CHILDREN PLAYING WITH FIRE

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Abstract

In 2006, an estimated 14,500 child-playing structure fires were reported to U.S. municipal fire departments, with associated losses of 130 civilian deaths, 810 civilian injuries, and $328 million in direct damage. Fifty-eight percent of these structure fires took place in the home. Most child-playing home fires begin with lighters or matches. The items ignited by home fire-play are principally mattresses, bedding, or clothing followed by magazines, newspaper, or writing paper, and upholstered furniture or vehicle seats. Nineteen percent of people who start reported fires by playing are 4 year olds. Nearly two thirds (63%) of all fatal victims of fires by playing are children 5 years old and younger. Estimates are based on data from the U.S. Fire Administration's (USFA) National Fire Incident Reporting System (NFIRS) and the National Fire Protection Association's (NFPA) annual fire department experience survey.

Keywords: Child playing, fire-play, firesetting

Acknowledgements

The National fire Protection Association thanks all the fire departments and state fire authorities who participate in the National fire Incident Reporting System (NFIRS) and the annual NFPA fire experience survey. These firefighters are the original sources of the detailed data that make this analysis possible. Their contributions allow us to estimate the size of the fire problem.

We are also grateful to the U.S. Fire Administration for its work in developing, coordinating, and maintaining NFIRS.

For more information about the National Fire Protection Association, visit www.nfpa.org or call 617-770-3000. To learn more about the One-Stop Data Shop go to www.nfpa.org/osds or call 617-984-7443.

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Executive Summary

In 2006, an estimated 14,500 child-playing structure fires were reported to U.S. municipal fire departments, with associated losses of 130 civilian deaths, 810 civilian injuries, and $328 million in direct damage. Of these fires, 4,300 were confined to trash or rubbish bins. Losses from confined fires are minimal. An estimated 8,500 fire-play structure fires occurred in the home, resulting in 94% of the fire-play civilian deaths, 95% of the civilian injuries, and 61% of direct property damage.

The figures for 2006 structure fires, deaths, and injuries are the lowest ever recorded. It is possible that definitional changes in the code for fires involving playing, as well as changes in the relationship of this cause to other causes, like intentional, are factors in the apparent decline, which may be less than the stated results.

Most child-playing home fires are started with lighters or matches. The decline in child-playing lighter fires and losses, which coincided with the introduction in 1994 of the Consumer Product Safety Commission (CPSC) child-resistant lighter standard, has coincided in time with an equally large and sustained decline in child-playing home match fires and losses. One reason may be that the trend for child-playing match fires was already declining before 1995, while child-playing lighter fires had been increasing for several years before 1995. Another factor may be a generally heightened awareness of the child-playing fire problem. It may reflect growing success in public fire safety education programs, which provided more attention to child supervision and other steps to reduce the child-playing fire problem, and did so at the same time that the lighter standard was being introduced. It is also possible that there is significant miscoding of fire-play with lighters as fire-play with matches – or that there used to be. If there has been a shift from matches to lighters, a point on which we have no information that could have played a role in the opposing trends seen before 1995.

The items ignited by home fire-play are principally mattresses, bedding, or clothing, followed by magazines, newspaper, or writing paper, and upholstered furniture or vehicle seats. Almost half (42%) of child-playing home structure fires begin in the bedroom.

Nineteen percent of people who start reported fires by playing are 4 year olds, which resulted in 38% of civilian fire deaths. Nearly two thirds (63%) of all fatal victims of fires by playing are children 5 years old and younger. People aged 21-39 are 38% of fire-play injury victims. It seems clear that non-fatal injuries often involve parents or other caregivers, but fatal injuries rarely do.

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February 10, 2009

My name is Thomas Papa. I am the current President of the New York Fire Alarm Association. I am a Licensed Fire Alarm installer in New York State, involved in Installation, maintaining, servicing and inspecting fire alarm systems since 1993. I am also Level II Certified in Fire Alarms Technology by the National Institute for Certification in Engineering Technologies (NICET). I speak on behalf of the New York Fire Alarm Association.

The New York Fire Alarm Association is a representative organization of Engineers; Manufacturers; Installers, Fire Alarm Equipment Distributers and Central Office Monitoring Companies.

Its principle mission is to provide for the education of its members and to insure that they remain current and up to date as regards to codes and standards. Individuals within this organization have been an integral part of the NYC Building and Fire Code development process as far back as the landmark legislation for high-rise buildings known as local law #5 of 1973.

All Fire Alarm installations are subject to a test and inspection by the Fire Alarm Inspection Unit in accordance with the applicable codes governing the work.

The successful installation of a Fire Alarm system is a multi-disciplined activity requiring knowledge of Electrical Codes, Construction Codes and Standards such as National Fire Protection Association (NFPA) and American National Standards Institute (ANSI) and The Americans with Disabilities Act (ADA). The installation of Fire Alarm Systems involves the application of over 50 recognized standards which deal with installation requirements. It requires approvals from Underwriters Laboratories (UL Inc) and\or Factory Mutual (FM) to name just two laboratories.

The list is voluminous since it is the Fire Alarm System that integrates all aspects of building systems not the least of which is the basic alarm functions to notify the occupants but control such functions as elevator recall and smoke control and notification to the Fire Dept.

Everything related to Fire Alarm is codified in one form or another

Members of our association are required to maintain proficiency through a variety of certifications by which they maintain their qualifications.

As an organization which has intimate connections with the Fire Alarm Inspection Unit we ask that this unit be provided with much needed support so that they have the necessary tools both educationally and physically to perform their vital role of insuring the public's safety.

We strongly urge that all inspectors be required to have a minimal level of certification by way of NICET, NFPA or ICC courses. We also advocate a continuing educational program designed to allow for the upgrading of their skills to keep pace with this dynamic and ever changing field.

This is extremely necessary as the new NYC Construction Code nears implementation.

We strongly advocate more complete testing of systems. Recognizing that this is not easy in terms of available manpower and current methods we believe it can and should be done.

This takes more time than is currently allotted and will require the cooperation of the Fire Dept and Industry to develop the methodology for this to happen.

This organization and its members depend greatly on the Fire Dept. Inspection Unit and its ability to perform knowledgeable, thorough and timely inspections.

We trust that this hearing will provide the impetus for a modernization of the unit as a partner which is responsible for the life safety of the residents of the City of New York.

I would like to start by urging a Reactivation of the FDNY Industry Advisory Board.

1 The FDNY Industry Advisory Board was established on 9/12/1989 by then Chief of Fire Prevention Joseph DeMeo, at the request of the Automatic Fire Alarm Association of New York.

2 The Fire Department Industry Advisory Board meetings were held by several subsequent Chiefs of Fire Prevention on the first Thursday of each month (except for July and August) from 1989 to 2001. Then a few meetings were held in 2002 and 2003.

3 The attendance list from 9/12/1989 shows representation of the FDNY, Buildings Department, Society of Fire Protection Engineers, Fire Safety Directors Association, Automatic Fire Alarm Association (The predecessor of the NYFAA), Real Estate Board, NY Fire Sprinkler Contractors Association, Building Owners and Managers Association, NY Board of Fire Underwriters, NYC Builders Association. Over the years, representatives of the Port Authority, NY Society of Architects, Society of Professional Engineers, Local 3 IBEW and the Sub-Contractors Association also attended these meetings.

4 For almost 15 years, the Industry Advisory Board served as a conduit of information flowing from the Fire Department to the private industry and vice-versa. It's many accomplishments included code changes after the first World Trade Center bombing, convincing the Port Authority to replace their centralized emergency lighting and fire alarm (which on 9/11/2001 helped save thousands of lives), revision of Halon 1301 regulations, revisions of Central Station monitoring regulations, several memoranda and code interpretations regarding free egress in fire- and non-fire emergencies, etc.

5 Since 9/11/2001, there were only a few IAB meetings; last of them on April 15, 2003.

6 We strongly believe that the presence of IAB helped disseminate information from the Fire Department and allowed for a constructive dialog between the FDNY, DOB, Real Estate and the fire protection industry.

7 With numerous problems related to the fire protection industry, building up over the past few years, and adoption of the IBC, there is even more need for re-activation of the Fire Department Industry Advisory Board as soon as possible.

Other additional members of our association will be speaking in more specific terms as to the steps which this association feels will enhance the effectiveness of the Fire Alarm Inspection Unit.

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Statement to the City Council Committee on Fire and Criminal Justice Services in relation to the Oversight: Review of the FDNY Fire Alarm Inspection Unit

My name is Edward Keshecki. I am the owner of Statewide Fire Corp located on Staten Island and we are an FDNY Approved Central Station where we monitor several thousand New York City fire alarm systems. I am currently Vice President of the NY Fire Alarm Association. I am a member of the National Fire Protection Association Building Fire Safety System Section and I am Level IV Certified in Fire Alarm Technology by the National Institute for Certification in Engineering Technologies (NICET). I am also a member of the NY Fire Safety Directors Association, and the Society of Fire Protection Engineers.

Central issues related to the scheduling, the conducting of inspections, and the entire process leading up to acquiring a fire alarm system Final Letter of Approval are directly related to a lack of resources.

The NYFAA recognizes the current lack of resources to adequately manage all inspections, documentation, and defect corrections. Bringing the existing system in line with current technologies will encourage time management, document standardization, document control and accessibility, data retrieval and storage through an electronic database which will generate revenue and increase public safety.

Lacking current technology, the present system often results in the following.

Inspections dates for fire alarm systems often run three months, and sometime longer. The engineer, building owner, electrician, and fire alarm company would have to file for an inspection date at least three months prior to completion of the fire alarm system in order to obtain a timely inspection.

In the case where an inspection date needs to be rescheduled, calling the telephone number provided by the FDNY has not proven to be a viable solution. Much of this communication can and should be performed via e-mail. This would allow for immediate notification of a schedule change by the FDNY and would eliminate situations where fire inspectors arrive to premises where concerned parties have tried to reschedule inspections. E-mail and cell phone communications would provide instant communication between the FDNY and those needing to reschedule or cancel an inspection.

It can also take up to several more months to obtain the actual FDNY Letter of Approval due to the internal policy that requires payment of the inspection bill before the document is issued. This should be a collections matter and should not be related to the issuance of the Letter of Approval. Further, credit card payments are presently accepted by most city agencies. The acceptance of credit cards as payment would simplify and expedite the process.

There are code related issues which presently are considered to be subject to interpretation by fire inspectors. Consistency during installation will lead to consistency during inspection. Consistency during installation can only occur when written clarifications are issued by the FD relative to items which may be subject to interpretation, and more importantly that information must be distributed to, and applied uniformly by, all fire inspectors and all members of the fire alarm industry. As a suggestion, the NYFAA and the FDNY could design a standardized inspection form to be used for different occupancies being inspected.

Based on the Comptroller's Audit Report, there are currently over 4000 open Letters of Defect and Violation Orders that have not been closed out. An increase in staffing, combined with the use of modern technologies such as PDA's and laptops, would allow the department to generate revenues exceeding the expense involved. Additionally, the revisiting and closing out of these pending Letters of Defect and Violation Orders will insure that proper corrective measures have been taken thereby providing the public with the protection that the system was intended to provide.

The NYFAA has the means to promptly disseminate new information through our website, our meetings, and the Symposium we will be holding in June of this year.

The NYFAA would also welcome input from the FDNY Inspection Unit, if they are aware of particular items that are frequently written on Letters of Defect which are not addressed by electricians and fire alarm system installers. This is just one item which would be addressed by the reactivation of the FDNY Industry Advisory Board. When the FDNY and the fire alarm community work together, the result would certainly be consistency in installation and inspection.

Providing the inspection unit with new technology and adequate staffing is absolutely essential if the unit is to function efficiently and in a manner which will greatly increase productivity and most certainly increase revenue.

Thank You

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February 10, 2009

Statement to the City Council Committee on Fire and Criminal Justice Services in relation to the Oversight: Review of the FDNY Fire Alarm Inspection Unit.

My name is Zygmunt Staszewski. I am a Licensed Professional Engineer in New York State, involved in design and inspection of fire alarm systems since 1982. In addition, for 17 years now I have been teaching fire alarm courses at the New York University - School of Continuing and Professional Studies. I am also a New York State Certified Instructor authorized to conduct Security and Fire Alarm System Courses required for NY State Licensing. I am also Level III Certified in Fire Alarms Technology by the National Institute for Certification in Engineering Technologies (NICET).

I was the Founding President of the New York Fire Alarm Association Inc. and currently serve as Advisor to the Board of Directors. I speak on behalf of the New York Fire Alarm Association Inc.

I would like to address one of the most important topics related to the Fire Department's Fire Alarm Inspection Unit - training and certification of the inspectors. Currently, under the Department of Buildings rules for Special Inspection Agencies already in effect, personnel conducting inspections of fire alarm systems, when not inspected by the Fire Department, must be NICET Level II certified in Fire Alarm Systems and work under a supervision of either a NY State Licensed Professional Engineer or a NYC Licensed Master Electrician. Under the present Fire Department rules, there are no established certification requirements for either the Fire Alarm Inspection Unit inspectors or their supervisors. We believe that the Fire Alarm Inspection Unit shall take advantage of the NICET certification program currently recognized by many Cities and 31 States.

Back in the 1980's Fire Department Chief Inspector Milton Fishkin was a Licensed Professional Engineer. Currently there are no Professional Engineers supervising all inspection units within the Bureau of Fire Prevention, which I believe is contrary to the New York State Educational Law.

In late 1990s the Automatic Fire Alarm Association (precursor to the New York Fire Alarm Association) conducted several NICET courses. At that time we invited all Fire Alarm Inspection Unit inspectors to participate in our training at no charge and many of them did. Such training gave them an thorough knowledge of the National Fire Protection Association Standard NFPA 72, currently known as the National Fire Alarm Code. Please note that both the NYC Building Code (effective July 1, 2009) and the NYC Fire Code (effective July 1, 2008) adopted the 2002 version of NFPA 72. Therefore, knowledge of NFPA 72 and certification based on such code will be crucial to conducting proper inspections of fire alarm systems designed and installed under such code.

The New York Fire Alarm Association will be soon conducting additional courses on NFPA 72 and preparation courses for the NICET Certification. We welcome all Fire Alarm Inspection Unit inspectors and supervisors to attend these courses. After the courses, we will welcome their participation in NICET examination and certification process, which will result in an unified standard.

Testimony of John C. Dean, Immediate Past President
National Association of State Fire Marshals
In Support of Proposed Int. No. 884-A, Novelty Lighter Act
February 10, 2009

Distinguished Members of the Committee on Fire and Criminal Justice Services, my name is John Dean. I am Immediate Past President of the National Association of State Fire Marshals (NASFM), whose members are the senior state-level fire officials in the United States and the District of Columbia. I am also the State Fire Marshal of Maine, and am proud to say that, in March of 2008, Maine was the very first state to pass a statewide ban on novelty lighters.

I appear here today on behalf of NASFM in support of Proposed Introduction No. 844-A, the Novelty Lighter Act. It is a well-crafted bill, and its passage will be an important step toward decreasing fire losses in your city, and protecting our most important resource – our children.

According to the National Fire Protection Association, "In 2006, children playing with fire started an estimated 14,500 structure fires that were reported to U.S. fire departments, causing an estimated 130 civilian deaths, 810 civilian injuries and $328 million in direct property damage." NFPA notes that "Nearly two-thirds (63%) of all fatal victims of fires by playing are children 5 years old and younger." Further, "Nearly two out of every three child-playing fires -- and four out of five associated deaths and injuries -- involve matches or lighters."[1] New York City's Child Fatality Report released in May of 2008 noted that, over the six years covered in the report's review, one-quarter of the city's child fire deaths resulted from children playing with matches or lighters.[2]

We also know that this is not only a young-child issue. Data collected in Oregon show that the majority of youth involved with fire are ages eight and above. Oregon data also show an alarming trend starting in 2005 that the preferred ignition source in 70 percent of the incidents was a lighter. This is up from 55 percent in 2002. Maine data show that children under the age of 6 account for nearly 8 percent of firesetting activity, while children between the ages of 6 and 16 account for more than 85 percent of set fires.

A youth intent on setting fires and harming others needs psychological help and close supervision. But many youths are curious about fire, and even one small mistake can prove deadly. Homes contain an abundance of products that can serve as fuel for deadly and

[1] "Children Playing with Fire" report by Jennifer D. Flynn, National Fire Protection Association, January 2009.

[2] "New York City Child Fatality Report," Child Fatality Review Team, New York City Health Department and New York City Fire Department, May 2008.

destructive fires, and an open flame is a dangerous and destructive ignition source in the hands of a youth.

Toylike, or novelty, lighters by design have characteristics that make them appealing and intriguing to adults and children alike. This presents a risk to our youth that is both unacceptable and preventable.

Though lighters defined as "novelty lighters" are required to comply with the federal child-resistance standard, this is not enough to keep children from starting fires with novelty lighters. The additional attraction of shapes, colors, sounds or other entertaining features could mean that a child may work – or play – extra hard to defeat the mechanism. Moreover, the federal child-resistance standard is designed to deter 85 percent of children under age 5, but children age 5 and over are also attracted to these products, and older children are more likely to have the additional dexterity to defeat the child-resistant mechanism. Novelty lighters also may be more accessible to children than other types of lighters, because their owners often put them out for display rather than locking them in a drawer or cabinet.

The fire service is only starting to collect statistical data on the prevalence of fires, injuries and deaths from fires started by children using novelty lighters specifically. Most of the data available on these types of fires is anecdotal, and probably every firefighter has such a story. We saw the news report that last October, five people – parents and three of their four children – died in a house fire in your Chelsea neighborhood that fire marshals determined was started by a kid playing with matches or a lighter.

While we may not be able to prevent all childplay fires, removing the temptation of toylike lighters by preventing their retail sale or distribution is a logical and relatively easy move to make, and will almost surely reduce the incidence of these types of tragedies.

You do not need to worry that you are alone in this endeavor. There is growing movement in the states to implement bans on the sale of novelty lighters, so you are in good and important company. The National Association of State Fire Marshals makes a model novelty lighter bill available to our members, and it is very similar to the bill you are considering today.

In my state of Maine, I can tell you that this was the least controversial bill that I have ever been involved with. It passed easily and we have had no problems with enforcement. At my request, a leading convenience store operator in the state even stepped up and stopped selling novelty lighters voluntarily before the ban was passed.

Prohibiting the sale of novelty lighters would not prohibit people from buying a lighter that actually looks like a lighter, if they need to have one. It would simply remove the items that pose a great danger to our children.

We in the fire service have learned that there is no single silver bullet to reducing fire losses. We need a tool box of approaches, including smoke alarms, safer furniture and other consumer products, residential sprinklers, and public education. Removing novelty lighters as an instrument of child fireplay is simply the right thing to do.

Thank you for inviting NASFM to testify on this bill. I would be happy to answer any questions that you may have.

Lighter Association Inc.

www.lighterassociation.org

TESTIMONY OF DAVID H. BAKER
GENERAL COUNSEL, LIGHTER ASSOCIATION

Before the Committee on Fire and Criminal Justice Services
The Council of the City of New York

Mr. Martinez and Members of the Committee:

My name is David H. Baker and I serve as General Counsel to the U.S. Lighter Association, Inc. I helped form the Lighter Association in 1986 and have served as General Counsel for the past 23 years. I am very familiar with federal, state and local regulation of disposable lighters, refillable lighters, utility/grill lighters and novelty lighters.

Our members manufacture and/or distribute approximately 600 to 700 million lighters a year in the U.S. market. Members include such household names as BIC, Calico, Cricket, Ronson and Zippo. Our primary goal as an Association is to preserve and expand safety regulations for lighters. The Association was instrumental in drafting and lobbying for child-resistant lighter regulation in the U.S. and abroad in the '90s. We have also been pushing for stricter general safety standards at the federal level, and have a pending rulemaking before the U.S. Consumer Product Safety Commission on this topic. Finally, we have been involved with novelty lighter legislation in approximately fifteen states during the past two years.

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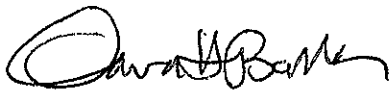
I am honored to have the opportunity to testify before this Committee. Let me make my testimony very simple and very clear. **Int. No. 884-A is an excellent proposed law**. It is extremely well written and uses precise and clear terms (as appropriate for banning legislation). It could well serve as the model for municipalities and states considering this issue throughout the country.

Make no mistake about this point. **Novelty lighters are stupid**! There is absolutely no reason to allow the sale of a lighter product, which emits a flame, but looks like a toy. Lighters are a useful tool to light tobacco products, fireplaces, camp fires, grills, etc. They are utilitarian products designed to produce a flame. They are not toys or novelties or gimmicks. And they certainly are not intended for children. **Lighters that look like toys should be banned.**

We commend the Committee for this proposed law. It has the 100% endorsement of the U.S. Lighter Association.

Respectfully submitted,



David H. Baker
General Counsel

February 10, 2009

Testimony before the Committee on Fire and Criminal Justice Services

By

William M. Webb

Executive Director, Congressional Fire Services Institute

February 10, 2009

Good day.

It is an honor for me to testify before the Committee on Fire Criminal Justice Services on the proposed measure pending before the Council of the City of New York to ban the sale of novelty lighters.

