The Bemidji Area IHS Sleep Safe Program: Increasing Smoke Alarm Usage in American Indian Head Start Homes

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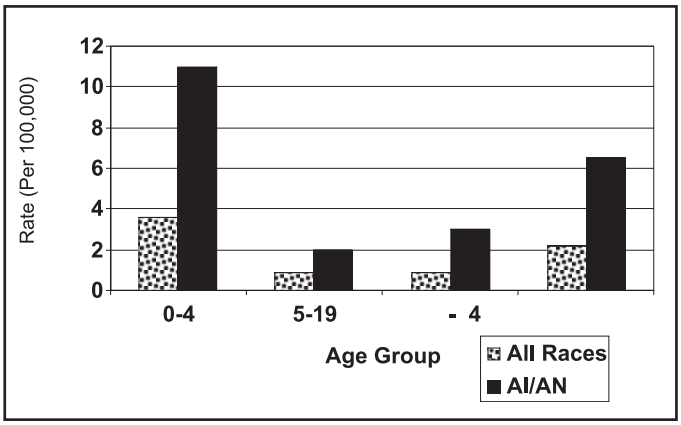
Introduction

The Bemidji Area Indian Health Service (BAIHS) Injury Prevention (IP) Program, part of the Environmental Health Service Section, provides services to 34 reservations in Minnesota, Wisconsin, and Michigan. Our program strives to reduce injury rates of American Indians (AI) by increasing tribal capacity in developing and implementing comprehensive local programs. This is achieved by IHS and tribal environmental health and injury prevention staff working in partnership with local communities in implementation of IP programs.

Although fire-related deaths and disparities have been declining gradually over the past two decades, the residential fire mortality rate for American Indians and Alaska Natives (AI/AN) is 1.5 times the national All Races rate.[1] In AI/AN populations, fire mortality rates vary geographically; they are highest in the north-central and middle western US and Alaska, where rates are 10 times the national All-Races rates.[2] The majority of fatal residential fires for all races combined occur in homes with absent or inoperable smoke alarm(s).[3] Other major risk factors include smoking, alcohol impairment, and physical disability.

Young AI/AN children (preschoolers) and elders are at highest risk of residential fire-related mortality[1]. The high rate of fire-related mortality in children has been attributed to their 1) limited ability to independently and/or quickly escape from a house fire; 2) lack of understanding of the need to escape from fire; and 3) difficulty in awakening from a deep sleep when a smoke alarm sounds.[4] In the Bemidji Area, young AI children aged 0 - 4 years old are at the highest risk of fire-related death (10.9 per 100,000)(Figure 1).[1] This is over three times higher than the All-Races rate for this age group (3.6 per 100,000) in Bemidji Area. Thus, Bemidji Area IHS has prioritized implementing fire safety programs aimed at reducing the exceedingly high rate of fire injury in young AI children.

Figure 1. Age specific fire- and burn-related deaths per 100,000 population, American Indians vs. All Races, by selected age groups, Minnesota, Wisconsin, Michigan combined (Bemidji Area IHS States), 1989-1998*



*Data presented are for years prior to implementation of the Sleep Safe Program

Since the first residential smoke alarm was patented in 1969,[5] they have proven to reduce residential fire-related death by 40 - 60 percent.[6] Although over 90 percent of homes in the US are reported to have at least one smoke alarm,[7] this is often not the case for AI/AN populations. In some AI/AN communities, fewer than half of the homes surveyed had even one operable smoke alarm, and smoke alarms were often disconnected due to frequent "nuisance" alarms from cooking or moisture from bathrooms.[8-10] Factors contributing to nuisance alarms in AI/AN homes include small home size (<1,000 square feet), prevailing use of frying as a cooking method, and location and type of smoke alarm installed.[8,9,11]

Many AI/AN children are enrolled in Head Start. Tribal Head Start grantees are funded through the Administration for Children and Families, Head Start Bureau, United States Department of Health and Human Services. The IHS Head Start Program, through an interagency agreement with the Head Start Bureau, provides preventive health support services for AI/AN grantees. Nationally, 197 tribal Head Start and Early Head Start programs provide comprehensive health, education, nutritional, and other developmental services to

25,911 AI/AN children ages 0 - 5 years in the US.[12] The local Head Start provides a central meeting place where children and parents congregate, classroom instruction and parent meetings, and education and interaction on a variety of topics, including health and safety. These messages are further reinforced by required home visits conducted by Head Start staff.

