⁶

Additional reports on children's health¹⁷⁻²⁰ and agriculture-related injuries²¹⁻²⁴ do not provide distinctions based on race or ethnicity. Furthermore, no current IHS programs focus specifically on agricultural injury prevention, and IHS does not currently collect or compile data specifically related to childhood agriculture-related morbidity and mortality.

Finally, the National SAFE KIDS Campaign (NSKC) publishes the *Children at Risk Fact Sheet*. The fact sheet summarizing the data from 2004 reports that higher injury fatality rates in rural communities are due in part to the high number of farm-related injuries.²⁴ Children account for 20% of all injury-related farm fatalities and represent an even larger proportion of nonfatal injuries. However, this fact sheet does not provide any information to illuminate differences among ethnic and racial groups.

INJURY PREVENTION PROGRAMS FOR AMERICAN INDIAN COMMUNITIES

There are few national AI-specific injury prevention programs and a Google search did not identify any that are focused on risks from agriculture or from the agricultural environment. There are also specific tribal injury prevention programs, some of them focused on injury to children, but none could be identified that specifically focus on agricultural injury prevention.

At least two national programs work in partnership with AI entities (such as advisory boards or with the Indian Health Service). The US Environmental Protection Agency (EPA) has a Tribal Environmental Health Research

Program, Science to Achieve Results (STAR) Research Grants Program, in partnership with the National EPA Tribal Science Council. Tribal-specific Requests for Applications (RFA) were released in 2002 and 2007 and 2009. This program has awarded funds to tribal communities to better understand the health effects of environmental contaminants on tribal populations. EPA STAR tribal environmental health research has focused on identifying and quantifying cumulative risk, determining the impacts of climate change, and identifying dietary exposure risks of traditional subsistence diets. According to the Web site, future priorities will include new methods to assess environmental health exposure and for preventing exposure while maintaining traditional ways of life.²⁵ The STAR program released a new Tribal Environmental Health Research RFA in 2011. Research topics were determined by EPA and Tribal representatives through feedback gathered at the 2010 National Tribal Science Forum. Currently there is a call for "Safe and Healthy Communities: Tribes and American Indian/Alaska Native/Pacific Islander Communities Fellowship for Graduate Study" (EPA F2012-STAR-F5).

In 1997, the Indian Health Service (IHS) Injury Prevention Program instituted an initiative titled "Tribal Injury Prevention Cooperative Agreement Program (TIPCAP)."²⁶ The goal of the program was to support the efforts of tribal participants to develop, implement, and evaluate proven or promising injury prevention intervention programs. More than 70 grantees have been supported since 1997, leading to improvements in the program's effectiveness at addressing the injury prevention needs of tribal communities. New IHS Injury Prevention Program priorities are the reduction of injuries due to motor vehicles (including child passenger safety) and falls (addressing the dramatically higher risks of AI children as noted above in the results of the WISQARS queries). The IHS Injury Prevention Program also has two fellowship programs: Program Development Fellowship and Epidemiology Fellowship, 12-month programs for the purpose of increasing the capacity of tribes to promote injury prevention in their communities.

RECOMMENDATIONS

Improve Injury data

The data necessary to ascertain agricultural work-related injury and health risk for AI youth are lacking; what is available may be inaccurate due to underreporting and is not comparable to other data collected on majority populations. Data regarding injuries to children related to forestry and fishing, hunting, and trapping were not identified, but are important and likely a source of morbidity and mortality, because many tribes rely on these activities for their food, particularly in the Northwest (Oregon, Washington) where 71% of the tribes and 10% of the American Indian population reside.⁶ The YRBS does not collect information on injury (fatal or nonfatal), and the data that are available are not reported out into ethnic groups that include American Indian children. There are, however, two examples of efforts to improve the information specific to American Indian children. In 2001, The Bureau of Indian Affairs (BIA) conducted the YRBS among students in grades 9–12 attending schools funded by BIA. Also, in 2009, the Cherokee Nation, Nez Perce, and the Winnebago Tribe of Nebraska were given funds to support special versions of the YRBS in their sovereign nations.¹³ These are excellent models for partnerships to improve the capture of AI-specific data.