I serve as the Executive Director of the Congressional Fire Services Institute, a nonprofit, nonpartisan policy institute in Washington, DC designed to enhance congressional understanding about the challenges and needs of our nation's fire and emergency services. Working in close consultation with the Congressional Fire Services Caucus, the largest caucus in Congress with over 300 members, the Institute fulfills its mission to members by providing them white papers and briefings on public safety issues, assisting them in developing federal legislation and offering them an array of unique hands-on training programs, exposing them and their staff to the fire and emergency services.

The strength of our organization is our National Advisory Committee (NAC), composed of 42 national fire and emergency services organizations including all the major fire service organizations. The NAC sets our agenda by approving resolutions addressing national public safety issues. In 2007, the National Association of State Fire Marshal presented a resolution before the NAC to encourage the Consumer Product Safety Commission to ban the sale and use of novelty lighters that appeal to children. The resolution was approved unanimously.

Shortly after the vote, we began work with members of Congress who introduced federal legislation to ban the sale of novelty lighters in the US. Congress failed to act on the measures during the 110th Congress, but we expect similar legislation to be introduced in the 111th Congress. Until federal legislation is approved, the fire service will continue to address the issue at the state and local levels where we are already seeing progress being made. Maine and Tennessee have banned the sale of novelty lighters and 18 states are working on state-wide legislation, including Oregon where the House recently approved a measure banning such lighters.

Novelty lighters as you know take on the appearances of toys, cartoon figures, scaled- down versions of vehicles, weapons, animals... basically anything that can capture the attention and imagination of adults and children, alike. I can't tell you the number of times I have taken one of my three children to a convenience store over the years and been asked whether I would purchase what appeared to them as a toy when in fact it was a lighter.

A novelty lighter is not something a person keeps in his pocket; it is a display piece which is part of the appeal. A child sees a novelty lighter and his naturally tendency is to pick it up and play with it. What else would you expect a child to do with a lighter that resembles a toy gun, hammer, or a scaled-down version of Nemo? The European Union realized the dangers these lighters present to young children and banned their sale as of March, 2007.

Each year, over 3,000 people die in fires and thousands more suffer debilitating injuries that leave them scarred for life. When a child suffers a scrape, a bump or a bruise, or when he has to get stitches, the wound in time will heal and that child will eventually lead a normal life. But when a child suffers a burn, the scars will remain despite the incredible advancements in burn treatment and that child has to live with that scar. And if the scar is significant, there is often an emotional scar that a child will have to endure for life.

I commend the National Association of State Fire Marshals for its leadership on this issue. In particular, Nancy Orr, former Oregon State Fire Marshal deserves credit for elevating the issue to the national level. During this brief opportunity I attempted to convey my reasons for supporting your efforts in the city of New York to ban the sale and distribution of novelty lighters. But the best reason I have heard was succinctly stated by Fire Marshal Orr when she said, "There is simply no good reason for a hazardous substance, a flammable liquid, to be placed in a toy-like container."

Again, I thank the Committee for this opportunity to present my testimony and for considering action that would be in the best interest of public safety.

FIRE DEPARTMENT OF NEW YORK

TESTIMONY
OF

Thomas Jensen
Chief of Fire Prevention

BEFORE
THE CITY COUNCIL COMMITTEE
ON
FIRE AND CRIMINAL JUSTICE SERVICES

February 10, 2009

Introduction

Good morning Chairman Martinez and Committee members. My name is Assistant Chief Thomas Jensen, and I am the Chief of Fire Prevention for the New York City Fire Department (FDNY). Thank you for the opportunity to speak with you today about the FDNY Fire Alarm Inspection Unit. I am joined today by Assistant Chief Richard Tobin, also of the Bureau of Fire Prevention, and Department Counsel, Julian Bazel.

The FDNY Bureau of Fire Prevention is responsible for protecting residential and commercial properties throughout New York City by enforcing local laws and regulations pertaining to fire protection. The Fire Alarm Inspection Unit is within the Bureau of Fire Prevention. Its mission is to ensure fire and life safety in both the public and private sectors via the implementation of a citywide program of fire alarm systems, fire detection systems, emergency fire voice communication systems and other related fire preventive and fire protective notification, detection and extinguishing systems. This includes systems located in facilities throughout New York City, including office buildings, hotels, hospitals, schools, nursing homes, department stores, health clubs, dormitories, day-care centers and cabarets.

The Fire Alarm Inspection Unit has a dedicated, highly experienced staff of 26 that includes a Director and Deputy Chief Inspector, three Supervisors, four clerks and 16 inspectors.

In the past, we had difficulty hiring inspectors for the unit because of relatively low starting salaries, a protracted hiring process and some stringent eligibility requirements. We had a limited applicant pool and a continuing inability to meet our

headcount. This affected our ability to keep up with industry demand for fire alarm inspections during this decade's unprecedented construction boom. Related issues surfaced in a report by the Comptroller in June 2007. The Department has begun to implement many of the recommendations contained in that report.

We have now been able to get back up to headcount through an aggressive recruitment effort over the last two years. Filling these vacancies has enabled us to strengthen the management of the unit, including adding more supervisory inspections and streamlining the unit's record keeping.

Among the management improvements we have made are:

- A new procedural manual for the unit;
- A new system for checking out files;
- A uniform system for tracking inspections;
- Improving the data we track and report in the Mayor's Management Report;
- Training Inspectors in the basic elements of Field Activity Routing and Reporting (FARR);
- Auditing 5 percent of the Letters of Defect we issue; and
- Instituting regular Supervisory Inspections.

Following the Comptroller's audit, we prioritized the clearing of the Letter of Defect reinspection backlog, which at the time of the audit totaled 3,200. Most accounts in the backlog were additions and modifications of already existing and approved base building fire alarm systems. Since November 2007, we dedicated two inspectors to exclusively target the backlog. Nine other inspectors shared the remainder of the workload. Through their efforts, we reinspected and cleared 1,839 of those accounts and reinspected and found violations at 687. The 2009 business plan provides for the reinspection of the remaining accounts not in compliance over the next year.

We also have underway two other initiatives. We are creating a professional certification/audit program for non-core additions and modifications to fire alarm systems. This is a voluntary program that we anticipate may free up as much as 25 percent of our current inspection workload. We are also revising our plan review process to include Department of Buildings (DOB) review of "add-ons" to fire alarm systems, for example additional strobes or smoke detectors.

Another important step will be in the area of technological advancement for the unit. The FDNY has entered into a four-year, $25 million contract with IBM to enhance our computer capabilities to track inspections, and improve the sharing of inspection data within the bureau and the Department, and with other City agencies that have inspection responsibilities (e.g., DOB and the Department of Environmental Protection).

Conclusion

With these measures, we believe we are turning the corner and are now better able to keep up with our workload and meet industry demand. We have been successful in moving this unit in the right direction. We are confident that, going forward, this will continue.

Intro 884-A

We were also asked to comment on Intro 884-A, the novelty lighter bill. We remind the Council of our interest in keeping children from harming themselves and others by starting fires. In 2007 alone, our Fire Marshals investigated 71 cases of juveniles involved in fire play in New York City, which caused 19 serious injuries and two fatalities. However, we are advised that Congress has been considering legislation that would ban the sale of novelty lighters designed to look like toys. We think it would

be more prudent to allow the legislation to go forward on the federal level to create uniformity across the country. We remain open to discussing this with the Council.

Thank you for the opportunity to speak with you today. We would be happy to answer your questions at this time.

Gibson

To: The New York City Council Fire and Criminal Justice Services Committee
RE: Novelty lighter act of 2009

Thank you for this opportunity to make a statement on behalf of the novelty lighter industry in regard to your proposed ban on novelty lighters. Let me first applaud your efforts and the efforts of all concerned in trying to keep our children safe. I know that the ban on novelty lighters is an honest attempt to do just that. However, in my humble opinion this legislation will make no difference and I will explain why. Novelty lighters are a tiny fraction of the market. Bic alone is 80% of the market. It begs to question why wouldn't the council ban Bic lighters too? All lighters in this country must be child resistant, that is Federal law. One issue that is constantly repeated in the news about deaths regarding novelty lighters is the tragic incident involving a 16 month old and two year old in Arkansas. It is alleged that they ignited a lighter which looked like a motorcycle. If this lighter was child resistant as prescribed by law it would be physically impossible for children of this age to ignite it. If it was not child resistant it would be because it was a very old lighter purchased before the child resistant law was passed or an illegal lighter which was smuggled into the country. If Fire Marshals and others concerned about lighter safety would research the laws in place for child resistance and the mechanisms used they would learn some surprising facts. For the most part the child resistant mechanisms on novelty lighters are more safe than Bic's mechanism. The mechanisms on novelty lighters are tamper resistant, where Bic's is not. It is impossible to disable the child resistant mechanism on a novelty lighter without rendering the lighter inoperable. The majority of consumers know that to disable the Bic child resistant mechanism that they need only use any sharp object like a pen or screwdriver and gently pry the metal band in the center of the flintwheel. The lighter then becomes 100% non child resistant. Bic knows this and the majority of the public knows this. It is common knowledge that many consumers who do not like the less than user friendly Bic mechanism perform this action. These lighters, like all lighters in many instances, are left by irresponsible parents where a child may have access to it. I challenge anyone in doubt to personally try removing this metal band from a Bic lighter and they will quickly understand what I am conveying. If anyone would take the time to research the facts they would also discover that Bic simply by sheer volume has more liability claims than any lighter company in the world. Gibson Enterprises and many other novelty lighter companies has never had a claim!

If the City of New York or any City or State is serious about child safety regarding lighters we believe there are better alternatives to consider than banning novelty lighters which are already child resistant by law. We know that a City or State cannot watch over neglectful, careless parents so why not mandate that all lighters, novelty and others, including Bic's 80% of the market be 100%

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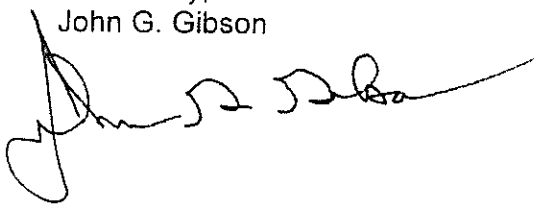
child proof? The technology exists today. Gibson Enterprises has patented and would be willing to make the technology available to all lighter manufacturers and importers in this country. It is a biometric mechanism which reads the owners thumbprint. Once the thumbprint is read only that print will allow the lighter to be ignited thus making it 100% child proof and beyond. If anyone is really serious about the child safety issue this technology should be considered. As a matter of fact, we will be watching in the future to see who writes legislation banning novelty lighters while allowing other less than child safe lighters to remain on the market. All the while a known totally safe technology is available but not mandated. Is it fair that anyone single out the novelty lighter industry which adheres to strict child resistance laws and at the same time allow companies like Zippo, Colibri and many others to remain exempt from these same regulations? Certainly it is well known that they do not have to comply with these laws. Their lighters are not even child resistant! Where is the fairness in this?

What about matches? Have children ever been known to start fires with them? Why are they not being considered for a ban? They are not child resistant at all, never have been. We cannot legislate responsible parenting any more than we can legislate good eating habits. Lets work together to make products as safe as we possibly can without infringing on the rights of consumers to choose what they want to purchase.

We can only ask that you consider all of these facts as you weigh your decisions and let your conscience be your guide.

Yours truly,
John G. Gibson



Zreative Product Inc

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Honorable panels of the Committee on Fire and Criminal Justice Services, thank you for giving this opportunity to address our common concern of public safety due to juvenile fire setters using lighters. I would not waste your precious time to repeat what Mr. Gibson has already covered, which I completely agreed, especially his point on the fairness and **equal treatment of all business under the law** (Bic versus small lighter companies); isn't that the essence of the New York State flag, with the goddess, wearing a blindfold and carrying the scales of justice?

Kids love to play with fire, no matter it is a match, a candle, butane lighter or a disposable lighter (e.g. Bic). Incidentally, in the Executive Summary, written by the CPSC staff in 2004 regarding lighter accidents, there were 2 deaths per billion lighters sold after adopting the child resistant law. Do you, ladies and gentlemen, realize that the number one cause of fire is home heating equipment? It is responsible for 22% of all residential fires, which killed more than 600 people annually. Candles were responsible for an estimated 12,500 fires resulting in 110 deaths, 1100 injuries, and $248.6 million in property loss yearly. There are so many products out there which cause more injuries and death than novelty lighters, and we just turn away from these significant problems, instead picking on a product which causes much less harm. Moreover, by banning sale of novelty lighters instead of the disposable lighters, which are the culprits of the majority of the injuries and death, exacerbated the bias of this proposal

We all want our kids to grow up in a safe environment. However, we do not want to overprotect them. We know riding bicycle or all-terrain vehicle (ATV) is a dangerous activity. Statistically, it causes much more injuries and death than lighters, yet we let our kids ride it. The reason is because we know that if we teach them all the safety rules and keep a watchful eye, they will be alright. We would never think of asking to ban selling it, do we? Similar to lighter, swimming pool, swing, electric fan, gun, knife, pit bull... etc are dangerous to children if they are not supervised or properly educated. Should they all be banned from selling to the public? The incident in Arkansas involving the two children playing with a motorcycle lighter, it is alleged that their mother gave them the lighter to play so that she could catch some sleep. If it is true, it was an outrageously irresponsible child endangerment act. It is not the object (lighter in this case, could be other items like gun, knife, small objects...), it is the negligence of the adult that led to this tragedy.

These days, smoking bans are every where because of the discovery of the affect of second hand smoking. It would be politically correct to also oppose the sale of lighters. However, please note that a lot of people collect novelty lighters, and they are non-smokers. The bills will deny people their rights to collect. I still remember the Article I, **the Bill Of Right** in the Constitution of the State of New York, which stated that "no person shall, because of race, color or religion, be subjected to any discrimination in his or her civil rights by any other person or by any firm, corporation, or institutional...".

I respectfully request the panel to make your decision based on the **equal protection of the laws,** and do not bend to the pressure of big corporations as well as their lobbyists. A measure worth considering is that it would require clerks to check the IDs of customers buying lighters. If you're 18, you'd be able to show your ID and buy the lighters. It'd be just like buying a pack of cigarettes. Clerks would be fined for selling the lighters to underage customers, and store owners could possible receive bigger fines.

Truly yours,

Tommy Wong

NYS State Fire Administrator Floyd A. Madison Submitted 1/29/09 Via Email

Prevention is the best way to protect the citizens of New York State from fire. Ongoing efforts to raise citizen awareness of fire safety issues and reduce the number of fire ignited by children will go a long way toward saving lives. Statistics indicate that lighters tend to be the preferred ignition source for youths who set fires in New York, and toy-like lighters only encourage such dangerous behavior.

In 2002, the National Fire Prevention Association (NFPA) estimated 13,900 structure fires in the U.S. were caused by children playing with fire. These resulted in 210 civilian deaths, 1,250 civilian injuries, and $339 million in direct damage. Children under five make up 70 percent of all fatalities caused by fires set by children. The most common area, where children set a fire at home, is the bedroom; with bedding, mattresses, and clothing being the most likely materials to ignite.

Of the fire reports submitted to my Office by fire departments all across the state over the last five years, more than 25% of those involving juveniles reported that a cigarette lighter was used by the juvenile to start the fire. Clearly, juvenile use of lighters is a concern, and the availability of toy-like or novelty lighters make them even more attractive to children.

Over 70 million toy-like lighters are imported into the United States annually. The European Union banned the sale of toy-like lighters as of March 2007 and as a result, more of these lighters are likely being redirected for sale to the U.S. only increasing the hazard on our doorstep.

Children cannot discriminate a toy from a fire tool that looks like a toy. For example, there are lighters on the market that resemble matchbox cars, animals and game pieces. Other lighters look like adult tools in miniature - a cell phone, hammer, bottle opener and felt-tip marker are just a few examples.

There is no good reason for lighters to be easily accessible to children that resemble toys. The child-resistant cigarette lighter standard has been highly effective. Surely it is time to take the next step and protect children from lighters that encourage their curiosity, inviting unintentional misuse and placing them and their families at risk.

I highly support the efforts to ban these dangerous products from the hands of our children.

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February 2, 2009

RE: Proposed Int. No: 884-A, Novelty Lighter Art of 2009

Elected officials, Offices of the diplomatic missions, Community leaders, District Leaders, and other VIPS, Good morning.

My name is Xuejie Wong. I am the deputy chair of the Product safety Association International, speaking on behalf of Mr. Lincoln Lin the Chairman of our association. Below are several points outlining why the Novelty Lighter Act that prohibits the retail sale, distribution or promotion of a novelty lighter in the city is an act that is unreasonable, excessive and overbroad.

1) **The retail sale and distribution of lighters have already been regulated within the United States**

In June 1994, Consumer Product Safety Commission (CPSC) required that all disposable lighters and novelty lighters imported to the United States must be Child Resistant (CR) and come with safety warning labels. See http://edocket.access.gpo.gov/cfr_2007/janqtr/pdf/16cfr1210.2.pdf. CPSC also revised the regulations and testing requirements for these lighters to provide guidelines in enforcement of the child resistant regulation. Since then, the total numbers of accidents and injuries involved with these lighters have been significantly reduced. CPSC has also proven that the child resistant legislation is a success and it is an effective way to reduce lighter-related accidents. With the child resistant legislation currently in place, there are not statistics available to support that a novelty lighter would create a substantial higher risk of injury or accident than a non-novelty lighter. Therefore, banning all novelty lighters from being sold or distributed is extremely unfair, unnecessary and overbroad.

2) **There are many other more dangerous products currently in the U.S. market posing more of a threat than novelty lighters, yet these products are not banned from distribution or sales**

According to the supplementary documents and figures attached as Exhibit 1, there are at least twenty different types of products involved in different degrees of accidents from the year 1980 to 2008. The number of injuries and deaths of these

accidents were ranging from 33 individuals to 210,310 individuals. These products are currently being distributed and sold in the US.

Although there were many accidents arising from use of these products, there are only laws to promote and regulate the safety of these products, rather than total ban of them from sales and distributions. In addition, according to these statistics, the injuries and deaths arose from many of these products are many times higher than the injuries and deaths caused by novelty lighters. Therefore, banning the total sale and distribution of the novel lighters is unreasonable and unfair, and substantially violates the consumer's right of selection from different varieties of lighters.

3) Majority of injuries are cause by disposable lighters not only novelty lights

Among the injuries and deaths caused by lighters, many of them were caused by disposable lighters and only a few accidents involved novelty lighters. Since the novelty lighters were being imported to this country until now, we found less than 5 documented cases involving the use of novelty lighters. However, there are at least 1,000 injuries yearly caused or had to do with disposable lighters.

Above records indicated that disposable lighter caused more accidents than novelty lighters and poses more risk than novelty lighters; nonetheless, why do we not ban the sales and distributions of disposable lighter rather than novelty lighters? Is it because that the disposable lighters manufactures and distributors are larger companies that have more funding to afford better lobbyists?
See https://www.recalls.gov/library/foia/foia02/pubcom/Lighterspt1.pdf

4) Market share and competition

The groups of leading manufacturer and distributors of disposable lighters are members of Lighter Association Inc., which have strong advocates against novelty lighters manufactures and distributors, who are their direct market competitors. In the past years, the novelty lighters have captured more and more market shares, and thus, caused the decline in the sales and distributions of disposable lighters. It is obvious that the introduction of the Novelty Lighters Act will help them cast out all of their novelty lighter competitors, and will enable them to recapture the lost market share. As a result, they will be able to monopolize the market and control the prices without the fear of competition.

On September 14, 2004, a hearing regarding petition of CP 02-1 on lighter, requesting that ASTM F400 be adopted as a mandatory standard submitted by lighter association, was held at the CPSC headquarters. Mr.Lin our chairman and Mr. Hank Zhang attended the hearing. The President of the National Association of State Fire Marshals (NASFM) was invited by the Lighter Association Inc., and presented at the

hearing. During the hearing, the President of NASFM testified that: "Many fire marshals thought that most fire related accidents were caused by children playing malfunctioning lighters." The representative officer from the CPSC asked his the names of these marshals. The President of NASFM was not able to reply to the question. In reality, according to the statistics, most of the fire related accidents were caused by heating and cooking equipment, not by novelty lighters. The petition for mandatory testing on lighters under ASTM-F400 standards was rejected as the result of that hearing. (See Sep.15, 2004, The Wall Street Journal)

The advocates from Lighter Association Inc. are from major corporations that are well established and funded. They will not stop lobbying or filing different petitions against their business competitors until they see all of them are out of business.

5) **Proactive steps instead of banning the sales and distribution of Novelty Lighters.**

I am a member of the Product Safety Association International. As the name of our association, our main focus is to promote product safety. However, health and safety of the product for the public use, availability of its variety, and the economic interests of the merchants are all factors need to be considered and well balanced.

I believe that there is a way to regulate the sales and distributions of novelty lighters rather than a total ban of all of the products in this category. For example, we may assert a minimum age requirement to purchase these lighters similar to minimum age requirement to purchase cigarettes or liquor. These laws will further prevent the reach of novelty lighters from minors at the same time still offer consumers a variety of fun products and more choices that are competitive in price.

In conclusion, I respectfully request the legislators to consider our comments in favor of us, and in opposition of the adding a new subchapter 15, the "Novelty Lighter Act."

WING SALE, INC.

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Email: wingsaleinc@yahoo.com

To: The New York City Council Fire and Criminal Justice Services Committee

Fr: Hank Chang, Chief Executive Officer of Wing Sale, Inc.

Re: Proposed ban on Novelty Lighters.