Several studies have shown that residential fire injury rates declined after targeting high-risk neighborhoods with smoke alarm installation combined with an education and media campaign.[13] Further, one study showed that Head Start home visitors were successful in increasing education and usage of smoke alarms in homes of Head Start children.[14] Consistent with these strategies, we created the Sleep Safe Program in 1998. The goal of this program is to reduce residential fire-related mortality in AI/AN children ages 0 - 5 years through provision of education and installation of smoke alarms. This program is a collaborative partnership between the IHS Division of Environmental Health Services, the US Fire Administration, and the IHS Head Start Program. It emphasizes community partnering via tribal Head Start programs, proper selection and location smoke alarms, education and reinforcement of fire safety educational messages, initial and follow-up home visits to assess smoke alarm operability, and proper installation of smoke alarms.

Methods: Sleep Safe Program Development

Indian Health Service Environmental Health Program staff coordinate the Sleep Safe Program's activities, with the lead Coordinator from the Oklahoma Area IHS and two co-coordinators from Bemidji Area IHS. The initial planning for this program involved a meeting in 1998 between IHS Environmental Health and IHS Head Start representatives to develop an outline for the curriculum.[15] The curriculum was intended to be flexible, based on the recognition that each community has a different set of needs, challenges, partners, and potential risk factors for fire-related injury. We also wanted to ensure flexibility for each site in designating their Sleep Safe Coordinator. The curriculum was drafted using a format consistent with that used in other Head Start educational materials. Additionally, activities were developed to meet Head Start performance standards in community partnering and safety.

Tribal Head Start programs are solicited annually to apply for the Sleep Safe Program. The University of North Carolina School of Public Health (UNC) provided assistance with development of a one-day annual Coordinator's workshop and on-going evaluation and monitoring for Sleep Safe sites participating between 1999 - 2001. They also evaluated the Sleep Safe curriculum annually and assisted in revising the program materials.

The initial curriculum consisted of four "guides" from which feedback was obtained by conducting three focus groups (3 - 6 participants each) of Arizona tribal Head Start teachers and community members who had reviewed and applied the materials at their respective sites. Input from the focus groups was used to improve clarity, readability, ease of application, content, and activities of the curriculum. A facilitator's guide from a resource manual previously developed through a collaborative project with the US Fire Administration to assist AI/AN communities in developing effective fire safety programs[16] was used to guide the focus group sessions.

Evaluation and revision of materials are key to ensuring the effectiveness of the Sleep Safe Program. On-going review of program implementation is accomplished through interviews with coordinators, evaluation of the curriculum and annual coordinator's workshops, retrospective data review, and quality assurance (QA) visits to homes by environmental health staff. The following are core components of the Sleep Safe Program:

Community partnering. Head Start's emphasis on community partnering allows each site to take advantage of local partners that can assist in implementation of their program. Such partners include environmental health, injury prevention, public health nursing, community health representatives, housing and fire departments, Honoring our Children (a Wisconsin program), and others. These partners assist with program implementation including training, data collection and analysis, and installation of smoke alarms.

Curriculum. The original curriculum was expanded from four to eight guides (Figure 2) and is used by project coordinators and their partners in developing and implementing their local comprehensive fire safety programs.

Training. An annual two-day workshop brings coordinators and their environmental health partners together to learn program goals and objectives, and administrative and technical requirements for project implementation. After the workshop, coordinators provide training to local Head Start staff, home visitors, parents, and Head Start students.

Home visits are provided by trained visitors initially and during follow-ups 2 - 8 months later.

Installation of photoelectric smoke alarms equipped with ten-year lithium batteries. Photoelectric smoke alarms were selected due to their lower rate of nuisance alarming.[8,9] We did not provide ionization models with hush buttons because 1) they are prone to nuisance alarming; and 2) many people tend to disable the smoke alarm rather than repeatedly activating the hush button.[17] Sites prioritize installation of smoke alarms to ensure that each home has at least one working smoke alarm. Additional smoke alarms, as available, are installed on each level of the home and in sleeping rooms.

Data tracking during home visits. The one page form collects smoke alarm presence and operability data during initial and follow up visits.

Each Sleep Safe site's progress is monitored via quarterly progress reports submitted to the IHS Sleep Safe Program Coordinator. These reports provide process data such as the number of initial and follow-up home visits conducted, smoke alarm operability, number of smoke alarms installed, training provided, and descriptions of other activities conducted.

