

Children and Smoke Alarms

Will your child awake to the sound of a smoke alarm in the event of a fire emergency?

A number of video news features and, more recently, Internet postings have depicted sleeping children's responses to smoke alarms. The first news feature appeared in 2001 on WCCO-TV in Minneapolis produced with the help of the Bloomington, Minnesota Fire Department. Since WCCO conducted its news story, similar news stories have aired across the United States. While these news stories lack the controls and specifications required for research, they have made one point clear – **Children can sleep through smoke alarms.**

According to published reports, researchers have long known that children sleep differently from adults and that their sleep is especially sound in the hours soon after they first fall asleep. The younger the child, the longer the deep-sleep phase is likely to last. Since children aged 5 and under and adults 65 and older (for whom smoke-alarm waking effectiveness might also be an issue) are twice as likely as the general population to die in a home fire, the research has commanded the attention of everyone interested in fire safety in the home.

Dr. Dorothy Bruck, a psychologist at the School of Psychology, Victoria University in Australia, did the original research into this issue. For children 15 and under, the reliable waking rate to a 60-decibel alarm sounding at pillow level was only 5.6%. In contrast, Bruck found all of the parents woke when the alarms sounded. In another study where the sound level was increased to 89-decibels, she concluded that louder, closer alarms were unlikely to solve the problem. No comparable research has been published by Bruck's peers to verify her findings.

In light of the above research and other studies, the National Fire Protection Association (NFPA) pointed out the overwhelming data demonstrating smoke alarms' proven benefit. Since the early 1970s, when smoke alarms made their way into homes, residential fire deaths have been cut in half.

A working group organized by ULC and UL brought together a multidisciplinary panel of experts, comprised of pediatric sleep experts, safety engineers, consumer interest groups and manufacturers including sleep researchers, to better understand the physiological and technical aspects of the issue.

(ULC convenes Subcommittee to study why some children may not awaken to smoke alarms *Public education to play key role in addressing issue in Canada: 4/29/03;*

http://www.ulc.ca/About_ulc/news_detail.asp?News_ID=38). Their report in 2003 made the following observations:

- based on the working group deliberations, this is a complicated issue that might not have a single, easy answer;
- children's sleep patterns may prevent them from being able to hear and react appropriately to alarms. If, and until, a technological solution can be found, awareness of the issue will be a pressing concern for the fire safety community.

There were no radical technological changes recommended to address this issue, however, the need for more research on this issue was recognized. The subcommittee also emphasized that smoke

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alarms – when maintained properly – continue to save lives every day, and that consumers should consider them a reliable “front-line defense” against fire.

Conclusions:

- Families should not forgo smoke alarms; NFPA statistics show that home smoke alarms are nearly as effective at saving the lives of children age 6 to 10 as they are in saving the lives of everyone else, although it may often be that the parents, not the alarms, are waking their children.
- What is imperative at the moment is for the public to understand the need to not rely solely on smoke alarms as the entire answer to escaping from fire. These recent news events serve to reinforce the need for home escape planning. Smoke alarms are a tool in the planning process. Parents need to clearly understand their supporting roles in the escape plan.
- Adult caregivers have a vital role and responsibility in waking up children and teenagers to the sound of smoke alarms. As children can be ‘deep sleepers’, caregivers should never assume that activated smoke alarms will awaken and alert their sleeping children. As part of their home fire escape plan, caregivers must make it their responsibility to awaken and evacuate children in a fire.
- If caregivers plan to leave their children in the care of a babysitter, they should review the home fire escape plan with the babysitter. They should also test the smoke alarms in the presence of the babysitter. This will ensure that everyone knows what to do in case of fire and will be able to escape safely.
- In addition, caregivers should consider the fact that smoke alarms may not awaken teenagers, older adults, people who take medication or those with sleep disorders (e.g. sleep apnea).
- Every household must assess the needs of its members and determine if anyone has special needs. These special needs must be taken into consideration when developing and practicing the home fire escape plans.
- Currently, the solution for individuals with special needs consists of using different types of smoke alarms and planning a fire escape that relies on the assistance of family members.
- Vocal smoke alarms, a recent technological innovation, may be a solution but again there are not enough trials to prove their reliability. Furthermore, smoke alarms with voice recording capability may not be effective either, as children may sleep through a parent’s instructions to wake up and evacuate. Also, the duration of the recording allowed may be too short and one message cannot be applicable to all possible fire scenarios. There is also a need to repeat a warning message which is not possible with these devices.

According to the National Fire Protection Association (NFPA), although children under 16 have longer periods of deep sleep than adults and do not reliably wake in response to smoke alarms, “there is no evidence that children have a higher fire death rate because of the inability to wake to a smoke alarm.” They noted that the smoke alarms that are currently available are effective at waking adults who are not under the influence of alcohol or drugs or who are not sleep deprived. However, the devices may not be reliable for older adults with hearing loss. The home layout and smoke alarm locations can influence whether the warning will be heard; earlier warning is provided by interconnected smoke alarms (2007 NFPA report (U.S. EXPERIENCE WITH SMOKE ALARMS AND OTHER FIRE DETECTION/ALARM EQUIPMENT. Marty Ahrens; Fire Analysis and Research Division, National Fire Protection Association (2007)).

For more information, please contact the Alberta Emergency Management Agency at (780) 422-9000 (dial 310-000 for toll-free access outside of Edmonton) or visit www.aema.alberta.ca
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