Date: February 8, 2009

On behalf of Wing Sale, Inc. I appreciate this opportunity to set forth my reasons for opposing Proposed Int. No. 884-A and requesting that the Committee reconsider its recent ban on Novelty Lighters. In doing so, I support the points previously made by Gibson Enterprises, Zreative Product Inc. and the Product Safety Association International.

For 15 years, the Consumer Product Safety Commission ("CPSC"), for purposes of federal law, has permitted the sale and use of Novelty Lighters, after testing these products and concluding that they were child resistant. We firmly believe that many of the same considerations that led the CPSC to reach its conclusion apply equally to the fire hazard issues regulated by this Committee, in that the CSPC could not have concluded that Novelty Lighters were child resistant unless they did not pose a significant fire hazard.

We specifically draw the Committee's attention to the fact that during the period in which there have been 53 reported injuries attributable to the use of disposable lighters there have been only three reported injuries attributable to Novelty Lighters. This is a striking statistic, which cannot be attributed to mere randomness or anecdotal evidence. We therefore believe that it is improper to single out Novelty Lighters for this ban while applying a different standard to disposable lighters.

We also direct the Committee's attention to the fact that, in the 2004 " National Fire Safety Record " USFA found that **fires started by children were overwhelmingly attributable to the use of matches rather than lighters**. Despite this, there has been no action to date taken requiring the use of child resistant matches. We therefore feel that the singling out of Novelty Lighters is not supported by the facts and constitute an uneven application of the law. We urge the Committee that, in these times of austerity, the funds that would have to be applied to enforcing the ban could be better spent educating the public, both children and adults, about responsible use of all forms of lighters and matches.

Furthermore, the record indicates that the wholesalers and retail distributors of Novelty Lighters consistently have complied with all applicable NASF rules and regulations. The industry remains committed to working with the Committee to ensure enforcement of its rules and to work jointly to develop reasonable safety guidelines for Novelty Lighters, as well as other types of lighters, short of banning Novelty Lighters entirely. We believe that adequate safety measures can be put into place that would ensure that the Committee's safety concerns are addressed.

We therefore respectfully request that the Committee reconsider its ban on the sale of Novelty Lighters in favor of commissioning further study of the fire hazards presented by all commonly used forms of lighters and matches. We believe strongly that an objective review would show that the risks posed by Novelty Lighters are minimal to nonexistent and could better be handled by the adoption of reasonable safety guidelines rather than banning the product altogether.

Thank you for your consideration of this request. I would be pleased to discuss this further with the Committee at its convenience.

Sincerely,

Hank Chang

Chief Executive Officer, Wing Sale, Inc.

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February 2, 2009

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1) **The retail sale and distribution of lighters have already been regulated within the United States**

In June 1994, Consumer Product Safety Commission (CPSC) required that all disposable lighters and novelty lighters imported to the United States must be Child Resistant (CR) and come with safety warning labels. See http://edocket.access.gpo.gov/cfr_2007/janqtr/pdf/16cfr1210.2.pdf. CPSC also revised the regulations and testing requirements for these lighters to provide guidelines in enforcement of the child resistant regulation. Since then, the total numbers of accidents and injuries involved with these lighters have been significantly reduced. CPSC has also proven that the child resistant legislation is a success and it is an effective way to reduce lighter-related accidents. With the child resistant legislation currently in place, there are not statistics available to support that a novelty lighter would create a substantial higher risk of injury or accident than a non-novelty lighter. Therefore, banning all novelty lighters from being sold or distributed is extremely unfair, unnecessary and overbroad.

2) **There are many other more dangerous products currently in the U.S. market posing more of a threat than novelty lighters, yet these products are not banned from distribution or sales**

According to the supplementary documents and figures attached as Exhibit 1, there are at least twenty different types of products involved in different degrees of accidents from the year 1980 to 2008. The number of injuries and deaths of these

accidents were ranging from 33 individuals to 210,310 individuals. These products are currently being distributed and sold in the US.

Although there were many accidents arising from use of these products, there are only laws to promote and regulate the safety of these products, rather than total ban of them from sales and distributions. In addition, according to these statistics, the injuries and deaths arose from many of these products are many times higher than the injuries and deaths caused by novelty lighters. Therefore, banning the total sale and distribution of the novel lighters is unreasonable and unfair, and substantially violates the consumer's right of selection from different varieties of lighters.

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Among the injuries and deaths caused by lighters, many of them were caused by disposable lighters and only a few accidents involved novelty lighters. Since the novelty lighters were being imported to this country until now, we found less than 5 documented cases involving the use of novelty lighters. However, there are at least 1,000 injuries yearly caused or had to do with disposable lighters.

Above records indicated that disposable lighter caused more accidents than novelty lighters and poses more risk than novelty lighters; nonetheless, why do we not ban the sales and distributions of disposable lighter rather than novelty lighters? Is it because that the disposable lighters manufactures and distributors are larger companies that have more funding to afford better lobbyists?
See https://www.recalls.gov/library/foia/foia02/pubcom/Lighterspt1.pdf

4) **Market share and competition**

The groups of leading manufacturer and distributors of disposable lighters are members of Lighter Association Inc., which have strong advocates against novelty lighters manufactures and distributors, who are their direct market competitors. In the past years, the novelty lighters have captured more and more market shares, and thus, caused the decline in the sales and distributions of disposable lighters. It is obvious that the introduction of the Novelty Lighters Act will help them cast out all of their novelty lighter competitors, and will enable them to recapture the lost market share. As a result, they will be able to monopolize the market and control the prices without the fear of competition.

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In conclusion, I respectfully request the legislators to consider our comments in favor of us, and in opposition of the adding a new subchapter 15, the "Novelty Lighter Act."

Exhibit 1

Death and Injured List

1. Cooking Equipment

Cooking equipment is estimated to be associated with more than 100,000 fires annually, and almost 400 deaths, and 5,000 injuries. Gas cooking equipment accounts for about 30,000 fires, and electric cooking equipment for about 55,000 fires.** Reference: http://www.cpsc.gov/cpscpub/pubs/556.html**

2. Safety alert on preventing TV tip-overs.

(CPSC) is estimates of at least 3000 cases of children being injured from TV tip-overs in 2005 and 36 death from 2000 to 2005.
** Reference:http://www.cpsc.gov/cpscpub/pubs/5004.pdf**

3. Home heating equipment top causes fire

It is important to remember that about 120,000 residential fires still occur annually with the use of these heaters, or about 22 percent of all residential fires. These fires kill more than 600 people. Annually there are 1000's of contact burn injuries and 100's of carbon monoxide poisonings.
** Reference:http://www.cpsc.gov/cpscpub/pubs/556.html**

4. Toy with magnets

(CPSC) is aware of at least 33 cases of children being injured from ingesting magnets. A 20 month-old died, and at least 19 other children from 10 months to 11 years old required surgery to remove ingested magnets.
** Reference:http://www.cpsc.gov/cpscpub/pubs/magnet.pdf**

5. Home Playground Equipment

There were nearly 47,000 home playground related injuries – roughly 23 percent of reported injuries associated with all categories of playground equipment in 1999. A

majority of injuries (81%) were related to falls from equipment.**Reference: http://www.cpsc.gov/volstd/homeplayground/homeplayground.html**

6. Baby Swings

In 2005, there were an estimated 1,800 portable infant swing relatedinjuries treated in U.S. hospital emergency departments. CPSC alsohas reports of four swing-related infant deaths that occurred from 2001-2003. **Reference: http://www.cpsc.gov/volstd/bbyswings/bbyswings.html**

7. Baby Walkers

In 1992, an estimated 25,700 children younger than 15 months of age were injuries associated with baby walkers. In 2005, there were an estimated 2,600 such injuries, there were two walker-related deaths for children under the age of 15 months reported to CPSC.**Reference: http://www.cpsc.gov/volstd/bbywalkers/bbywalkers.html**

8. Toys

In 2004, there were an estimated 210,300 toy-related injuries, 77% (161,100) of the injuries for 2004 were to children under 15 years of age, and 35 percent (72,800) were to children under 5. CPSC also has reports of 16 toy-related deaths in 2004.**Reference: http://www.cpsc.gov/volstd/toys/toys.html**

9. Portable Pools

Approximately 280 children under 5 years old drown in pools each year nationwide and an additional 2200 are submersion incidents. Most of the incidents involve residential pools. Additionally, CPSC staff is aware of an average of 12 deaths per year (for 2003-2005) associated with inflatable pools.**Reference: http://www.cpsc.gov/volstd/inflatable/inflatable.html**

10. Portable Fans

There were an estimated 4,500 fires associated with portable electric fans from

1990-1998. These fires resulted in more than 20 deaths, 270 injuries.**Reference: http://www.cpsc.gov/volstd/portablefans/portablefans.html**

11. Candles and Candle Accessories

Attended candle fires was an estimated 12,500 fires resulting in 110 deaths, 1,100 injuries, and $248.6 million in property loss annually.** Reference:http://www.cpsc.gov/volstd/candles/candles.html**

12. Inflatable Air Mattresses

Since 2002, CPSC has received reports of 16 deaths, mostly infants younger than 8 months of age, who were placed to sleep on air mattresses.** Reference:http://www.cpsc.gov/volstd/airmattresses/airmattresses.html**

13. All-Terrain Vehicles

In 2005, there were 467 deaths associated with ATVs reported to CPSC for that year. In addition, CPSC staff estimates that there were 136,700 emergency-department treated injuries associated with ATVs in 2005. ** Reference:http://www.cpsc.gov/volstd/atv/atv.html**

14. Bicycles

The number of bicyclists killed at night has increased from 304 to 372 per year. In 1975, the number of nighttime deaths accounted for 30% of the total number of bicyclists killed. By 1982 (the latest year for which complete data are available), nighttime deaths accounted for 42% of the total number of bicyclists killed.** Reference:http://www.cpsc.gov/cpscpub/pubs/5003.html**

15. Table Saws

The estimated injuries associated with table saws averaged 29,000 per year from 1991 to 2000. Additional incidents injury estimates to be computed for 2001 (38,000 injuries) and 2002 (38,980 injuries).** Reference:http://www.cpsc.gov/volstd/tablesaws/tablesaws.html**

17. Paper shredder

2000 through 2005 CPSC received 50 incident of injuries were children under

age 5.**Reference: http://www.cpsc.gov/CPSCPUB/PUBS/5127.pdf**

18. Hair Curling Irons

Children under 5 years of age suffer approximately 7,700 burn injuries when they touched hot curling irons. **Reference: http://www.cpsc.gov/cpscpub/pubs/5029.html**

19.Recliner Chairs

Since January 1980, the CPSC has received reports of 8 deaths and several serious brain injuries to children involv-ing recliner chairs.**Reference: http://www.cpsc.gov/cpscpub/pubs/5071.html**

20.Household Batteries Can Cause Chemical Burns

CPSC estimates that approximately 3,700 people a year are treated in hospital emergency rooms for battery-related chemical burns. Approximately 20 percent of people are children under the age of 16.** http://www.cpsc.gov/cpscpub/pubs/5088.html**

To: The New York City Council Fire and Criminal Justice Services Committee

Fr: Susan Santanello Lilfishes.Com

Re: Proposed Ban on Novelty Lighters.

I have been a novelty lighter collector and retailer for the past 11 years. My customer base consists of collectors throughout the US and also worldwide. Since 1994 novelty lighters have been subjected to tests overseen by the CPSC to make sure that children 5 and younger are unable to light them. Many adults are also unable to light them.

Stats from *Children and Fire in The US 1994-1997*(FEMA, United States Fire Administration) (*"Children"*) state that of the fires that resulted in child deaths 94% were residential fires (p. 14). Over one-third of all fires involving child injuries and deaths were the result of open flame (*id.* at 17). Matches as the form of ignition remained relatively constant over the four years. There was a consistent yearly decrease in injuries and in deaths related to lighters over the four year period (from 22.2% in 1994 to 12.6% in 1997). (*Id.* at 17). This is proof that the CPSC Doc 5021 instituted in 1994 which required child-resistant mechanisms for lighters was working. (Consumer Product Safety Commission ("CPSC" 5021). The report also states that from 1993-1997 matches as the form of heat ignition in 58% of children playing fires were still the most common form. (*Children,* p. 18).

An article titled "*Study of the effectiveness of the US safety standard for child resistant cigarette lighters*" by LE Smith, MA Greene & HA Singh state that there was a 58% reduction in fires caused by children age 5 and younger in a report published in 2002 due to the CPSC regulation.

According to Statistics for a ten-year period reported by the US Fire Administration *Residential Structure and Building Fires* (October 2008), between 1996 thru 2005, the percent of fire deaths have gone down by 18.1 percent (p. 15). The NFPA estimates reflect that 83 percent of fire deaths occur in residential structures (p. 13) . According to the 2005 report the causes of residential fires were Cooking (40%), Open Flame (12%) (which includes candles, matches & careless cause), Heating (13%), and Smoking (19%) Playing with a heat source (0.6%), (pp. 18-20).

In January 2009 an article "*Children Playing With Fire*" written by Jennifer Flynn for NFPA states "that 2006 structure fires, deaths, and injuries are the lowest ever recorded." (Exec. Summary, i).

Why aren't Colbri, Ronson & Zippo required to have child resistant devices on their products? If you drop a lit Zippo lighter it continues to burn, a novelty lighter needs pressure on the igniter to remain lit. Bic and Scriptos safety devices are easily removed as well as easy to light. If a child could have the overall strength to depress the igniter down on a novelty lighter they surely could easily light a Bic, Zippo or any other lighter as well. What about matches? According to the US Fire Administrations report 58% of children playing fires were started with them. This is a unfair attack on a product that has been in compliance with the CPSC. By banning novelty

lighters this will have no effect on children playing fires, they will continue to use matches, Bics and the rest that have no childproof mechanisms.

By banning novelty lighters in NY and possibly the US, you will only be opening the door to an illegal importation of this product from foreign sources who are not in compliance with the child safety requirements. You will also be hurting many small business and commerce throughout the country on top of an already economic crisis.

I fail to see why banning an item that is currently in compliance with the law, while allowing other types that are available and which are easily disabled or not in compliance at all to remain in the marketplace. It seems self defeating, those items are much more a bigger threat. It seems more practical to make all lighters child resistant and to educate the public and reinforce the need for fire safety.

Resources

Children Playing With Fire by Jennifer Flynn NFPA January 2009 - Executive Summary

US Fire Administration - Residential Structure & Building Fires Oct 2008 FEMA US Dept of Homeland Security p.13,15,18-20

Children and Fire In The United States 1994-1997
p14,17,19

Consumer Product Safety Commission -Child-Resistant Lighters Protect Young Children
CPSC Document #5021 1994

Study of the effectiveness of the US safety standard for Child resistant cigarette lighters by LE Smith, MA Greene, HA Singh www.injuryprevention.com v192-196 2002

CHILDREN AND FIRE IN THE UNITED STATES: 1994-1997

Federal Emergency Management Agency
United States Fire Administration

This publication was produced under contract by IOCAD Emergency Services Group for the United states Fire Administration, Federal Emergency Management Agency. Any information, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of the Federal Emergency Management Agency or the United States Fire Administration.

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Tables and Figures

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Introduction

The purpose of this report is to analyze and discuss the incidence of fires involving children. According to National Center on Health Statistics data, there has been a consistent decline in child mortality from fire over the past decade. However, hundreds of child deaths from fire continue to occur each year. Children playing fires account for a large portion of child fire deaths and the majority of fire-related deaths among children are the result of residential fires. This report devotes sections to each of these factors.

Methodology

Data Sources

This report uses two primary data sources as the basis of analysis. The National Center on Health Statistics (NCHS) data from 1994-1996 on child mortality from accidents due to fire and flames (ICD code 890-899) and general population data are used to identify:

- number of annual deaths reported for each of three age groups (infant, 1-4, and 5-9)
- deaths/million population
- risk factor based on age and ethnicity of victims (white and African-American)

Portions of the National Fire Incident Reporting System (NFIRS) data from 1994-1997 are used to describe fires associated with child injuries and deaths. All states, and fire departments within them, have been invited to participate in NFIRS on a voluntary basis. Participating fire departments collect a common core of information on fire and casualty reports using a common set of definitions. In 1995, thirty nine states and the District of Columbia were reporting to NFIRS with 39% of the more than 33,000 fire departments providing data to the system.[1] NFIRS data provide information on fires of all types and are used in studies conducted by many agencies including the Consumer Product Safety Commission, Department of Transportation and the Department of Housing and Urban Development.

In addition to the primary data sources, findings from the Consumer Product Safety Commission (CPSC) are used to support some of the findings of the primary analysis.

CPSC data analysis uses NFIRS data and the National Fire Protection Association's (NFPA) annual survey of fire departments.

Definitions

Child - For the purpose of this report, a child is defined by the ages of birth through nine years. This age range was chosen for two reasons. Using this age range corresponds to the current age categories used by NCHS of: under one year, one to less than five years, and five through nine years. Using this definition also enables comparison of findings of the 1993 Children and Fire Report as well as other studies.

Adjusted Percentages – Where data sets contained unknowns, percentages were adjusted by weighting the unknown incidents based on occurrence of known incidents. The adjusted percentage was computed using only those incidents for which the cause was provided. This, in effect, distributes the fires for which the cause is unknown in the same proportion as the fires for which the cause is known. This method was used to account for unknown data since the distribution of the unknowns is assumed to follow the distribution of the knowns. It is the best method available without additional knowledge of the nature of the unknown and is suggested and described in detail by both Hall and Harwood [2] and in the tenth edition of *Fire in the United States.*[1]

Population Numbers – Population numbers obtained from NCHS represent resident population only and are estimates for the years utilized in this report.

Limitations

Although NFIRS is not a random sample, it is believed that the distribution of participating fire departments is a reasonable representation of all fire departments in the U.S. In 1995, over 835,400 fire incidents were collected by NFIRS; about 42% of the estimated total attended by fire departments. [1] The actual numbers available in NFIRS are cited in this report as the sample size (n =) notation found in the tables and charts.

A second limitation is that the data sets used for this report collect information using different methods. Therefore, sample size numbers may vary among these data sets.

Demographic Profile

Child Fire Death Rates

Table 1 presents a general overview of the relationship of child mortality to overall population fire deaths reported for the years 1994-1996. Although the actual number of reported fire deaths for children has decreased over three years, the percentage of child fire deaths in relationship to population for the age groups shows only a minimal decrease. Table 1 shows the comparison of child fire deaths to that of the total population. The population of children from birth to 10 years of age has decreased from 16% in 1994 to 14% in 1996. This has been accompanied by a decrease from 23% to 18% of the total fire deaths. Table 2 shows the comparison of child fire deaths by age group. While the percentage of fire deaths in relationship to population has decreased somewhat over those years, it still remains higher for children than for the general population. This table also demonstrates the vulnerability of the 1through 4 age group. Although decreasing from 65% on 1994, this age group still accounts for 60% of all the reported fire deaths for children.

Table 1. Percent of Fire Deaths by Population

Age	Year	Population	% of Population	Fire Deaths	Total % of Fire Deaths
Birth –9 years					
	1994	38,585,750	16	940	23
	1995	38,811,104	15	734	20
	1996	38,727,149	14	660	18
Over 10					
	1994	221,755,239	84	3046	77
	1995	224,144,166	85	3027	80
	1996	226,556,634	86	3081	82

Source: NCHS

Table 2. Percent of Child Fire Deaths by Age Group

Age	Year	Population	% of Population	Fire Deaths	Total % of Fire Deaths
Under 1					
	1994	3,870,185	3	93	2
	1995	3,848,106	1	64	2
	1996	3,769,485	1	56	2
1-4					
	1994	15,856,964	6	601	15
	1995	15,743,042	6	446	12
	1996	15,516,482	6	408	11
5-9					
	1994	18,858,601	7	246	6
	1995	19,219,956	8	224	6
	1996	19,441,182	7	196	5

Source: NCHS

Variation in Risk

The relative risk for fire death is determined by first determining the deaths per capita of the overall population (number of deaths reported for each year divided by the total population for the year). Then the deaths per capita for each age group is calculated and divided by the per capita death rate of the overall population. For example, if the deaths per capita for the general population for a given year was 19.32 and the deaths per capita for those under the age of four were 41.99, those under the age of four have a 2.17 relative risk for fire death – over twice that of the general population.

Table 3 presents a breakdown of the overall risk for children dying in a fire for the years 1994-1996. Overall, the relative risk of dying in a fire has decreased slightly over three years. However, the 1-4 age group is still 1 ½ times more likely to die in a fire than the general population (relative risk = 1.49).

The relative risk for children dying in a fire also varies considerably depending on gender and ethnicity. Table 4 presents the breakdown of risk according to gender and ethnicity for each age group. Ethnicity data is limited, since only white and African-American data are collected separately by NCHS. Data presented in Table 4 are for the year 1996

only. Girls have a higher risk of fire death under the age of one. In the other two age categories, boys have a higher risk.

Of particular concern is the variation in fire death risk based on ethnicity. African American children are at considerably higher risk of fire death relative to white children in all age categories. In 1991, African American males in the 1-4 age group were 6 times (relative risk = 5.95) more likely to die in a fire than white males.[3] Although down slightly from 1991, African American males in the 1-4 age group are still 5 times more likely to die in a fire than their white counterparts and remain at the highest relative risk (5.17) for fire death.

Table 3. Relative Risk of Fire Death for Children

Age	Year	Fire Death Rate/million	Relative Risk*
Under 1			
	1994	15.3	1.56
	1995	14.3	1.17
	1996	14.1	1.07
1-4			
	1994	15.3	2.08
	1995	14.3	1.62
	1996	14.1	1.49
5-9			
	1994	15.3	0.85
	1995	14.3	0.82
	1996	14.1	0.72

Source: NCHS

*Relative risk of general population is 1.00 based on the fire death rate for each year per million population for the U.S. as a whole.