Policy and Programmatic Opportunities

There are several initiatives that could include a component focusing on childhood injuries in agriculture or in the broader categories of agriculture forestry and fishing (AFF). For example, the STAR Research Grants Program could release a request for applications to examine environmental risks for children related to agriculture, but this would be dependent on community priorities, which are elicited by the EPA during tribal forums. There may be opportunities for collaboration between NIOSH (where data exist on the injury risks to children on farms) and EPA (where data exist on the injury risks to children in the environment) to develop a presentation to inform the community about the

risks of agriculture and fishing for children, and put it on the agenda of the next national tribal forum.

The Indian Health Service (IHS) Tribal Injury Prevention Cooperative Agreement Program (TIPCAP) does not provide titles of the topics of the programs, and therefore there is no information to assess whether childhood agriculture-related injuries and mortality data were collected as part of the initiative. If this program is continued, there is an opportunity to address agriculture-related injuries to children.²⁶

Interventions

The literature suggests that parental supervision is important to avoid fatal and non-fatal injuries among majority populations and this suggestion is certainly relevant to AI families.^{27–30} One segment on the national radio program “Native America Calling” addressed this issue specifically.³¹ Given that AI families are more likely to be impoverished, it is important to know more about injury risk exposures and experience that could be mediated through training, improved organization of work practices, or other interventions. As an example, the US Department of Justice Office of Juvenile Justice and Delinquency Prevention Program is developing programs to address the issues of supervision for youth at risk.³² These programs could be adapted for AI families to reduce risk for agricultural injury caused by insufficient parental supervision on AI farms.

CULTURAL CONSIDERATIONS

Injury Data

Despite the addition of field surveys, the validity of the AI data in the M-CAIS data is uncertain. This assessment is based on personal research experience that validates the communal versus individual nature of tribes related to agricultural production³³ and cultural beliefs related to injury reporting, particularly with regards to vulnerable populations like children and elderly persons (personal communication: Gary Hathorn, New Mexico State University, 2006; Dr. Cameron Crandall, University of

New Mexico School of Medicine, 1997). Fewer members of AI populations have access to land line phones compared to the general population and remoteness of many farms precludes cell phone access. A high level of trust and collaboration is required to gather data in a culturally acceptable manner; this may result in approaches that are not consistent with the methodology used to implement surveys among majority populations.^{34–37} In addition, in many AI communities, discussion of death or dying is considered taboo because there is a widespread belief that the discussion in itself may bring on a death.³⁸ It is our experience that a participatory approach will increase the acceptability of collecting data and its accuracy so that that rates and proportions of injury can be compared to those of other populations. Agencies and researchers conducting injury surveillance are encouraged to work through the Indian Health Service (IHS), the Bureau of Indian Affairs (BIA), or other agencies, and to engage members of communities in the collection of agricultural injury data. The two examples of cooperation between the CDC YRBS program and AI agencies and tribes present models of collaboration that can be built upon.

American Indian Childhood Injury Prevention and Education

AI youth often participate in 4-H programs: nonformal, hands on, practical agriculture educational programs for youth in the community. Many of these programs teach safety prevention. Also, Extension Services (funded by Land Grant Colleges) provide an important educational and injury prevention role in AI communities. Extension is a certifying organization for the youth tractor certification program and 4-H programs currently provide injury prevention training. New proposed regulations and decreases in funding challenge the viability of these programs for AI communities.³⁹

SUMMARY

In summary, there is a paucity of data about injuries (fatal and nonfatal) to American Indian

children.^{40–41} Several data sources that compile information on injuries to children either do not collect information on American Indian children or do not make distinctions among races. American Indian farmers constitute a small proportion of all farmers and therefore the absolute numbers and rates of injuries are often too small to be meaningfully calculated. There are few injury prevention programs for children but none that focus on preventing injuries experienced by AI children in agriculture, forestry, or fishing. Nevertheless, there are opportunities to introduce programs and interventions to focus on injuries to American Indian children involved in farming. It will be important to ensure that that these programs (and surveillance initiatives) benefit from community participation in their development and implementation.

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