Figure 2. Core components and purpose of the Sleep Safe Program Curriculum Guides*

Curriculum Guides		
Component		**Purpose**
1.	Coordinator's Guide	Describes the roles and responsibilities of coordinators and EHO's in implementing program activities
2.	Environmental Health Officer (EHO) Guide	Describes how to plan an effective smoke alarm distribution program, including installation, data collection, and follow-up activities
3.	Smoke Alarm Distribution Guide	
4.	Teacher's Guide	Describes fire safety educational activities that can be provided to parents and children by Head Start teachers
5.	Staff and Childcare Provider's Guide	
6.	Children's Guide	
7.	Tribal Partnerships Guide	Describes how to expand fire safety partnerships and activities to the larger community
8.	Resource Guide	Provides additional resources and Internet sites for fire safety information and activities

*Developed by IHS, USFA, and UNC to support the Sleep Safe Program

Because the goal of the Sleep Safe Program is to ensure at least one operable smoke alarm per Head Start student, impact data tracked are the percent increase in homes with at least one working smoke alarm as determined during initial and follow-up home visits. Anecdotal stories of Sleep Safe Program-installed smoke alarms alerting residents to fire are also collected and documented.

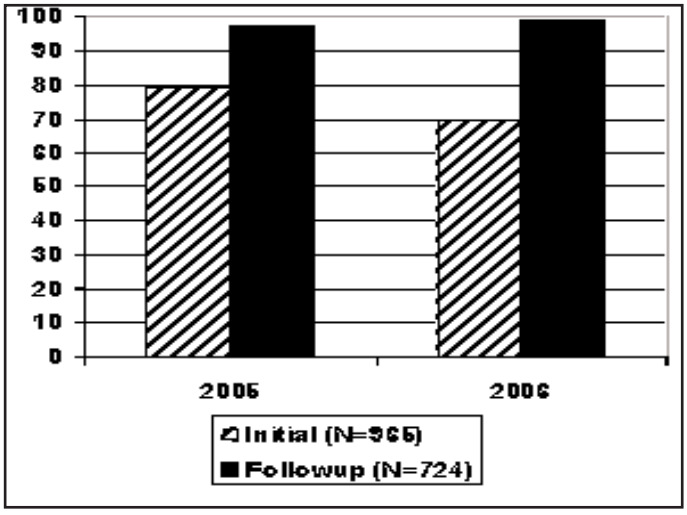
Results

Since fall 1999, 76 tribal Head Start grantees across the country have participated in the Sleep Safe Program as new or continuing sites. These programs have distributed over 20,000 smoke alarms. The results presented below focus on the efforts of the Bemidji Area IHS in implementing this program.

From 1999 to May 2006, the Sleep Safe Program has been implemented by 20 of the 27 Bemidji Area tribes with Head Start programs. Seven of the sites participated for four or more years, two participated for six years, and four participated for only one year. Bemidji Area IHS Sleep Safe sites installed 7,125 smoke alarms. The Minnesota Department of Health provided 984 of these smoke alarms. The cost of the smoke alarms installed by BAIHS Sleep Safe sites totals an estimated $106,876.

Prior to implementing the Sleep Safe Program in the BAIHS, we observed on several reservations that less than 50 percent of homes had at least one working smoke alarm. This is typical of sites in their first year of participation. Continuing Sleep Safe sites see many families re-enrolling their students for several years of Head Start, and their baseline smoke alarm operability tends to increase each year. During FY2005 and FY2006, among all sites in the Bemidji Area, smoke alarm operability increased 40 percent, from a baseline of 70 percent (N=965) to 99 percent (N=724) on follow-up visits (Figure 3). Because of the documented effectiveness of smoke alarms in reducing deaths in residential fires, the observed increase in smoke alarm operability would predict a decrease in residential

Figure 3. Percentage of homes with at least one working smoke alarm, initial and follow-up home visits, Sleep Safe Program Sites



fire mortality. Among American Indian/Alaska Native children ages 0 - 4 years living in the three states of the Bemidji Area (Michigan, Minnesota, and Wisconsin), there have been only two residential fire deaths in the five-year period 2000 - 2004. This compares to ten such deaths in the five-year period (1994 - 1998) preceding the implementation of Sleep Safe in 1999.[1] In addition, we have documented five anecdotal stories of lives saved by smoke alarms installed by local Sleep Safe programs.