Table 4. Relative Risk of Fire Death for Children Based on Gender and Ethnicity Compared to General Population

Age	Gender/ Ethnicity	1996 Fire Deaths	Deaths/ Million	Relative Risk*
Under 1				
	White/Male	16	10.66	0.76
	White/Female	16	10.88	0.77
	African/ American/Male	9	32.14	2.28
	African/ American/Female	12	44.61	3.16
1-4				
	White/Male	141	22.42	1.59
	White/Female	84	14.04	1.00
	African/ American/Male	89	72.95	5.17
	African/ American/Female	75	63.56	4.51
5-9				
	White/Male	68	8.63	0.61
	White/Female	46	6.15	0.44
	African/ American/Male	40	25.48	1.81
	African/ American/Female	35	23.03	1.63

Source: NCHS

* Relative risk of the general population is 1.00 based on a fire death rate of 14.1 per million population for the U.S. as a whole.

Patterns of Child Fire Deaths

Seasonal Patterns

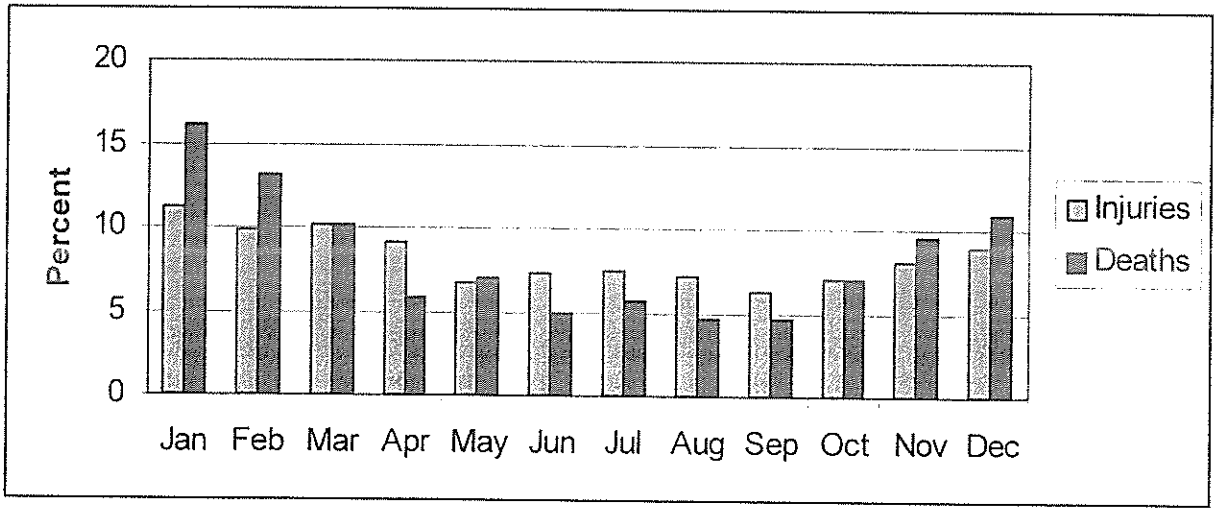
Table 5 presents the break down by month for child injuries and deaths due to fire for the years 1994-1997. Figures 1 and 2 display the annual average by month for child fire injuries and deaths for the years 1994-1997. Injuries and deaths appear to follow the same trends. The greatest percentage of child fire injuries and deaths has consistently occurred during the winter months. This can be attributed to a degree to the fact that people generally spend more time indoors during the coldest months and use heating sources including furnace, fireplace and space heaters.

Table 5. Percent of Reported Child Fire Injuries and Deaths by Month

	1994		1995		1996		1997	
	Injuries (*n*=1195)	Deaths (*n*=468)	Injuries (*n*=794)	Deaths (*n*=312)	Injuries (*n*=866)	Deaths (*n*=293)	Injuries (*n*=789)	Deaths (*n*=253)
Jan	12.5	18.8	9.9	12.5	9.5	18.6	13.0	14.6
Feb	11.5	9.9	8.8	21.2	10.9	11.7	8.5	10.1
Mar	9.7	12.8	10.6	9.7	8.4	9.3	12.1	8.9
Apr	9.5	7.9	8.9	6.0	10.7	4.9	7.4	4.4
May	6.4	6.9	7.1	6.4	6.3	6.3	7.1	8.4
Jun	7.5	4.6	7.1	3.2	7.7	6.3	7.1	5.6
Jul	7.1	4.6	7.7	6.4	7.1	5.8	8.1	5.6
Aug	7.2	4.6	7.1	4.6	7.6	5.3	6.9	3.9
Sep	6.8	6.6	6.4	1.8	4.7	3.9	7.3	6.1
Oct	6.2	4.2	7.8	8.7	7.9	5.8	6.0	9.5
Nov	6.0	8.9	10.1	7.4	8.4	9.3	7.4	12.3
Dec	9.0	9.9	7.9	11.5	10.3	12.2	8.5	10.1

Source: NFIRS

Figure 1. Average Percent of Child Fire Injuries and Deaths by Month



Source: NFIRS

Weekday

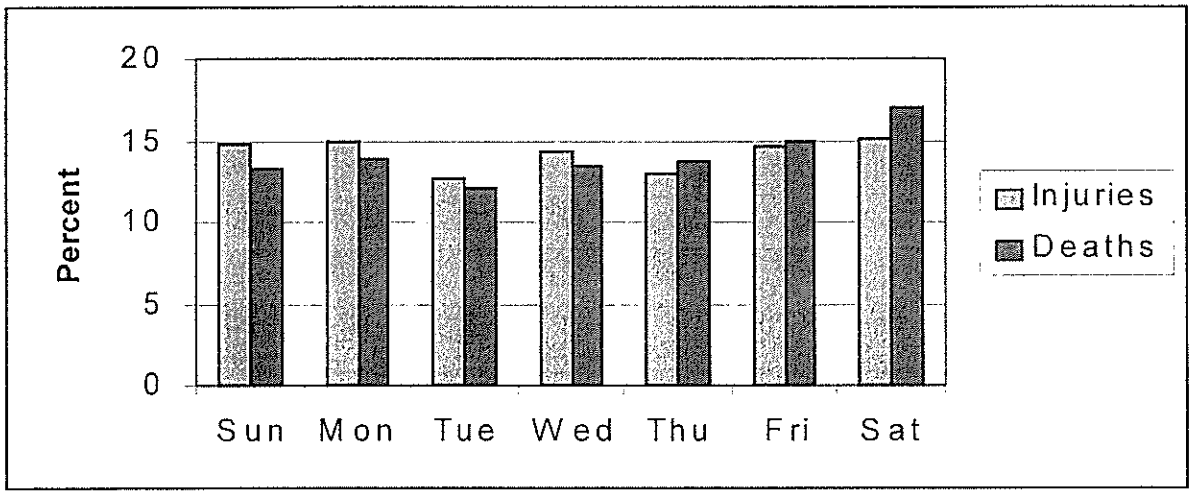
Table 6 presents the breakdown of child injuries and deaths due to fire by weekday. Figure 2 present the annual average of injuries and deaths for 1994-1997. Both injuries and deaths are distributed relatively evenly throughout the week.

Table 6. Percent of Reported Child Fire Injuries and Deaths by Weekday

	1994		1995		1996		1997	
	Injuries (*n*=1195)	**Deaths** (*n*=468)	**Injuries** (*n*=794)	**Deaths** (*n*=312)	**Injuries** (*n*=866)	**Deaths** (*n*=293)	**Injuries** (*n*=789)	**Deaths** (*n*=253)
Sun	11.6	12.5	14.3	14.8	16.8	14.7	16.5	11.2
Mon	14.3	14.8	14.1	13.4	14.6	10.7	16.5	16.8
Tues	13.4	11.5	13.9	10.1	12.2	14.7	11.4	12.3
Weds	15.5	13.8	12.3	10.6	15.5	13.7	14.0	15.7
Thurs	14.0	11.8	14.1	15.5	13.1	13.2	10.9	14.6
Fri	13.8	15.5	17.0	15.7	13.4	16.6	14.4	11.7
Sat	17.1	19.1	13.7	18.0	14.1	15.1	15.4	15.7
Unk		0.6		0.4		0.9		1.6

Source: NFIRS

Figure 2. Average Percent of Child Injuries and Deaths by Weekday



Source: NFIRS

Time of Day

Table 7 presents the breakdown of child injuries and deaths due to fire by time of day. Figure 3 present the annual average of injuries and deaths for 1994-1997. With the exception of 1996, the greatest number of injuries occurred from 0800-1159. With the exception of 1994, the greatest number of deaths occurred between midnight and 0400. The least number of both injuries and deaths occurred from 0400-0759.

Both injuries and deaths are more frequent during nighttime hours (8:00 PM to 8:00 AM). Most household members are likely to be asleep during these hours. That, coupled

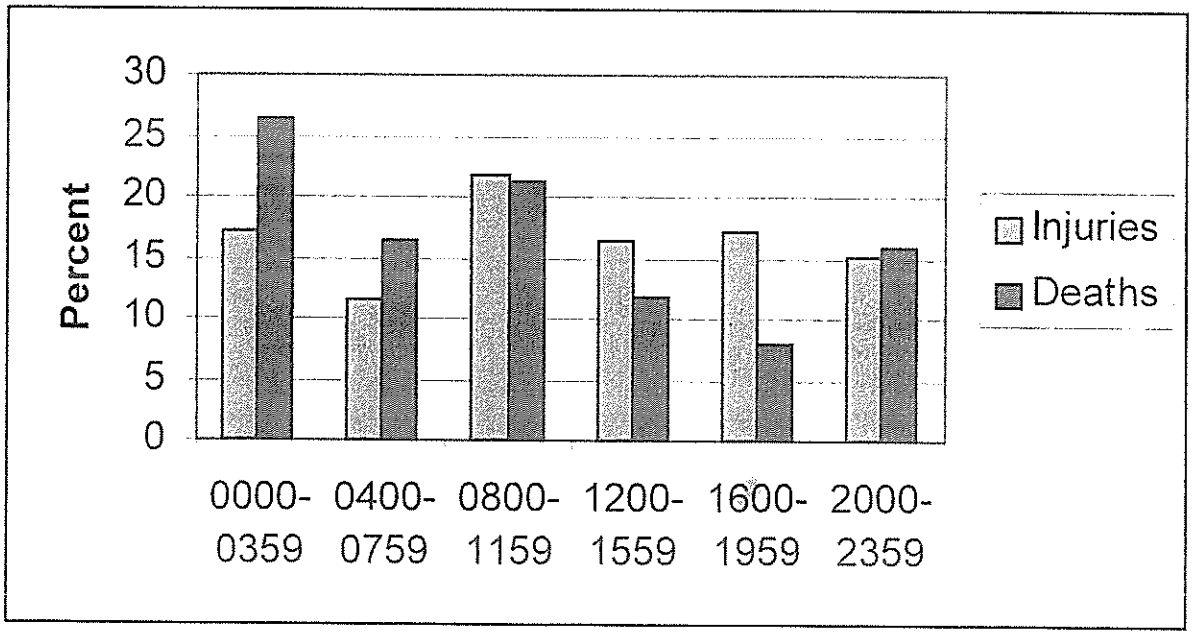
with the smoke detector data presented later in this report, may allow fires to extend farther before they are detected, thus decreasing the chance of escape.

Table 7. Percent of Reported Child Fire Injuries and Deaths by Time of Day

	1994		1995		1996		1997	
	Injuries (*n*=1195)	**Deaths** (*n*=468)	**Injuries** (*n*=794)	**Deaths** (*n*=312)	**Injuries** (*n*=866)	**Deaths** (*n*=293)	**Injuries** (*n*=789)	**Deaths** (*n*=253)
0000-0359	16.6	21.5	17.3	27.6	17.7	25.0	17.1	32.0
0400-0759	11.7	17.7	11.0	18.3	11.6	16.0	11.8	13.9
0800-1159	24.8	24.0	25.3	23.0	18.2	19.8	19.5	18.5
1200-1559	16.6	13.5	14.7	9.6	16.3	11.3	18.3	12.4
1600-1959	14.9	7.5	16.5	7.6	20.1	9.2	17.3	7.6
2000-2359	15.3	15.8	14.6	13.8	15.8	18.4	15.0	15.3

Source: NFIRS

Figure 3. Average Percent of Child Injuries and Deaths by Time of Day



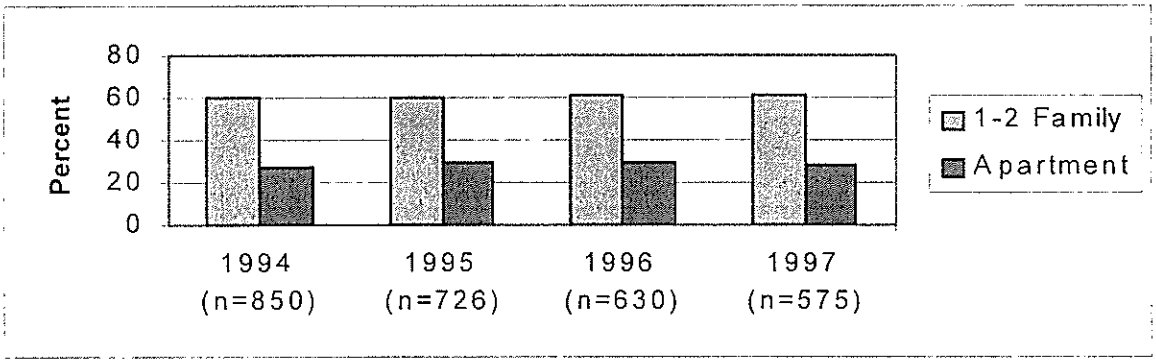
Source: NFIRS

Residential Fires

Where Fires Occur

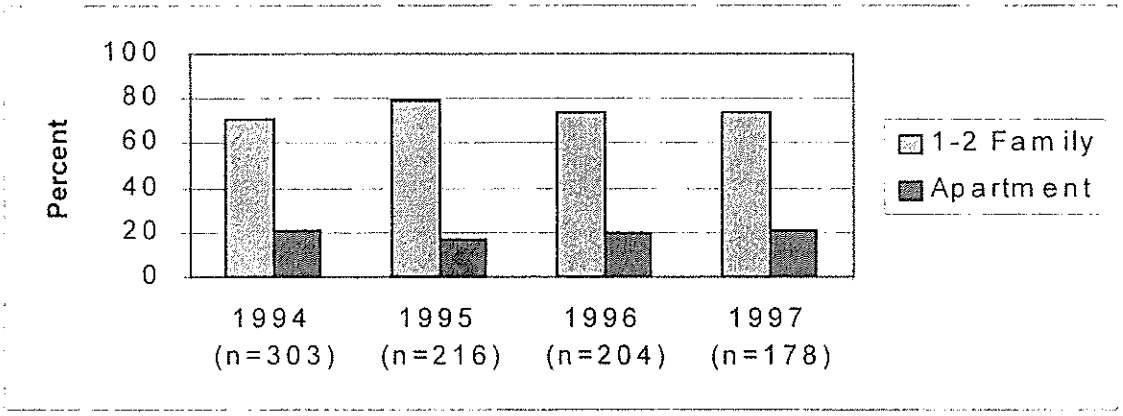
Figures 4 and 5 present the type of residential fires that resulted in child injuries and deaths for the years 1994-1997. The *n* noted is for number of reported incidents. Of the fires that resulted in child injuries, an annual average of 90% were residential. Of the fires that resulted in child deaths, an annual average of 94% were residential. The majority of residential fires continue to occur in one and two family dwellings and apartments. The percentage of fatalities attributable to residential fires in one and two family dwellings is somewhat higher (74%) than for injuries (61%) in one and two family dwellings. In contrast, the percentage of fatalities attributable to residential fires in apartments is somewhat lower (20%) than for injuries (29%).

Figure 4. Types of Residential Fires Resulting in Child Injuries by Year



Source: NFIRS

Figure 5. Types of Residential Fires Resulting in Child Deaths by Year



Source: NFIRS

Area of Fire Origin

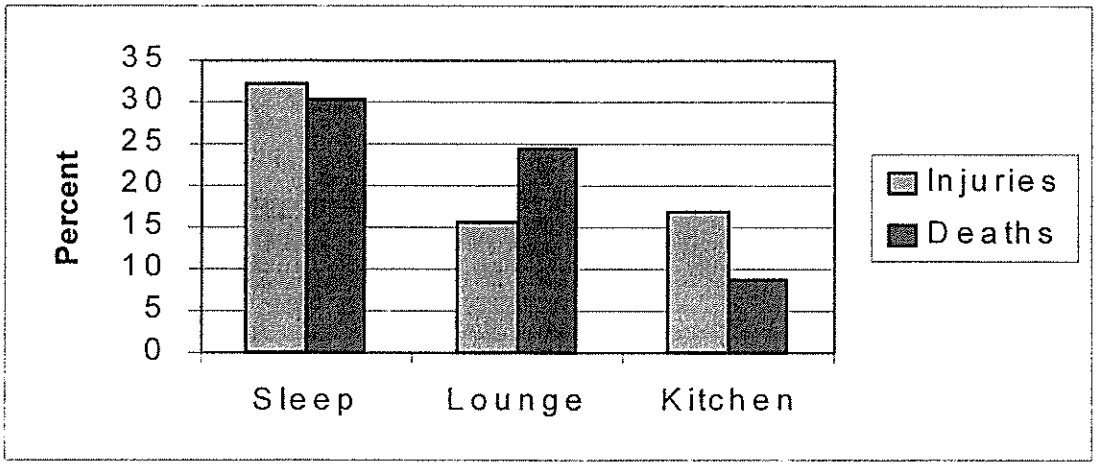
The top-ranking areas of fire origin for reported child fire injuries and deaths remain the same as those identified in the 1993 report: sleeping area, lounge area, and kitchen/cooking area. Although the total percentage reported related to these areas has decreased from the 71% in the 1993 report, they still account for over 60% of all child fire injuries and deaths. Table 8 presents the breakdown for each of these areas by year. Figure 6 compares the annual average for the years 1994-1997 for both injuries and deaths. The percentage originating in the sleep area resulting in deaths remained consistent with the findings (31%) of the 1993 report with the exception of 1996. The 25% noted for 1996 should be viewed as an isolated finding and not indicative of a decreasing trend. The percentage originating in the lounge area resulting in deaths has shown a slight decrease from the 31% noted in the 1993 report. The percentage of fires originating in the kitchen/cooking area that resulted in deaths showed a consistent decrease over the years of 1993 through 1996 (9% in 1993 to 6.8% in 1996). However, the percentage doubled to 12.3% in 1997. At this point, this should also be considered an isolated finding and further years should be studied.

Table 8. Percent of Reported Child Fire Injuries and Deaths by Area of Origin Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (n=850)	**1995** (n=726)	**1996** (n=630)	**1997** (n=575)
Sleep	33.0	35.5	30.4	29.3
Lounge	16.1	17.0	15.8	13.7
Kitchen	13.4	12.9	21.1	20.5
Unknown*	5.0	4.0	5.1	5.5
Deaths				
	1994 (n=303)	**1995** (n=216)	**1996** (n=204)	**1997** (n=178)
Sleep	32.6	33.3	25.0	30.3
Lounge	25.7	22.6	28.9	20.7
Kitchen	8.2	6.9	6.8	12.3
Unknown*	9.2	9.6	10.2	8.4

Source: NFIRS; *Unknowns included for reference.

Figure 6. Average Percent of Child Fire Injuries and Deaths by Area of Origin



Source: NFIRS; Adjusted Percentages

Causes of Fires

This section analyzes causes of reported fires involving child injuries and deaths for the years 1994-1997 from two aspects. The first aspect looks at equipment involved in ignition. The second aspect looks at the ignition factor.

Equipment Involved in Ignition

Approximately one-third of reported fires resulting in child injuries and deaths over the four years reviewed involved some type of equipment in ignition. Table 9 presents the breakdown of the four top-ranking equipment related causes for injuries and deaths. Cooking equipment was the leading cause of injuries with over two-thirds of the injuries the result of stoves. Heating systems were the leading cause of deaths.

Table 9. Percent of Reported Child Fire Injuries and Deaths by Equipment Involved Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (*n*=850)	**1995** (*n*=726)	**1996** (*n*=630)	**1997** (*n*=575)
Heating	9.5	9.6	8.0	7.1
Cooking	10.0	9.4	15.9	17.7
(Fixed Surface)	(6.9)	(7.4)	(12.0)	(11.8)
Electrical	6.6	8.3	7.0	7.6
Appliances	4.2	4.2	3.0	3.7
Unknown*	15.2	15.3	15.3	14.1
Deaths				
	1994 (*n*=468)	**1995** (*n*=312)	**1996** (*n*=293)	**1997** (*n*=253)
Heating	15.0	11.5	16.4	13.0
Cooking	3.2	5.1	3.1	5.1
(Fixed Surface)	(1.9)	(4.5)	(2.4)	(5.1)
Electrical	7.9	10.6	5.5	9.1
Appliances	1.7	2.9	1.7	3.2
Unknown*	27.3	26.3	23.9	29.6

Source: NFIRS; * Unknowns included for reference

Ignition Factors

Data were reviewed for major forms of ignition and types and forms of material ignited. Over one-third of all fires involving child injuries and deaths were the result of open flame. Matches as the form of ignition remained relatively constant over the four years. There was a consistent yearly decrease in injuries (from 27% in 1994 to 18.4% in 1997) and in deaths (from 22.2% in 1994 to 12.6% in 1997) related to lighters over the four year period. However, matches and lighters still accounted for over two thirds of the reported open flame fires resulting in child injuries and deaths. Table 10 presents the percent of child injuries and deaths for 1994-1997 resulting from reported open flame fires as the form of ignition. It includes the breakdown of the percent of open flame fires attributed to matches and lighters.

Table 10. Percent of Child Injuries and Deaths in Open Flame Fires Adjusted to Include Apportioned Unknown Responses, 1994-1997

Injuries				
	1994 (*n*=1195)	**1995** (*n*=794)	**1996** (*n*=866)	**1997** (*n*=789)
Open Flame	48.9	48.9	44.1	42.7
Matches	12.4	16.4	13.3	12.8
Lighter	27.0	21.5	20.1	18.4
Unknown* Ignition Form	21.6	19.3	17.9	21.7
Deaths				
	1994 (*n*=468)	**1995** (*n*=312)	**1996** (*n*=293)	**1997** (*n*=253)
Open Flame	40.8	38.1	34.5	34.4
Matches	13.9	13.8	10.9	11.1
Lighter	22.2	19.2	13.7	12.6
Unknown* Ignition Form	35.5	43.9	34.2	43.2

Source: NFIRS; * Unknown included for reference

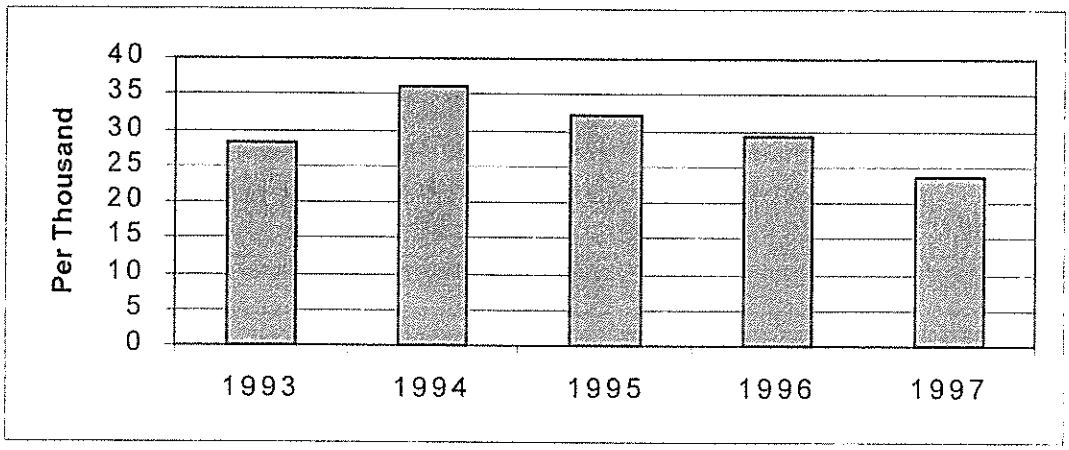
Based on adjusted percentages, NFIRS data from 1994-1997 also revealed that an annual average of 57% of all reported child fire injuries and 50% of all child deaths include either misuse of heat ignition or misuse of material involved in ignition. Over half (58%) of the child fire injuries and 62% of the child fatalities involving misuse of heat ignition or misuse of material involved in ignition were attributed to children playing.

Children Playing Fires

Children playing fires account for a large proportion of reported child fire injuries and deaths. Although, not a total data set of all fires and related deaths and injuries, NFIRS provides a reasonable overall picture of the scope of the problem. Figure 7 presents the number of reported children playing fires for 1994-1997. The 1993 report estimated 25,400 children playing fires occurred in 1993[3] (p.22). Thus, 28.1 per thousand of all fires reported to NFIRS in 1993 were children playing fires. In 1997, 23.6 per thousand of all fires reported to NFIRS were children playing fires, a slight decrease from 1993. A review of the intervening years reveals an increase in 1994 to 36.2 per thousand of total fires reported. From 1995 through 1997, a small, but consistent, decrease is seen.

Figure 7 illustrates the number of children playing fires per thousand total fires reported from 1993 through 1997.

Figure 7. Children Playing Fires per Thousand of Total Reported Fires, 1993-1997



Source: NFIRS

Form of Heat Ignition

Lighters and matches remain the first and second most common forms of heat ignition in reported children playing fires. The easy availability of matches and lighters and their relative ease in use likely accounts for this high proportion of cases. These data highlight the importance of keeping these materials out of the hands of children.

Down from the 1993 report showing matches as the form of heat ignition in 58% of children playing fires, they are still the most common form. The decrease from the percent noted in the 1993 report has remained relatively consistent at an annual average of 42.2%. Lighters as a form of heat ignition has remained consistent at an annual average of 20.5%, down slightly from the 22% in the 1993 report.

Although matches are the leading form of ignition in children playing fires, lighters account for more injuries and deaths. However, the discrepancy appears to be narrowing. The fact that most lighters sold today are "child proof" as the result of the CPSC lighter regulation may account for some of the decrease in injuries and deaths attributed to lighters and for some of the decrease in the overall number of children playing fires.

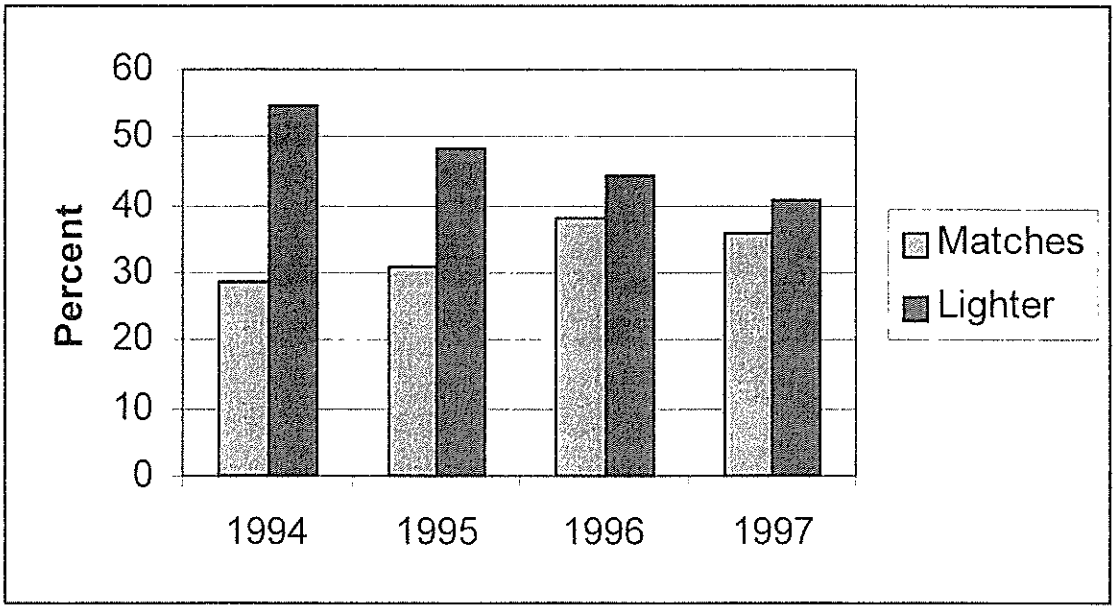
Table 11 shows the breakdown of injuries and fatalities from matches and lighters in children playing fires by year. Figures 8 and 9 show these data graphically.

Table 11. Percent of Reported Injuries and Deaths from Matches and Lighters in Children Playing Fires Adjusted to Include Apportioned Unknown Responses 1994-1997

Injuries				
	1994 (*n*=1336)	**1995** (*n*=1131)	**1996** (*n*=1098)	**1997** (*n*=800)
Matches	28.7	30.9	38.0	35.8
Lighter	54.6	48.5	44.4	40.8
Deaths				
	1994 (*n*=149)	**1995** (*n*=85)	**1996** (*n*=71)	**1997** (*n*=65)
Matches	30.9	34.1	32.4	26.2
Lighter	51.7	56.5	46.5	43.1
Unknown* Ignition Form	17.8	15.6	14.4	10.4

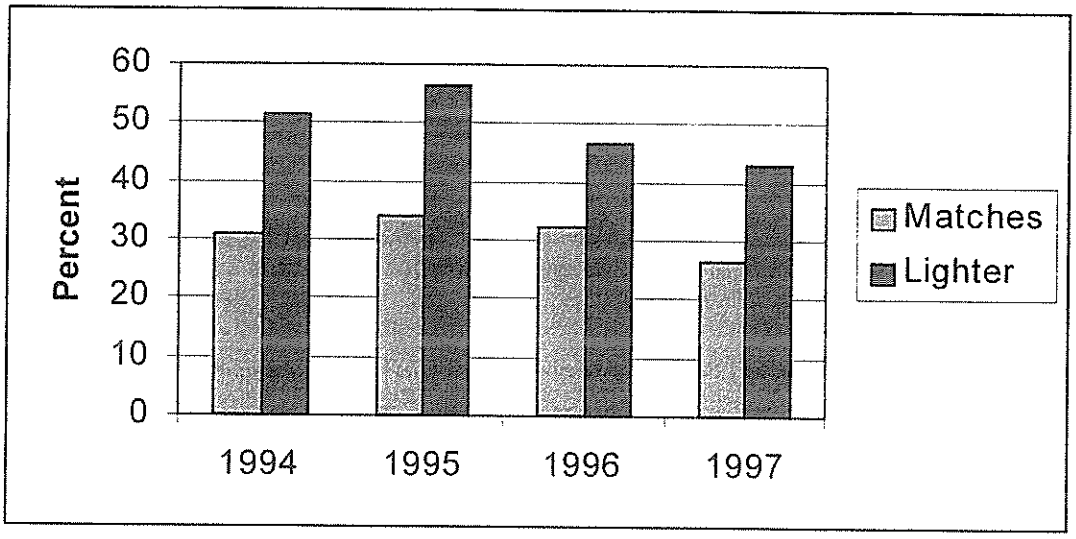
Source: NFIRS; * Unknown included for reference

Figure 8. Percent of Injuries from Matches and Lighters in Children Playing Fires



Source: NFIRS ; Adjusted percentages

Figure 9. Percent of Deaths from Matches and Lighters in Children Playing Fires



Source: NFIRS; Adjusted percentages

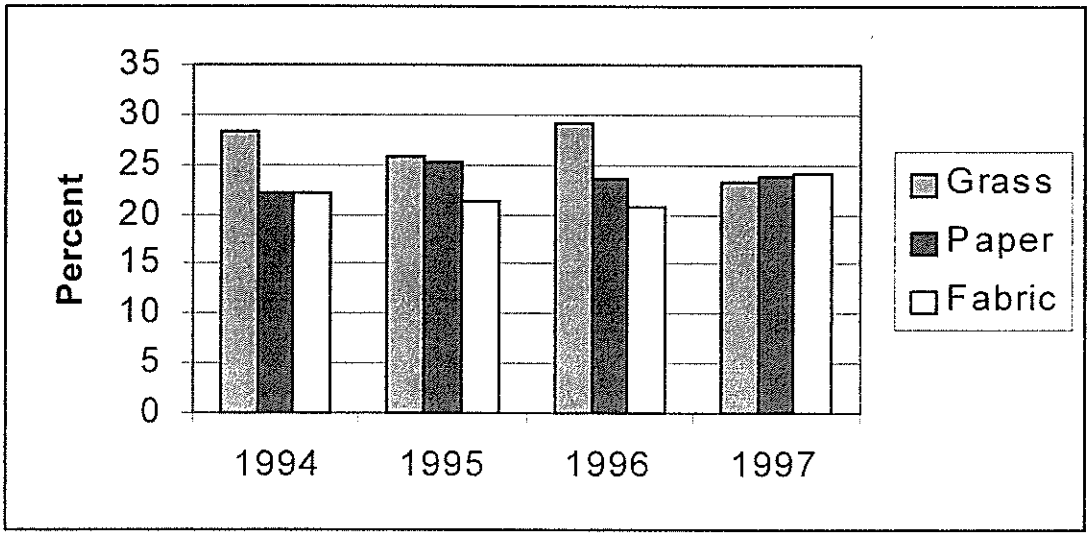
Material Ignited

Of the nine NFIRS categories for material ignited, two-thirds of all children playing fires reported for 1994-1997 are relatively evenly distributed between three categories: grass/leaves, wood/paper, and fabric. Grass/leaves account for approximately 25% of all reported children playing fires. The fact that so many fires are set by children outdoors raises an interesting issue. "Children playing" fires involve three categories of child fire setters. These are children too young to understand the dangerous implications of playing with fire, children having reached the "age of reason" (usually defined as eight and older), and children who set fires intentionally. This last category raises special concerns. According to the United States Fire Administration's report "Arson and Juveniles: Responding to the Violence", two-thirds of all arson fires in 1994 occurred outdoors.[4] Intervention may be needed to prevent these "children playing" fire setters from becoming juvenile fire setters and, perhaps, juvenile or adult arsonists.

Although NFIRS data do not allow identification of the age of a child who starts a fire, one hypothesis is that younger children set more indoor fires, especially those involving the ignition of fabrics, and older children are more involved with igniting materials found outdoors. Figure 10 depicts the breakdown of material ignited in the reported children

playing fires for the years 1994-1997. "Paper/cardboard" is a subcategory of Wood/Paper and "cotton" is a subcategory of Fabrics. These subcategories account for half of the material ignited in each of their respective categories.

Figure 10. Material Ignited in Children Playing Fires Adjusted to Include Apportioned Unknown Responses

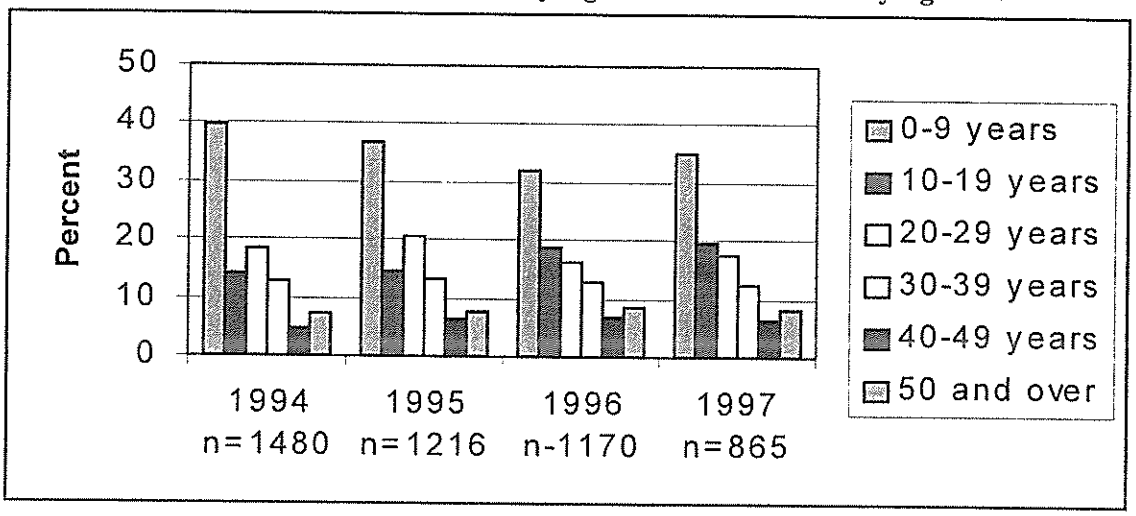


Source: NFIRS; Adjusted Percentages

Victims of Children Playing Fires

Victims of children playing fires occur in all age groups, but children themselves account for the greatest number of victims. Combining age groups to include those from birth through nine years, children account for over one-third of the reported casualties resulting from children playing fires. Figure 11 displays the breakdown by age group of all reported fire casualties associated with children playing fires for the years 1994-1997. This varies from the 1993 report that analyzed deaths due to children playing fires by age group for only residential fires.

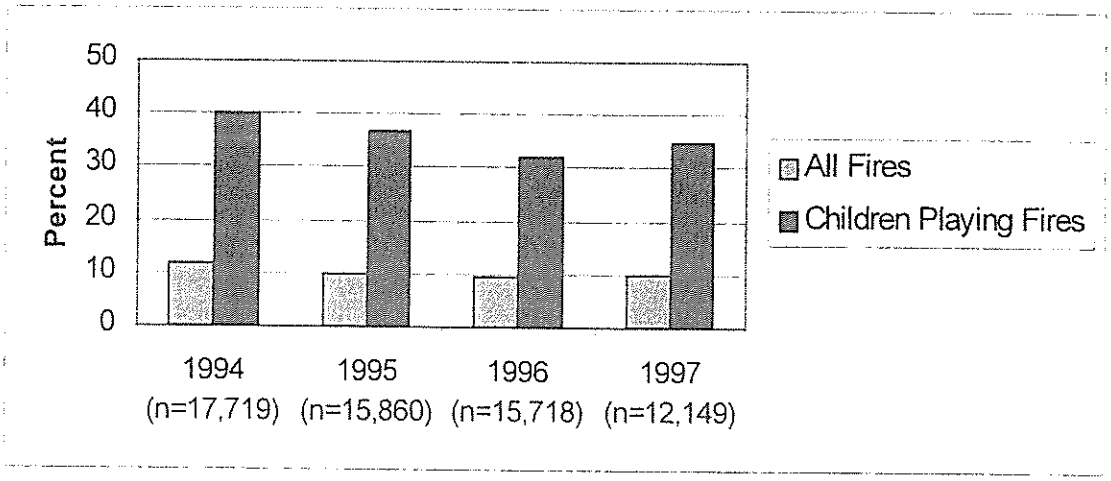
Figure 11. Percent of Casualties by Age Due to Children Playing Fires



Source: NFIRS; Adjusted Percentages

An additional comparison of child casualties between the total casualty data and the children playing fires data was also conducted. Comparing these data further supports the fact that the majority of child fire casualties occur in relationship to children playing fires. This should further the concern for the need to remove materials that can ignite fires from the reach of children. Figure 12 presents the reported total child fire casualties compared to child casualties related to children playing fires.

Figure 12. Percent of Child Casualties in All Fires Compared to Children Playing Fires



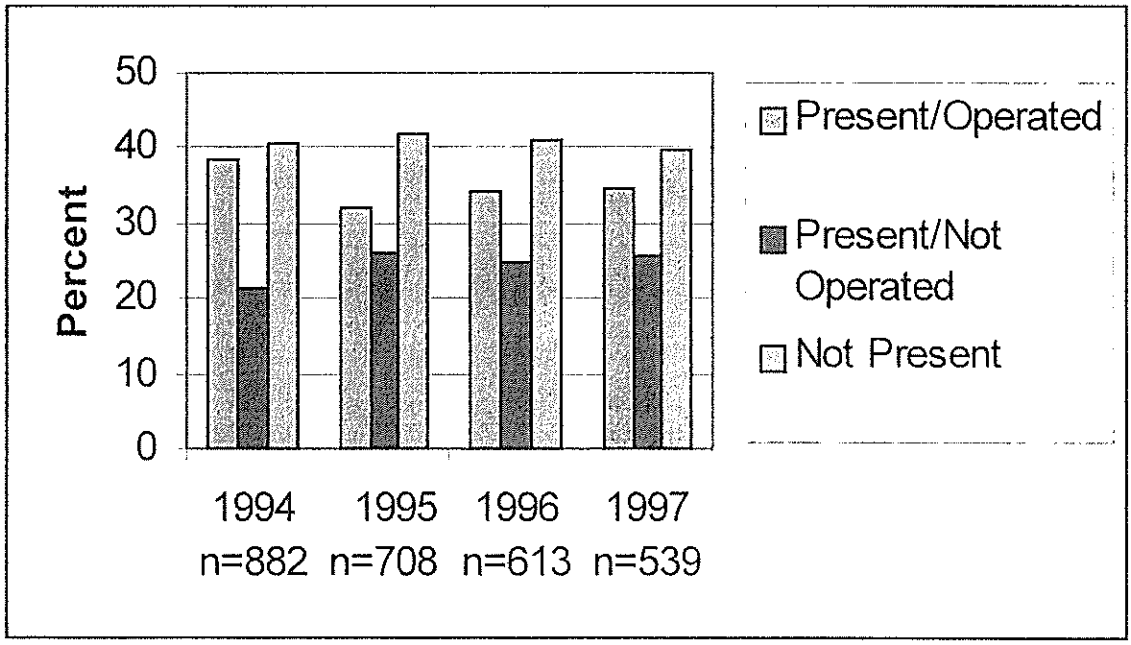
Source: NFIRS; Adjusted Percentages

Impact of Smoke Detectors

The importance of smoke detectors in preventing fire injuries and deaths among children cannot be overstated. Figures 13 and 14 show smoke detector status in fires involving child injuries and deaths for the years 1994-1997. Data used in these figures are only for cases where detector presence and operability were known.