Success in the Sleep Safe Program spurred some sites to expand activities within their communities to other aspects of childhood injury prevention. Six Bemidji Area Tribal Head Starts were funded by BAIHS for carbon monoxide (CO) detector installation projects that they did in conjunction with Sleep Safe activities. These sites distributed 906 CO detectors, usually as incentives to ease entry into homes during follow up smoke alarm visits. One site assisted a neighboring non-Tribal Head Start in implementing the program. Interest in child passenger safety led eleven Area Tribal Head Start grantees to apply for the Ride Safe Child Passenger Safety program. This program, implemented in FY 2003, was modeled after Sleep Safe in providing curriculum, educational outreach, and in this case, child safety seat installation. In Bemidji Area, implementation of the Ride Safe Program led to increased expertise of tribes in child passenger safety by training 41 certified CPS techs who distributed over 1,000 child safety seats.

During the initial years of the Sleep Safe program, problems were encountered in the quality of data obtained from many sites, especially those that discontinued participation in the program after one or two years. These problems included 1) forms submitted with inconsistent or missing data; 2) inclusion of self-reported data; 3) failure of some home visitors to fill out some or all of their forms; and 4) forms that were lost.

Discussion

Previous smoke alarm distribution programs often saw a lack of long-term operability of the devices. Residents frequently disconnected the smoke alarm if there were false ("nuisance") alarms, or they failed to replace a used battery. Sleep Safe addresses these problems by providing ten-year batteries and photoelectric alarms (which are less likely to nuisance alarm); educating parents about the importance of smoke alarms; and promoting parental involvement in the community fire safety effort.

Participation in Sleep Safe by tribal Head Start sites is voluntary. Successful implementation of the Sleep Safe Program varied among project sites. We sought to understand factors that contributed to sites that were able to implement the program and achieve increased smoke alarm usage. Characteristics of successful sites include a motivated coordinator; administrative support for the staff time commitment required of this program; and effective community partnering, especially with IHS or tribal environmental health and/or injury prevention staff. Although 20 sites in Bemidji Area have participated in this program, only seven continued for at least four years. This is due in part to high rates of staff turnover; variable support from Head Start administration; competing priorities and mandates; lack of support from local Environmental Health or Injury Prevention partners; and under-estimation of the time commitment. Some sites discontinued the program after a few years because they had saturated their communities with smoke alarms.

During the early years of the program, many sites were inconsistent in the collection and submission of good quality data. The first home visit data collection form collected volumes of data, some of which were unrelated to fire safety. One copy of this form was filled out during the initial home visit, and one during the follow up visit. Forms that were received often were incomplete, with inconsistent data, and often either the initial or follow up form for any given home was missing. Because of this, the home visit data collection form was radically simplified, with coordinator's feedback, to collect only smoke alarm installation and operability data. The two pages were combined into one page to keep initial and follow-up data together. A guide was also developed to facilitate and standardize staff training in data collection during field visits. In 2005 we implemented an on-line data collection and analysis program through *Surveymonkey.com*. This tool has greatly improved reporting and data analysis. The data training session was expanded at the annual coordinator's workshop, and we added a computer laboratory to teach participants data entry and analysis skills.

Random home visits for quality assurance made by a team of environmental health staff on one reservation revealed problems in home visitor standardization. Some of the home visitors had not physically tested the smoke alarms, instead they had telephoned residents or had the residents fill out their own data forms. Some home visitors installed smoke alarms incorrectly, suggesting a need for more effective training of home visitors. At one site, smoke alarms were simply handed out and not installed. We felt that these problems were due in part to lack of partnering by the site's local environmental health or injury prevention partner and lack of adequate training of Head Start home visitors.

Local environmental health and injury prevention staff can assist their sites by providing staff and community training, assisting with data collection and analysis, and in smoke alarm installations. Because environmental health and injury prevention staff, especially early on, were not often engaged in providing assistance to their sites, we cemented the relationship between them and their site in several ways, as follows: 1) we developed an Environmental Health Officer's (EHO) Guide to define the roles and responsibilities of EHOs to their sites; and 2) we required attendance by the EHO at the annual coordinator's workshop. After we made the above changes to data collection and EHO partnering, we obtained our first complete data sets for BAIHS sites during FY 2005 and FY 2006.

Conclusion

The BAIHS Injury Prevention Program recognizes that reducing injuries depends on the active involvement of communities. It aims to partner with communities to address local injury problems through locally developed solutions. We have demonstrated that the Sleep Safe Program is a promising strategy for increasing the number and operability of smoke alarms in homes of high-risk AI/AN Head Start children. It has also stimulated the development of community partnerships and expansion into other aspects of childhood injury. The Sleep Safe program can serve as a model and tool for local groups to use as a starting point for addressing fire and other injury problems in their communities.

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