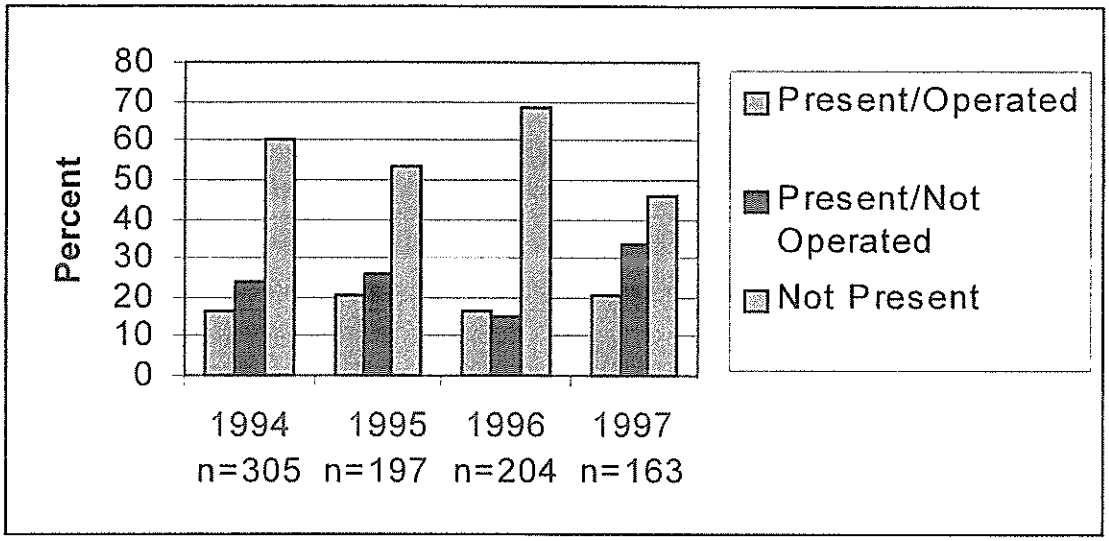
Based on reported data, the impact of detectors is compelling. Two-thirds of the annual reported child fire injuries and over three-fourths of child fire deaths occurred where there was no operable smoke detector. This raises a concern of a potential false sense of security with a detector present. It also reinforces the importance of educating the public to changing batteries on a regular basis to maintain existing detectors and placing detectors in sleeping areas where approximately one-third of fires involving child injuries and deaths originate.

Figure 13. Percent Comparison of Reported Smoke Detector Status in Fires Resulting in Child Injuries



Source: NFIRS

Figure 14. Percent Comparison of Reported Smoke Detector Status in Fires Resulting in Child Deaths



Source: NFIRS

Conclusions

This report has highlighted a number of facts about the fire experiences of children in the U.S. that should help mold public education efforts aimed at this target group. Among the key findings are:

- All children do not experience the same risk. Younger children (birth through 4 years) are at a significantly higher risk than older children (5 through 9 years). Among all children under age ten, African American children face inordinate fire risks relative to white children. This finding must be taken in context of other studies that show a strong correlation between socioeconomic factors such as poverty and education. A larger percentage of African Americans fall into the poverty and lower education categories than other cultures. The reader is referred to the United States Fire Administration, *Socioeconomic Factors and the Incidence of Fire* report for further information. However, the findings of this report should help public educators target their efforts to affected groups to make them aware of the gravity of the situation.

- Data demonstrate that the majority of child fire deaths occur during the colder months. This is substantiated in the data that show heating equipment as the top-ranking cause in fires with equipment involved in ignition.

- Although occurrence of injuries and deaths is relatively consistent for day of the week, the time of day analysis shows the greatest number of injuries occurred from 0800-1159 and the greatest number of deaths occurred between midnight and 0400.

- The majority of fires resulting in child fire injuries and deaths originate in the sleeping area, with the most common form of material ignited indoors being fabric.

- Children playing fires are a major factor in fire injuries and deaths in general and child fire injuries and deaths in specific. Comparison of NFIRS data reveals that the majority of all child injuries and deaths are related to children playing fires. These fires are usually started with matches or a lighter. These findings highlight the critical importance of adequate supervision of children.

- A disproportionate number of child fire injuries and deaths occur in homes without operating smoke detectors. Universal installation in high incidence areas of fire origin and maintenance of smoke detectors is of the utmost importance for the prevention of future child fire deaths.

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[1] United States Fire Administration. (1995). Fire in the United States (10th ed.); 11-16.

[2] Hall, J. & Harwood, B. (1989). The national estimates approach to U.S. fire statistics. *Fire Technology*, 25(2); 99-113.

[3] United States Fire Administration (1991). Children and fire. p. 6.

[4] United States Fire Administration (1994). Arson and juveniles: responding to the violence. p. 3.

Consumer Product Safety Commission

Child-Resistant Lighters Protect Young Children

CPSC Document #5021

Children under 5 years old playing with lighters cause more than 5,000 residential fires a year, resulting in approximately 150 deaths and more than 1,000 injuries according to the U.S. Consumer Product Safety Commission (CPSC). Approximately 30 million households own one or more working lighters. Lighters are frequently used for purposes other than lighting smoking materials and they are often left with-in a child's reach.

Although children as young as 2 years old are capable of operating lighters, the majority of the children who start fires by playing with lighters are ages 3 and 4. At these ages, children are curious about fire but don't understand the danger. Typically, when children start a fire, they will leave the room without telling anyone about the fire.

CPSC set a mandatory safety standard that requires disposable lighters and certain novelty lighters to be child-resistant. The standard covers more than 95 percent of the 600 million lighters purchased in the United States each year.

The standard became effective in summer 1994.

Parents and caregivers are urged to:

- Purchase child-resistant lighters. Remember, these lighters are child resistant, not childproof.
- Keep lighters and matches out of the reach of children.
- Never use a lighter as a source of amusement for children. That may encourage children to think of lighters as a toy and try to light one on their own.

KEEP LIGHTERS AWAY FROM YOUNG CHILDREN

09611

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ORIGINAL ARTICLE

Study of the effectiveness of the US safety standard for child resistant cigarette lighters

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Objective: The purpose of this research is to evaluate the effectiveness of the US Consumer Product Safety Commission's (CPSC) Safety Standard for Cigarette Lighters, which requires that disposable cigarette lighters be resistant to operation by children younger than age 5.
Methods: Fire data on children playing with lighters were solicited from selected US fire departments for incidents occurring from 1997–99, to identify the proportion of such fires caused by children younger than age 5 playing with cigarette lighters. These data were compared with similar data from 1985–87. An odds ratio was used to determine if there was a significant decrease in cigarette lighter fires caused by children younger than age 5 compared to children ages 5 and older. To estimate fires that would have occurred without the standard, the odds ratio, adjusted for population, was applied to 1998 national estimates of fires occurring. National estimates of 1998 fire losses were based on data from the National Fire Incident Reporting System and the National Fire Protection Association to which the 1997–99 age and lighter type distributions were applied. The difference between the fire losses that would have occurred and those that did occur represented fire losses prevented.
Results: In the post-standard study, 48% of the cigarette lighter fires were started by children younger than age 5, compared with 71% in the pre-standard study. The odds ratio of 0.42 was statistically significant ($p<0.01$). This represented a 58% reduction in fires caused by the younger age group compared to the older age group. When applied to national fire loss data, an estimated 3300 fires, 100 deaths, 660 injuries, and $52.5 million in property loss were prevented by the standard in 1998, totaling $566.8 million in 1998 societal savings.
Conclusions: The CPSC standard requiring child resistant cigarette lighters has reduced fire deaths, injuries, and property loss caused by children playing with cigarette lighters and can be expected to prevent additional fire losses in subsequent years.

In 1985, the US Consumer Product Safety Commission (CPSC) was petitioned to begin rulemaking to require disposable cigarette lighters to be resistant to operation by children. Subsequently, the US CPSC estimated that children younger than age 5 playing with cigarette lighters ignited 5900 residential fires that resulted in 170 deaths and 1150 injuries annually for the period 1986–88.[1] Disposable lighters were involved in 97% of those fires and accounted for about 95% of the estimated 488 million disposable lighters sold annually during that period.[1]

In response to those findings, CPSC developed the Safety Standard for Cigarette Lighters (16 CFR Part 1210), which applies to products manufactured or imported after 12 July 1994. The standard requires disposable and novelty cigarette lighters to have a child resistant mechanism that makes the lighters difficult for children younger than age 5 to operate. A lighter with one type of child resistant ignition mechanism is shown in fig 1. The definition of disposable lighters includes non-refillable lighters and inexpensive refillable lighters. Novelty lighters are defined as those that resemble or depict articles appealing to children younger than age 5, or that have entertaining audio or visual effects. Novelty lighters may be either disposable or refillable. The standard excludes "multi-purpose" lighters such as those used to light barbecue grills and fireplaces, which were not evident as a child play hazard when work on the standard occurred. These lighters now are covered by a separate standard (16 CFR Part 1212) which took effect for products manufactured or imported after 22 December 2000.

The child resistance of a cigarette lighter is determined by tests conducted by lighter manufacturers using panels of children between the ages of 42 and 51 months. Lighters used for the tests have no fuel. When activated, they produce an audible or visual signal. Child resistant lighters must be designed so that at least 85% of children included in the test panel are not able to operate the lighters under timed test conditions.

The purpose of this paper is to evaluate the effect of the Safety Standard for Cigarette Lighters. Based on information indicating that disposable cigarette lighters have an average product life of two to three months, CPSC concluded that virtually all disposable cigarette lighters in US households would be child resistant by late 1997 and initiated a study to evaluate the effectiveness of the standard.[1]

METHODS

In brief, the evaluation of standard effectiveness involved three phases. The first phase involved a comparison of the age distributions of children playing with cigarette lighters before and after the standard, based on two CPSC studies. The result was an odds ratio comparing the reduction in fires among the younger age group (affected by the standard) to the reduction among the older age group (not affected by the standard). The second phase involved application of the post-standard CPSC study age and lighter type distributions to national estimates of fire losses derived from National Fire Protection Association (NFPA) and National Fire Incident Reporting System (NFIRS) data, to estimate fire losses that were still occurring after the standard. The third and final phase involved application of the

Abbreviations: CPSC, Consumer Product Safety Commission; NFPA, National Fire Protection Association; NFIRS, National Fire Incident Reporting System

Figure 1 Cigarette lighter with a child resistant ignition mechanism. Note: This is one of many types of child resistant mechanisms. The metal shield must be depressed before the sparkwheel can be turned to produce a spark. The force required to depress the shield is difficult for young children to achieve.

odds ratio to the post-standard estimates to estimate hypothetical losses that would have occurred without the standard. The difference represented fire losses prevented. Datasets used in this paper are listed in table 1 and described below.

Phase 1: comparison of the age distributions

The before and after standard age distributions were identified in two CPSC data collection studies. The pre-standard data collection occurred from 1985–87.[4] CPSC field staff across the country contacted fire jurisdictions in their local areas requesting notification of all fires started by children playing with cigarette lighters as they occurred during the ongoing data collection period. A total of 113 fires involving children playing with lighters were reported to CPSC by the fire service. CPSC field staff then completed a follow up investigation identifying the age of the child who started the fire, the characteristics of the lighter involved, fire casualties, property loss, and a description of the incident scenario.

After implementation of the standard, CPSC conducted a second data collection during the period October 1997 to February 1999. As in the first study, CPSC's field offices requested notification from nearby fire jurisdictions on all fires started by children playing with lighters as they occurred. Participating fire departments submitted their fire incident and investigation reports documenting fire cause for all fires that involved a child playing with any type of lighter. When a child younger than age 5 started the fire, the fire department also completed a CPSC questionnaire providing additional detail on the age of the child and the lighter characteristics. Lighters used in fires started by children younger than age 5 were collected whenever possible. The study included reports from 108 local fire jurisdictions in 31 states and consisted of 375 fires that resulted in 23 deaths and 95 injuries. Lighter type was identified in all but seven of the 375 fires.

In both studies, fires attended by the fire service that were caused by children playing with lighters were identified via a set of standardized incident codes contained in the NFIRS. Fire departments were requested to report to CPSC every incident that met these specific criteria and submit their standard fire cause documents, a fire incident report and an investigation report, to CPSC. Although the fire service has no universally accepted definition of when a fire should be considered child play rather than arson, the decision is usually based on the perceived ability of the child to understand the consequences of his actions.

Since lighter fires may have decreased for reasons other than the standard, the analysis focused on the change in the proportion of cigarette lighter fires caused by children younger than age 5 (affected by the standard) compared to children age 5 and older (not affected by the standard). The procedure had the effect of controlling for a variety of other factors that were likely to have contributed to a reduction of fire losses over the years.

Odds ratio methods were used for the comparison. Children younger than age 5 were considered the treatment group t. Children ages 5 and older were considered the comparison group c. Time periods before and after the standard were designated b and a respectively, with n representing the number of incidents. The odds that an event occurred before the standard for the treatment group was:

$$\text{ODDS treatment} = n_{tb}/n_{ta}$$

with the analogous expression for the control group. The incident odds ratio, was then defined as ODDS comparison/ODDS treatment. An additional adjustment was made for changes in the US population at risk in the two time periods because a decrease in the relative proportion of children younger than age 5 in the population could be confounded with the effect of the standard. To adjust for the change in population, we calculated the population odds ratio for children younger than age 5 and ages 5–9 in the general population in both time periods and applied it to the crude odds ratio from the two studies. Confidence intervals and hypothesis tests used the standard error for the odds ratio found in Fleiss (1981, equation 5.19, page 63).[5]

Phase 2: national estimates

To translate the odds ratio into prevented fire losses, we first estimated post-standard fire losses. This was done by applying the fire starter age and lighter type distributions from the post-standard CPSC data collection to 1998 national estimates

Table 1 Data sources

Dataset	Dates	Data provided	Data source
CPSC pre-standard study of lighter child play fires	1985–87	Age distribution of children who started fires by playing with cigarette lighters	Lighter child play fires attended by solicited fire departments
CPSC post-standard study of lighter child play fires	1997–99	Age distribution of children who started fires by playing with cigarette lighters	Lighter child play fires attended by solicited fire departments
NFPA	All years	Estimates of US residential structure fires attended by fire departments	Probability survey of public fire departments
NFIRS*	All years	% Of residential structure fires in NFIRS that involve children playing with lighters	Fire incident reports from local fire departments. NFIRS captured about 40% of residential fires attended by fire departments in 1998, as estimated by NFPA

*Lighter fires involving children playing are identified in NFIRS from ignition factors 36 and 48 (child play), form of heat ignition 46 (lighter), equipment involved in ignition 98 or 99 (no specific equipment), type of situation 11 (structure fire), and fixed property use 4 (residential).

Table 2 Age distributions of the fire starters playing with cigarette lighters in two CPSC studies

Age distribution (years)	1985–87	1997–99	Odds
0–4	80	144	0.56
≥5	33	154	0.21
% Ages 0–4	71	48	
Crude odds ratio			0.39
Age adjusted odds ratio			0.42*
95% Confidence interval			0.23 to 0.62

Note: One incident with unknown age or lighter type was deleted from the 1997–99 study. The age adjusted odds ratio was derived by dividing the crude odds ratio by the population odds ratio.
*The odds ratio was statistically significant, z=−4.24, p<0.01.

of residential fires caused by children playing with lighters, based on NFPA and NFIRS data.

The NFPA survey is based on a stratified random sample of fire departments in the US and provides annual estimates of all residential structure fires, deaths, injuries, and estimated property loss. It does not identify fire cause.[6]

Fires caused by children playing with lighters were identified in the NFIRS. NFIRS is a compilation of fire incident reports completed by US fire departments on fires they attend. Reports are submitted voluntarily to the US Fire Administration, which assembles the reports to construct the NFIRS database. In 1998, NFIRS contained 156 600 residential structure fires, about 40% of the residential structure fires estimated by NFPA. The NFIRS reporting code that identifies lighters includes both cigarette and multipurpose lighters. Age of the fire starter is not included. While NFIRS is not a probability sample, the US Fire Administration has stated that to the best they can determine, the distribution of participating fire departments is reasonably representative of the entire nation.[7]

To develop 1998 fire loss estimates for all ages of children playing with all types of lighters, the percentage of all NFIRS residential structure fires that involved children playing with lighters was calculated. Unknown values of the variables used in the analysis were allocated proportionally among the known values.[8 9] The process was repeated for deaths, injuries, and property loss. Then, the percentages were applied to NFPA estimates of US residential structure fires and fire losses (deaths, injuries, and property loss) to provide national estimates of US residential structure fires and losses that involved all ages of children playing with all types of lighters.[10]

Estimates of 1998 fire losses by age group and lighter type were developed by applying the 1997–99 study age and lighter type distributions to the 1998 national estimates of all lighter child play fires and fire losses.

Phase 3: fire losses prevented

Finally, fire losses prevented by the standard were computed. If the standard had no effect, then one could expect that the rate of change in fires involving the treatment group (children younger than age 5) from 1985–87 and 1997–99 would have been the same as the comparison group. This would put the hypothetical sample estimate for fires caused by children younger than age 5 as $n^*_u = n_u/OR$ where OR is the age adjusted odds ratio. Incidents saved would then $n^*_u - n_u$ or $n_u(1-1/OR)$. To obtain national estimates, the national estimate of fires caused by children younger than age 5 was inserted in the formulas above.

Hypothetical deaths, injuries, and property loss were derived by first calculating the 1998 per fire rates of estimated death, injury, and property loss caused by children younger than age 5 playing with cigarette lighters. Then, the rates were multiplied by the estimate of hypothetical fires, to obtain estimates of the hypothetical number of fire deaths and injuries.

Table 3 Estimated 1998 residential structure lighter child play fire losses attended by the fire service

Loss measure and lighter type	Total	Age of fire starter: Age <5	Age of fire starter: Age ≥5
Fires (n=375)			
Total	6100	3100	3000
Cigarette	5000	2400	2600
Multipurpose	1100	800	400
Deaths (n=23)			
Total	130	90	40
Cigarette	90	70	20
Multipurpose	50	20	20
Injuries (n=95)			
Total	810	530	280
Cigarette	670	480	200
Multipurpose	140	50	90
Property loss ($millions) (n=$7.1)			
Total	99.0	53.7	45.3
Cigarette	79.8	38.2	41.7
Multipurpose	19.2	15.6	3.6

Note: Detail may not add due to rounding. All estimates were rounded, fires to the nearest hundred, deaths and injuries to the nearest ten, and estimated property loss to the nearest tenth of a million dollars.

and amount of property loss that would have occurred in those fires. The difference between the hypothetical fire losses and the 1998 fire losses that occurred represented the losses prevented by the standard.

The overall societal cost associated with the fire losses was calculated by summing the estimated monetary value of the deaths, injuries, and estimated property loss involved. CPSC's Directorate for Economic Analysis valued each death at $5 million and each injury at $50 000.[11 12]

RESULTS

Estimate of standard effectiveness

Table 2 presents the age distribution of the children who started cigarette lighter child play fires in the two CPSC studies, one pre-standard and one post-standard. The table shows that 71% of the fires were started by children younger than age 5 in the 1985–87 study, while 48% of the incidents were started by children younger than age 5 in the 1997–99 study. The age adjusted odds ratio of 0.42 was statistically significant ($p<0.01$), with a 95% confidence interval of 0.23 to 0.62. This suggests that the standard was associated with a 58% reduction in cigarette lighter fires caused by children younger than age 5.

National estimates of post-standard fire losses

Application of post-standard age and lighter type distributions to 1998 national estimates of all fires caused by children playing with lighters indicated that children younger than age 5 caused an estimated 2400 cigarette lighter fires that resulted in 70 deaths, 480 injuries, and $38.2 million in property loss in 1998 (table 3). Among only cigarette lighter fires, children younger than age 5 ignited an estimated 48% of the fires that resulted in 80% of the deaths, 71% of the injuries, and 48% of the property loss. Less than 1% of the cigarette lighter fires caused by children younger than age 5 involved novelty lighters, the same proportion as in the pre-standard data.

National estimates of fire losses prevented

Table 4 presents 1998 estimated cigarette lighter fires and fire losses caused by children younger than age 5 that would have occurred if the standard had no effect. This estimate of 5700 cigarette lighter fires is 3300 more fires than the 1998 estimate of fires that occurred. The actual fire estimate of 2400 represents a 58% reduction from the "no effect" estimate.

Table 4 Estimated 1998 cigarette lighter child play fire losses prevented by the CPSC standard

Case	Fires	Deaths	Injuries	Property loss ($millions)	Total societal cost ($millions)
Actual 1998 fire losses	2400	70	480	38.2	412.2
1998 Expected fire losses if standard had no effect	5700	170	1140	90.7	979.0
1998 Fire losses prevented	3300	100	660	52.5	566.8

Table 5 Lighters involved in fires ignited by children younger than age 5, 1997–99

Lighter type	No of fires	Lighters collected	Lighters not collected
Total	191	100	91
Cigarette	144	71	73
Disposable	90	69	21
Refillable	2	1	1
Unknown	52	1	51
Multipurpose	46	29	17
Unknown	1	0	1

Note: When lighters were not collected, types were identified by the fire service based on discussion with the occupants.

Maintaining the 1998 estimated per fire loss rates for cigarette lighter fires caused by children younger than age 5 shown in table 3, the 1998 fire losses prevented were estimated at 100 deaths, 660 injuries, and $52.5 million in property loss. Total societal cost prevented was estimated at $566.8 million for 1998.

Types of cigarette lighters involved in post-standard fires

Among 191 lighter fires ignited by children younger than age 5 in the post-standard data collection, 144 involved cigarette lighters, 46 involved multipurpose lighters, and one could not be identified (table 5). Among the 92 cigarette lighters that could be identified as either disposable or refillable, two (2%) were refillable, the same proportion as in the pre-standard data. Cigarette lighters are often destroyed in fires to the extent that the type cannot be identified.

Disposable cigarette lighters operated by children younger than age 5, when collected, were evaluated to determine if the child resistant feature had been defeated. Of the 69 disposable lighters collected, 59 were manufactured with a child resistant mechanism and 10 were not. The child resistant features had been defeated on 13 of the 59 lighters (22%) It was not possible to determine whether the 10 lighters manufactured without child resistant features were illegally manufactured or imported after the standard took effect or whether they were older, pre-standard, models.

Multipurpose lighters

The estimates of lighter fires shown in table 3 additionally identified the recent involvement of multipurpose lighters as a contributor to lighter child play fires and fire losses. Children younger than age 5 playing with multipurpose lighters caused an estimated 800 fires, 20 deaths, 50 injuries, and $15.6 million in residential property loss in 1998. There was no product safety standard addressing those incidents at the time.

DISCUSSION

It is estimated that the CPSC Safety Standard for Cigarette Lighters reduced cigarette lighter child play fires caused by children younger than age 5 by 58%. This conclusion is based on the assumption that, after adjusting for changes in the population, the standard is the only known factor that affects child play fires involving the younger age group but not the older age group. Many factors are believed to contribute to the general reduction of residential fires over the years but they are unlikely to affect younger children more than older children. These factors include public education, improvements in building construction, reductions in the size of the smoking population, and the increased presence of smoke alarms. It may be expected that the increased presence of smoke alarms would increase the proportion of fires that did not require the presence of the fire service. However, once a fire reaches the threshold level that results in fire service attendance, those captured for this analysis, it is not clear that the greater presence of smoke alarms changes the risk equation for the two age groups.

Taking into account the estimated fire losses that would have occurred if the standard had no effect, it is estimated that the CPSC safety standard was responsible for reductions of 3300 fires, 100 deaths, 660 injuries, and $52.5 million in property loss in 1998. These reductions represent total 1998 societal savings of $566.8 million. It is noted that these savings apply only to 1998 and that additional savings are expected in subsequent years.

To some extent these estimates may be conservative. First, children of ages 52–59 months were included in the group considered to be affected by the standard—that is, children younger than age 5. However, because they were not included in the tests used to qualify lighters it cannot be concluded that the standard should be expected to protect them to the same extent. Second, the estimates included here refer only to fires attended by the fire service. To the extent that additional losses, mostly injuries and property damage, occurred in unreported fires, estimates of losses prevented are underestimated. Third, despite the expectation that homes would be fully saturated with child resistant lighters by 1998, review of the lighters involved indicated that some lighters were not child resistant. If all the lighters in homes had been child resistant, the effectiveness of the standard would have been greater than estimated. It is reasonable to expect that the number of pre-standard, non-child resistant lighters will continue to decline over time.

The 1997–99 study also documented that multipurpose lighters were a cause of child play fires, a hazard that was not evident when the cigarette lighter standard was developed. To address this hazard, CPSC developed the "Safety Standard for Multi-Purpose Lighters" (16 CFR Part 1212) which became effective on 22 December 2000, and includes the same child resistant performance requirements as the cigarette lighter standard. Since the performance requirements are the same as for cigarette lighters, proportionally similar savings may be expected in the future.

IMPLICATIONS FOR PREVENTION

These results document the value of the US standard in reducing fire deaths caused by children playing with cigarette

Key points

- Fires, deaths, and injuries caused by young children playing with cigarette lighters have been reduced as a result of the standard requiring child resistant lighters.
- Casualties could be prevented in other countries by adoption of a child resistant lighter standard with similar requirements.
- The standard is not a substitute for parental supervision.
- Continuing media campaigns are needed to inform caregivers that some young children, and most older children, can still operate cigarette lighters.
- Lighter safety campaigns should specify both cigarette lighters and multipurpose lighters.

lighters. To our knowledge, only Canada has a similar standard in effect, although discussions are underway in several other countries and in the European Union. Based on the US experience, adoption of a child resistant lighter standard by other countries could be expected to reduce fire deaths to children in those countries.

Many fire deaths involving lighters remain. Increased efforts to educate parents could help further reduce cigarette lighter deaths and injuries caused by child play. Messages should focus on two issues—first, the effectiveness of the standard, to encourage parents not to remove the child resistant feature, and second, the limitations of the standard. Parents may not be aware that some children as young as age 2 have been known to operate lighters, or that the child resistant features may not be equally effective for older children. Also, the CPSC standard is intended to make cigarette lighters child resistant, but not child proof. While the standard can increase the time needed for a child to operate the lighter, it may not prevent some children from operating the lighters with enough practice. Given the similarity of the hazard and performance requirements, educational materials addressing child play fires should specifically include multipurpose lighters since it may not be evident to parents that multipurpose lighters pose the same hazard.

ACKNOWLEDGEMENTS

The opinions expressed by the authors do not necessarily represent the views of the US CPSC. Since this material was written in the authors' official capacities it is in the public domain and, in accordance with 17 USC 1005, may be freely copied or reprinted. The authors acknowledge the contribution of the reviewers who provided comments to improve the earlier draft.

This material as well as additional material on the subject are contained in the *report Fires Caused by Children Playing with Lighters: An Evaluation of the the CPSC Safety Standard for Cigarette Lighters*, September 2000. The report is available at www.cpsc.gov/library.

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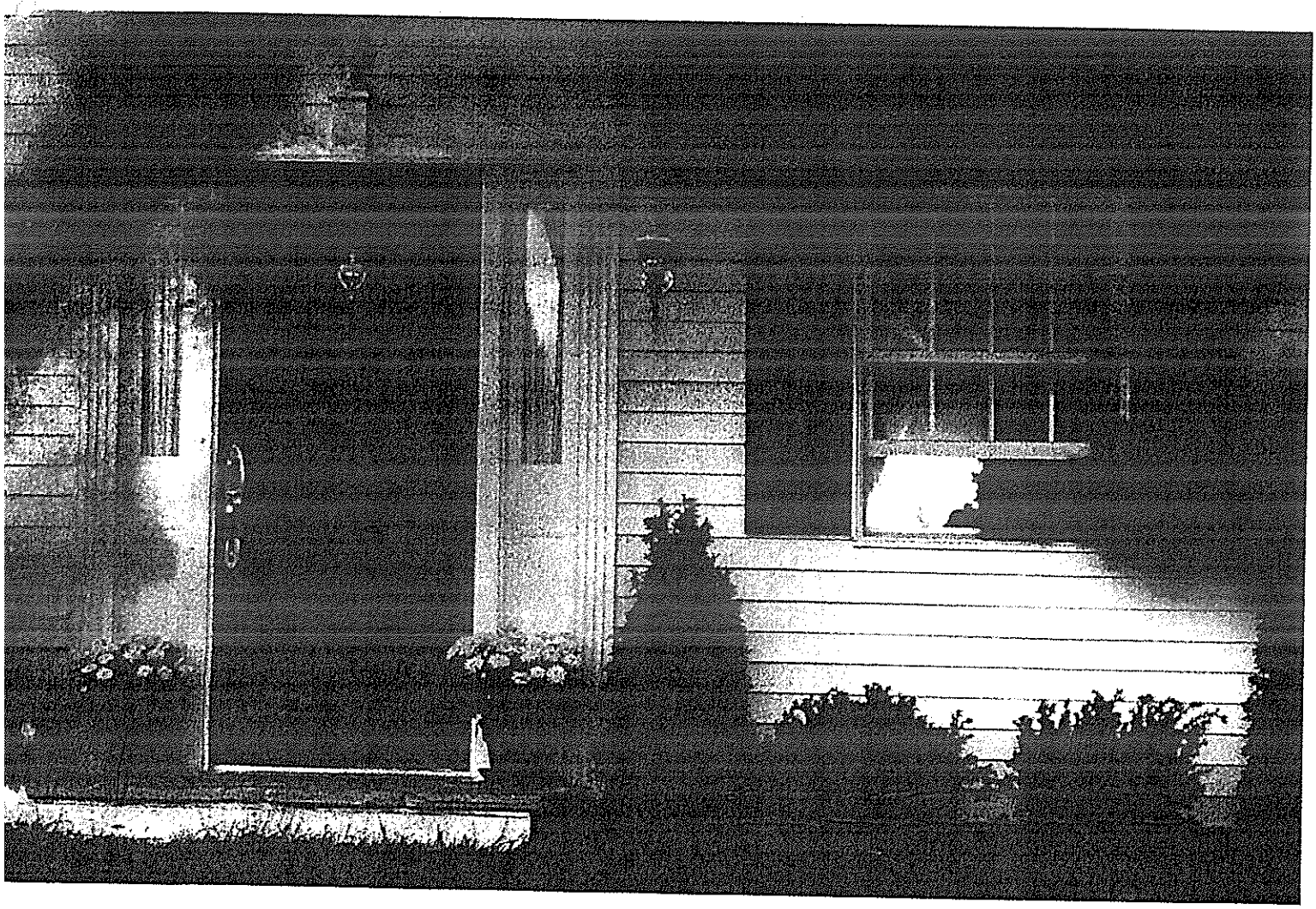
U.S. Fire Administration

Residential Structure and Building Fires

October 2008

FEMA



U.S. Fire Administration

Mission Statement

We provide National leadership to foster a solid foundation for local fire and emergency services for prevention, preparedness, and response.

FEMA

U.S. Fire Administration

Residential Structure and Building Fires

October 2008

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RESIDENTIAL STRUCTURE AND BUILDING FIRES

INTRODUCTION

The residential portion of the fire problem continues to account for the vast majority of civilian casualties. National Fire Protection Association (NFPA) estimates show that, while residential structure fires account for only 25 percent of fires nationwide, they account for a disproportionate share of losses: 83 percent of fire deaths, 77 percent of fire injuries, and 64 percent of direct dollar losses.[1]

Analyses of the residential structure fire problem were published formerly as a chapter in each edition of *Fire in the United States*. The most recent edition of *Fire in the United States*, the fourteenth edition published in August 2007, featured an abbreviated chapter on residential structures. This full report is the most current snapshot of the residential fire problem as reflected in the 2005 National Fire Incident Reporting System (NFIRS) data and the 2005 NFPA survey data. In this report, as in previous chapters in *Fire in the United States*, an attempt has been made to keep the data presentation and analysis as straightforward as possible. It is also the desire of the United States Fire Administration (USFA) to make the report widely accessible to many different users, so it avoids unnecessarily complex methodology.

TERMINOLOGY

The term "residential", as used in fire data analyses, includes properties commonly referred to as "homes," whether one-, two-, or multifamily properties. Residential refers to a type of property—whether it is a building or other type of structure, or whether the property is the land or real estate itself. Residential properties also include manufactured housing, hotels and motels, residential hotels, dormitories, assisted living facilities, as well as halfway houses for formerly institutionalized individuals (e.g., mental patients, drug addicts, or convicts) that are designed to facilitate their readjustment to private life. The term residential does not include institutional properties such as prisons, nursing homes, juvenile care facilities, or hospitals, though many people may reside there for short or longer periods of time.

The term "residential structures" refers to all built structures on residential properties. Structures include buildings as well as other nonbuilding structures (e.g., breezeways, fences, etc.). The vast majority of residential fires, deaths, and injuries occur in buildings, and that is where prevention efforts are targeted most often. The term "residential buildings" refers to those residential structures that are enclosed, and where people spend the majority of their time.[2]

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[1] These percentages are derived from summary data presented in the NFPA's annual survey and report, *Fire Loss in the United States During 2005*.

[2] USFA uses the structure type data element to determine the type of structure. Buildings include enclosed buildings and fixed portable or mobile structures (often used in conjunction with mobile (manufactured) homes). Residential structures with no structure type noted are included, as these structures frequently are the scene of confined structure heating and cooking fires, which are associated most often with enclosed buildings. These definitions are noted in detail in a later section.

The term "residence" is used interchangeably with "residential building". The term "home" is used infrequently, but also refers to a "residential building". In both instances, the terms exclude any nonbuilding structure.

Throughout this report, the term "fire casualties" refers to deaths and injuries; the term "fire losses" collectively includes fire casualties and dollar loss due to fire. As fire data are collected fire by fire, many of the data elements collected reflect the characteristics of the fire versus the characteristics of the casualties. This report also uses the following terms: "fatal fires" for those fires where one or more civilian fire fatalities occur, "fires with injuries" for those fires where one or more civilian fire injuries occur, and "fires with dollar loss" for those fires where a loss greater than zero was reported.

Organization of Report

This report addresses residential structure fires over the 10-year period from 1996 to 2005, with a focus on 2005 data. It is organized differently from its predecessor chapters in the many editions of *Fire in the United States*.

As NFIRS 5.0 allows analysts to distinguish between buildings and nonbuildings, this report addresses residential structure fires in two major sections. The first section presents an overview of residential structure fires and trends for the residential subsets of one- and two-family structure fires (including mobile homes used as fixed residences, a subset of one- and two-family dwellings), multifamily structure fires (apartments, rowhouses, town houses, condominiums, and tenements), and other residential structure fires such as rooming houses, hotels/motels, and other property types reported as residential.

The second section addresses residential building fires with the above three major subsets applied to residential buildings: one- and two-family, multifamily, and other residences.

The "Resources" section, formerly at the end of each chapter of *Fire in the United States*, is now in one, comprehensive resource list at the following URL: http://www.usfa.dhs.gov/statistics/reports/fius.shtm

METHODOLOGY

Residential Structure Fires in 2005 relies on data from the Nation's largest fire incident database, NFIRS; on independent surveys from the NFPA; and on analytic techniques widely accepted by fire data analysts. The primary data source and analytic considerations when using the data are addressed in the following sections.

National Fire Incident Reporting System Data

The fire-related findings in this report are based primarily on analyses of the NFIRS fire incident data for 2005. NFIRS is a State-based, voluntary data collection system administered by the USFA, an agency under the Department of Homeland Security (DHS). From an initial six States in 1976, NFIRS has grown both in participation and in use. Over the life of the system, all 50 States, the District of Columbia, and Native American Tribal Authorities have reported to NFIRS. Participation in NFIRS is voluntary, although some States do require their departments to participate in the State system. Additionally, if a fire department is a recipient of a Fire Act Grant, participation is required.[1]

[1] From the Assistance to Firefighters Grant Program guidance, if the applicant is a fire department, the department must agree to provide information, through established reporting channels, to NFIRS for the period covered by the assistance. If a fire department does not participate currently in the incident reporting system and does not have the capacity to report at the time of the award, the department must agree to provide information to the system for a 12-month period that begins as soon as the department develops the capacity to report. See http://www.firegrantsupport.com/docs/2007AFGguidance.pdf

Not all States necessarily participate each year and, for those that do, reported fire incidents do not reflect all of a State's fire activity. Within a State, the participating fire departments include career, volunteer, and combination career/volunteer departments. These departments serve communities that range from rural hamlets to the largest cities. In addition, not all recorded information is complete. Nonetheless, with over half of all fire departments nationwide reporting fire incidents to NFIRS 5.0, the reporting departments represent a very large sample that enables us to make good estimates of various facets of the fire problem.[4, 5]

In 2005, approximately one million fire incidents and more than 13 million non-fire incidents were added to the database. NFIRS is the world's largest collection of incidents to which fire departments respond.

National Estimates

With the exception of the summary totals from the NFPA surveys at the beginning of each section of residential structures, the numbers in this report are scaled-up national estimates or percentages, not just the raw totals from NFIRS. Many of the estimates are derived by computing a percentage of fires, deaths, injuries, or dollar loss in a particular NFIRS category and multiplying it by the corresponding total number from the NFPA annual survey. For example, the national estimate for the number of residential building fires (Figure 10) was computed by taking the percentage of NFIRS residential structure fires that are building fires and multiplying it by the estimated total number of residential structure fires from the NFPA survey. This methodology is the accepted practice of national fire data analysts.[6]

Ideally, one would like to have all of the data come from one consistent data source. Because the "residential population protected" is not reported to NFIRS by many fire departments and the reliability of that data element is suspect in many other cases, especially where a county or other jurisdiction is served by several fire departments that each report their population protected independently, this data element was not used. Instead, extrapolations of the NFIRS sample to national estimates are made using the NFPA survey for the gross totals of fires, deaths, injuries, and dollar loss.

One problem with this approach is that the proportions of residential fires and fire losses differ between the large NFIRS sample and the NFPA survey sample. Nonetheless, to be consistent with approaches being used by other fire data analysts, the NFPA estimates of fires, deaths, injuries, and dollar loss for residential structures are used as a starting point. The details of the residential fire problem below this level are based on proportions from NFIRS. Because the proportions of fires and fire losses differ between NFIRS and the NFPA estimates, from time to time this approach leads to minor inconsistencies. These inconsistencies will remain until all estimates can be derived from NFIRS alone.

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[4] *Fire in the United States 1995-2004, Fourteenth Edition,* United States Fire Administration, August 2007: http://www.usfa.dhs.gov/statistics/reports/fius.shtm

[5] NFIRS 5.0 contains converted NFIRS version 4.1 data and native NFIRS version 5.0 data. USFA uses only NFIRS 5.0 data for its analyses.

[6] John R. Hall and Beatrice Harwood, "The National Estimates Approach to U.S. Fire Statistics," *Fire Technology*, May 1989. Also available at: http://www.nfpa.org/assets/files/PDF/Research/Nationalestimates.pdf

Unknowns

On a fraction of the incident reports or casualty reports sent to NFIRS, the desired information for many data items either is not reported or is reported as "unknown" or "undetermined." Often the total number of blank or unknown entries is larger than some of the important subcategories. For example, 42 percent of the fatal residential structure fires reported in 2005 do not have sufficient data reported to NFIRS to determine cause. The lack of data masks the true picture of the residential fire problem. Many prevention and public education programs use NFIRS data to target at-risk groups or to address critical problems; fire officials use the data in decisionmaking that affects the allocation of firefighting resources; and consumer groups and litigators use the data to assess product fire incidence. When the unknowns are large, the credibility of the data suffers. Fire departments need to be more aware of the effect of incomplete reporting.

Incomplete Loss Reporting

As troublesome as insufficient data for the various NFIRS data items can be, equally challenging is the apparent nonreporting of injuries and property loss associated with the fire incident (although the latter is notoriously difficult to quantify). It is exceedingly rare that a fire department experiences no firefighter injuries of any type. Yet there are fire departments, large and small, that report no firefighter injuries or a minuscule number of them, but report fires. Fire, by its nature, is destructive. Yet there are many reported fires where the flame spread indicates damage but no property loss is indicated. Incomplete reporting of associated civilian deaths is much more difficult to identify, as the numbers of deaths are relatively small. Incomplete reporting of civilian injuries is equally difficult to ascertain, as the injury-per-fire profiles for most departments are within reason.

Adjusted Percentages in Fire Data

In making national estimates of the fire problem, unknown or undetermined data in the NFIRS database are not ignored. Unknown data occur when the information in nonrequired data collection items in NFIRS is not provided (left blank), the coding provided is invalid, or the information is noted as "undetermined." The approach taken in this report is to provide an "adjusted" percentage that is computed using only those incidents for which the valid information was provided for the data item being analyzed. In effect, this distributes the unknown responses in the same proportion as the known responses for the data item, which may or may not be approximately right.

As in past editions of the parent document, *Fire in the United States*, both the reported data and the adjusted data (if unknowns are present) are plotted on the bar charts in this edition. Unless otherwise noted, as in the Smoke Alarms section below, adjusted percentages are used in the text.

Comparing Statistics to Previous Analyses

Differences between the current NFIRS and older versions have, or may have, an effect on the analyses of fire topics. These differences, the result of both coding changes and data element design changes, required revisions to long-standing groupings and analyses. The definitions of some property types,[7] the cause methodology, smoke alarm performance, mutual aid, building data, and streamlined reporting for qualified incidents are among those areas that are approached differently in NFIRS 5.0. As these revisions have

[7] Examples of these property type changes include detached residential garages, which, as a subset of nonresidential storage properties, previously were included under residential structures. They now are included with nonresidential properties. Vacant and under construction now is an attribute of a structure, and no longer is considered a separate property type.

resulted in changes in overall trends—some subtle and some substantial—this edition does not include trends based on previous versions of NFIRS data. Subsequent editions will build on the analyses presented here. This edition does, however, present trends based on data from the NFPA annual surveys.

Streamlined reporting of confined, low-loss structure fires[8] allows the fire service to capture incidents that either might have gone unreported prior to the introduction of NFIRS 5.0 or were reported, but as a nonfire fire incident, as no loss was involved.[9] Data from this reporting option were investigated in a 2006 USFA report, *Confined Structure Fires*. The addition of these fires results in increased proportions of cooking and heating fires in analyses of fire cause. In other analyses, the inclusion of confined fires may result in larger unknowns than in previous analyses, as detailed reporting of fire specifics (e.g., room of origin) is not required. In 2005, these confined fires accounted for 45 percent of residential structure fires. Nearly 90 percent of these confined residential structure fires were no- or low-loss cooking fires (67 percent) and heating fires (22 percent).

Smoke Alarms

Smoke alarm data collection in NFIRS 5.0 has changed in two significant ways. First, in keeping with the abbreviated reporting for confined fires, smoke alarm performance data for confined structure fires is limited to information on smoke alarm alert notification. Second, for nonconfined structure fire reporting, only incidents reported as buildings are required to provide detailed information on smoke alarm presence, type, operational status, and the like. Because the data items are not wholly compatible for analytic purposes, smoke alarm performance is presented separately for confined and nonconfined fires. Adjustments for unknowns are not presented.

The effectiveness of smoke alarms is understood to be whether the smoke alarm alerted occupants to the fire. In the case of confined fires, effectiveness data are collected by a single data element. In the case of nonconfined fires, data are collected on the presence of alarms, operation of alarms when present, and alerting status for present and operating alarms. Effectiveness then is a combination of alarms present and operating with the successful alerting of occupants.

At the time of publication, a methodology to analyze NFIRS 5.0 smoke alarm data is under review. As smoke alarm data are of great interest to many readers, the NFIRS 5.0 smoke alarm data (e.g., raw NFIRS 5.0 counts) for each residential building category are presented in the Appendix.

[8] Confined structure fires are defined in NFIRS as incident types 113 to 118.

[9] Some fire departments routinely reported such non-loss fires as smoke scares. The result, from a reporting viewpoint, is that the incident was reported but not coded as a fire incident, thereby reducing the number of reported fires in NFIRS.

Trend Data

A frequently asked question is how much a particular aspect of the fire problem has changed over time. The usual response is in terms of a percentage change from one year to another. As we are dealing with real-world data that fluctuate from year to year, a percent change from one specific year to another can be misleading. This is especially true when the beginning and ending data points are extremes—either high or low. For example, Table 1 shows the percent change in residential structure fire deaths from 1996 (4,080 deaths) to 2005 (3,055) would be a decrease of 25.1 percent. Yet, if we were to choose the next year, 1997, as the beginning data point (3,390 deaths), this change would show a much smaller decrease of 9.9 percent. As we are interested in trends in the U.S. fire problem, this report presents the computed best-fit linear trend line (which smoothes fluctuations in the year-to-year data) and presents the change over time based on this trend line. In this example, the overall 10-year trend is a decrease in residential structure fire deaths of 18.1 percent. As noted above, trends that incorporate NFIRS data from the 5.0 system may have subtle changes as a result of the system design, and not a true trend change.

Table 1. Comparison of Percentage Change Indicators

Year	Residential Structure Fire Deaths	Linear Best Fit Trend	Change between 1996 and 2005	Change between 1997 and 2005
1996	4,080	3,558	4,080	
1997	3,390	3,486		3,390
1998	3,250	3,415		
1999	2,920	3,344		
2000	3,445	3,272		
2001	3,140	3,201		
2002	2,695	3,129		
2003	3,165	3,058		
2004	3,225	2,987		
2005	3,055	2,915	3,055	3,055
Percent Change		**-18.1%**	**-25.1%**	**-9.9%**

Sources: Residential structure fire death data, NFPA; analysis, USFA.

Trend data presented in this report are either 10-year trend data for residential structure fires from the NFPA annual surveys (1996–2005) or 3-year national estimate trend data for building fires (2003–2005).

Cause Categories

Since the introduction of NFIRS Version 5.0, the implementation of the cause hierarchy has resulted in a steady increase in the percentage of unknown fire causes. This increase may be due, in part, to the fact that the original cause hierarchy (described in *Fire in the United States 1995-2004, Fourteenth Edition*) was developed to capture the causes identified from the data collected in previous NFIRS versions. It appears that, for some fire incidents, a considerable amount of causal information collected as part of the NFIRS Version 5.0 was not used in the old hierarchy. As a result, these incidents were assigned to the unknown cause category. USFA has developed a modified version of the previous hierarchy of cause groupings for structure

fires to address this deficiency (Table 2). The revised schema provides three levels of cause descriptions: a set of more detailed causes (priority cause description), a set of mid-level causes (cause description), and a set of high-level causes (general cause description). The priority cause description and the cause description existed previously as part of the original cause hierarchy, but have been expanded in the revised schema to capture the rest of the 5.0 data. Generally, the mid-level causes are the cause groupings used by USFA analysts.

Table 2. Three-Level Structure Fire Cause Hierarchy

Priority Cause Description (in hierarchical order)	Cause Description	General Cause Description
Exposure	Exposure	Exposure
Intentional	Intentional	Firesetting
Investigation with Arson Module	Investigation with Arson Module	Unknown
Children Playing	Playing with Heat Source	Firesetting
Other Playing		
Natural	Natural	Natural
Fireworks	Other Heat	Flame, Heat
Explosives		
Smoking	Smoking	
Heating	Heating	Equipment
Cooking	Cooking	
Air Conditioning	Appliances	
Electrical Distribution	Electrical Malfunction	Electrical
Appliances	Appliances	Equipment
Special Equipment	Other Equipment	
Processing Equipment		
Torches	Open Flame	Flame, Heat
Service Equipment	Other Equipment	Equipment
Vehicle, Engine		
Unclassified Fuel-Powered Equipment		
Unclassified Equipment w/ Other or Unknown Fuel Source	Unknown	Unknown
Unclassified Electrical Malfunction	Electrical Malfunction	Electrical
Matches, Candles	Open Flame	Flame, Heat
Open Fire		
Other Open Flame, Spark	Other Heat	
Friction, Hot Material		
Ember, Rekindle	Open Flame	

continued on next page

Table 2. (cont'd)

Priority Cause Description (In hierarchical order)	Cause Description	General Cause Description
Other Hot Object	Other Heat	Flame, Heat
Natural Condition, Other	Natural	Natural
Heat Source or Product Misuse	Other Unintentional, Careless	Unknown
Equipment Operation Deficiency	Equipment Misoperation, Failure	Equipment
Equipment Failure, Malfunction		
Trash, Rubbish	Unknown	Unknown
Other Unintentional	Other Unintentional, Careless	
Exposure (Fire Spread, Other)	Exposure	Exposure
Unknown	Unknown	Unknown

Note: Fires are assigned to a cause category in the hierarchical order shown. For example, if the fire is judged to be intentionally set and a match was used to ignite it, it is classified as intentional and not open flame, because intentional is higher on the list.

The causes of fires are often a complex chain of events. To make it easier to grasp the "big picture," 16 mid-level categories of fire causes such as heating, cooking, and playing with heat source are used by the USFA here and in many other reports. The alternative is to present scores of detailed cause categories or scenarios, each of which would have a relatively small percentage of fires. For example, heating includes subcategories such as misuse of portable space heaters, wood stove chimney fires, and fires involving gas central heating systems. Experience has shown that the larger categories are useful for an initial presentation of the fire problem. A more detailed analysis can follow.

Fires are assigned to one of the 16 mid-level cause groupings using a hierarchy of definitions approximately as shown in Table 3.[10] A fire is included in the highest category into which it fits on the list. If it does not fit the top category, then the second one is considered, and if not that one, the third, and so on. (See Table 2 Note for examples.)

The cause categories displayed in the graphs are listed in the same order to make comparisons easier from one to another. The y-scale varies from figure to figure, depending on the largest percentage that is shown; the y-scale on a figure with multiple charts, however, is always the same.

The cause categories used throughout most of this report were designed to reflect the causes of structure fires—where the majority of fatal fire deaths occur. While these categories have usefulness for the other property types, there are limitations. For example, in vehicle fires, these limitations are such that the cause categories are not used. In the future, USFA also plans to investigate and develop cause categories for vehicle and outside fires.

An additional problem to keep in mind when considering the rank order of causes in this report is that sufficient data to categorize the cause were not reported to NFIRS for all fatal fires in the database. The rank order of causes might be different than shown here if the cause profile for the fires whose causes were not reported to NFIRS were substantially different from the profile for the fires whose causes were reported. However, there is no information available to indicate that there is a major difference between the known causes and the unknown causes, and so our present best estimate of fire causes is based on the distribution of the fires with known causes.

[10] The structure fire cause hierarchy and specific definitions in terms of the NFIRS 5.0 codes may be found at (http://www.usfa.dhs.gov/fireservice/nfirs/tools/fire_cause_category_matrix.shtm). The hierarchy involves a large number of subcategories that are later grouped into the 16 mid-level cause categories, then the 8 high-level cause groupings.

Table 3. Mid-Level Cause Groupings

Cause Category	Definition
Exposure	Caused by heat spreading from another hostile fire
Intentional	Cause of ignition is intentional or fire is deliberately set
Investigation with Arson Module	Cause is under investigation and the case status on the NFIRS Arson Module is either open, closed, inactive, closed with arrest, or closed with exceptional clearance
Playing with Heat Source	Includes all fires caused by individuals playing with any materials contained in the categories below as well as fires where the factors contributing to ignition include playing with heat source. Children playing fires are included in this category
Natural	Caused by the sun's heat, spontaneous ignition, chemicals, lightning, static discharge, high winds, storms, high water including floods, earthquakes, volcanic action, and animals
Other Heat	Includes fireworks, explosives, flame/torch used for lighting, heat or spark from friction, molten material, hot material, heat from hot or smoldering objects
Smoking	Cigarettes, cigars, pipes, and heat from undetermined smoking materials
Heating	Includes confined chimney or flue fire, fire confined to fuel burner/boiler malfunction, central heating, fixed and portable local heating units, fireplaces and chimneys, furnaces, boilers, water heaters as source of heat
Cooking	Includes confined cooking fires, stoves, ovens, fixed and portable warming units, deep fat fryers, open grills as source of heat
Appliances	Includes televisions, radios, video equipment, phonographs, dryers, washing machines, dishwashers, garbage disposals, vacuum cleaners, handtools, electric blankets, irons, hairdryers, electric razors, can openers, dehumidifiers, heat pumps, water-cooling devices, air conditioners, freezers and refrigeration equipment as source of heat
Electrical Malfunction	Includes electrical distribution, wiring, transformers, meter boxes, power switching gear, outlets, cords, plugs, surge protectors, electric fences, lighting fixtures, electrical arcing as source of heat
Other Equipment	Includes special equipment (radar, x-ray, computer, telephone, transmitters, vending machine, office machine, pumps, printing press, gardening tools, or agricultural equipment), processing equipment (furnace, kiln, other industrial machines), service, maintenance equipment (incinerator, elevator), separate motor or generator, vehicle in a structure, unspecified equipment
Open Flame, Spark (Heat From)	Includes torches, candles, matches, lighters, open fire, ember, ash, rekindled fire, backfire from internal combustion engine as source of heat
Other Unintentional, Careless	Includes misuse of material or product, abandoned or discarded materials or products, heat source too close to combustibles, other unintentional (mechanical failure/malfunction, backfire)
Equipment Misoperation, Failure	Includes equipment operation deficiency, equipment malfunction
Unknown	Cause of fire undetermined or not reported

Source: USFA.

NFIRS fire data can be analyzed in many ways, such as by the heat source, equipment involved in ignition, factors contributing to ignition, or many other groupings. The hierarchy used in this report has proved to be useful in understanding the fire problem and targeting prevention, but other approaches certainly are useful too. Because the NFIRS database stores records fire-by-fire, and not just in summary statistics, a very wide variety of analyses is possible.

When Fires Occur

NFIRS collects information on the date and time the fire alarm was received by the fire department. It is important to note that the time the alarm was received is **not** the same as the time when the fire started. For many reasons, such as in the case of a long-smoldering fire, there may be a significant time lag between fire ignition and fire department notification. This observation is especially noteworthy for any analysis that attempts to determine how long a fire burned freely before the fire department arrived—in this case, what can be derived is the response time from the fire department receipt of alarm to the first apparatus arrival on the fire scene.

Nonetheless, for the purposes of this report, the time of the fire alarm is used as a reasonable approximation for the general time the fire started. The text associated with each section on time of fire alarm presumes this to be the case.

Rounding

Percentages on each chart are rounded to one decimal point. Textual discussions cite these percentages as whole numbers. Thus, 13.4 percent is rounded to 13 percent and 13.5 percent is rounded to 14 percent.

National estimates are rounded as follows: fires are rounded to the nearest 100 fires, deaths to the nearest 5 deaths, injuries to the nearest 25 injuries, and loss to the nearest million dollars.

Differences Between National Fire Incident Reporting System and National Fire Protection Association Data

There is an inconsistency between the NFIRS 5.0 data and the NFPA annual survey data. While NFIRS 5.0 and NFPA both show declines in deaths and injuries per fire, the NFIRS decline is much more prominent. In addition, NFIRS 5.0 dollar loss per fire is 10 to 15 percent lower than that of NFPA.[11] This issue is discussed further in *Fire in the United States in 2004*, Appendix A.

[11] As NFIRS 5.0 now captures a large number of small, low-loss fires (confined fires) thought to be unreported previously, these differences in loss rates per fire may not be surprising.

Unreported Fires

NFIRS includes only fires to which the fire service responded. In some States, fires attended by State fire agencies (such as forestry) are included; in other States, they are not.

NFIRS includes fires from all States, but does not include incidents from many fire departments within participating States. However, if the fires from the reporting departments are reasonably representative, this omission does not cause a problem in making useful national estimates for any but the smallest subcategories of data.

An enormous number of fires are not reported to the fire service at all. Most are believed to be small fires in the home or in industry that go out by themselves or are extinguished by the occupant. Based on a study done in the early 1970s, these unreported fires collectively cause a great deal of property loss and a large number of injuries requiring medical attention. The latest study of this problem was a report published by the Consumer Product Safety Commission (CPSC) in 1985.[12] The CPSC recently conducted the 2004–2005 Residential Fire Survey, however, the published findings were not released in time to be included in this report.

Perhaps the most disturbing type of unreported fire is one that is not submitted by fire departments that are participating in NFIRS. Some departments submit information on most, but not all, of their fires. Sometimes the confusion is systematic, as when no-loss cooking fires or chimney fires are not reported. Sometimes it is inadvertent, such as when incident reports are lost or accidentally not submitted. The information that is received is assumed to be the total for the department and is extrapolated as such. Although there was no measure of the extent of this problem in the past, NFIRS 5.0 provides fire departments with the capability to report this information in a simplified, more straightforward manner.

Residential Structures and Residential Buildings

As noted previously, NFIRS 5.0 allows for the differentiation between buildings and nonbuildings. In NFIRS, a structure is a built object and can include platforms, tents, connective structures (e.g., bridges), and various other structures (e.g., fences, underground work areas, etc.). This distinction between building and nonbuilding is particularly important when determining the effectiveness of non-behavior-based fire safety mechanisms such as smoke alarms and residential sprinklers. These important components of early fire detection apply to buildings and not necessarily to these other types of structures. To facilitate analysis of these components and to acknowledge that prevention efforts generally are focused on buildings, USFA separates residential buildings from the rest of the residential structures.

[12] *1984 National Sample Survey of Unreported Residential Fires: Final Technical Report*, prepared for the U.S. Consumer Product Safety Commission, Contract No. C–83–1239, Audits & Surveys, Inc., Princeton, NJ (1985).

Residential Structures

For the purposes of this report, residential structure fires are defined as fires that occur in structures on residential properties.[13] In terms of NFIRS data, these fires are defined as:

- Incident types 111 to 123:

  111–Building fire;
  112–Fires in structure other than in a building;
  113–Cooking fire, confined to container;
  114–Chimney or flue fire, confined to chimney or flue;
  115–Incinerator overload or malfunction, fire confined;
  116–Fuel burner/boiler malfunction, fire confined;
  117–Commercial compactor fire, confined to rubbish;
  118–Trash or rubbish fire, contained;
  120–Fire in mobile property used as a fixed structure, other;
  121–Fire in mobile home used as fixed residence;
  122–Fire in motor home, camper, recreational vehicle; and
  123–Fire in portable building, fixed location.

  (Note that incident types 113 to 118 do not specify if the structure is a building.)

- Property use 400 to 499:

  400–Residential, other;
  419–1 or 2 family dwelling;
  429–Multifamily dwelling;
  439–Boarding/Rooming house, residential hotels;
  449–Hotel/Motel, commercial;
  459–Residential board and care;
  460–Dormitory-type residence, other;
  462–Sorority house, fraternity house; and
  464–Barracks, dormitory.

Residential Buildings

Residential building fires are a subset of residential structure fires. They are defined as residential structure fires where the structure type is a building or, for mobile homes, a fixed structure. By definition, this excludes non-building structures. Previous USFA analyses demonstrated that confined structure fire incidents with full incident reporting primarily occurred in buildings. To accommodate the confined fire incident types with abbreviated incident reporting, the incident also is assumed to be a building if the structure type is not specified. In terms of NFIRS data, residential building fires are, therefore, defined as:

[13] USFA analyses on fires do not include aid runs, to avoid the double counting of fires. That is, analyses exclude those fire incidents where mutual or automatic aid is given.

- Incident types:

  111–Building fire;
  112–Fires in structure other than in a building;[14]
  113–Cooking fire, confined to container;
  114–Chimney or flue fire, confined to chimney or flue;
  115–Incinerator overload or malfunction, fire confined;
  116–Fuel burner/boiler malfunction, fire confined;
  117–Commercial compactor fire, confined to rubbish;
  118–Trash or rubbish fire, contained;
  120–Fire in mobile property used as a fixed structure, other;
  121–Fire in mobile home used as fixed residence;
  122–Fire in motor home, camper, recreational vehicle; and
  123–Fire in portable building, fixed location.

  (Again, note that incident types 113 to 118 do not specify if the structure is a building.)

- Property use:

  400–Residential, other;
  419–1 or 2 family dwelling;
  429–Multifamily dwelling;
  439–Boarding/Rooming house, residential hotels;
  449–Hotel/Motel, commercial;
  459–Residential board and care;
  460–Dormitory-type residence, other;
  462–Sorority house, fraternity house; and
  464–Barracks, dormitory.

- Structure type:

  1–Enclosed building;
  2–Fixed portable or mobile structure; and
  Structure type not specified (null entry).

RESIDENTIAL STRUCTURES

The residential structure portion of the fire problem continues to account for the vast majority of civilian casualties. NFPA estimates reflect that 83 percent of fire deaths and 77 percent of fire injuries occur in residential structures.[15]

[14] Preliminary findings noted that the fires coded as 112s appear to be buildings. A more detailed look at these incident types is required to determine whether they were coded correctly.

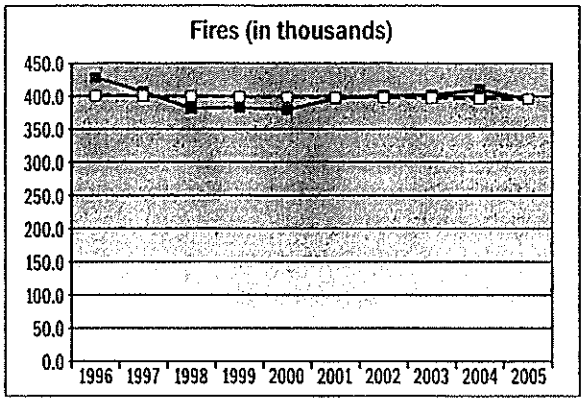
[15] Michael J. Karter, *Fire Loss in the United States During 2005*, NFPA, September 2006. These percentages are derived from summary data presented in this report.

Overview of Trends

Figure 1, based on the NFPA annual surveys of fire departments, shows the 10-year trend in residential structure fires, deaths, injuries, and dollar loss. The trend in number of residential structure fires, deaths, and injuries declined 1, 18, and 29 percent, respectively. These decreases continue the downward trends estimated in past editions of this report. The decreases would be even greater if they were weighted against the number of residences that existed in 1996 versus the much higher number in 2005. Property losses trended upward 17 percent between 1996 and 2005. This increase may be attributed to the change in the way property loss is estimated. Current loss estimates often include the value of the loss associated with the building or structure contents in addition to the loss associated with the building (or structure). Previously, this distinction was not implemented, and one overall estimate was provided.

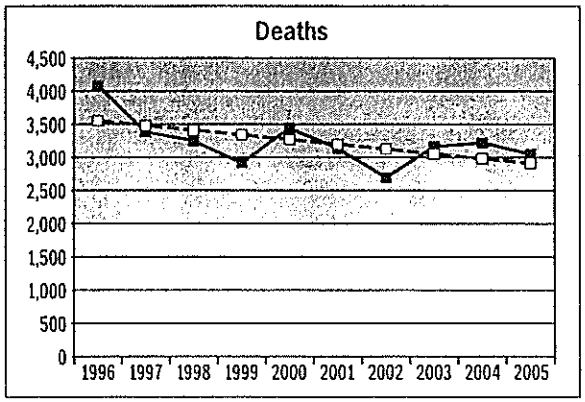
As well, these trends would appear lower if presented as per capita rather than in the absolute, because the population increased by an estimated 10 percent over the 10-year period. Therefore, an upward trend that is less than the population increase or any downward trend reflects an improvement to the overall fire problem.

Figure 1. Trends in Residential Structure Fires and Fire Losses (1996–2005).



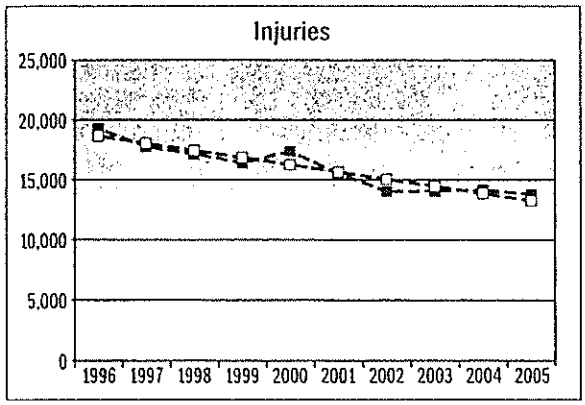
FIRES (IN THOUSANDS)

Year	Value
1996	428.0
1997	406.5
1998	381.5
1999	383.0
2000	379.5
2001	396.5
2002	401.0
2003	402.0
2004	410.5
2005	396.0
10-Year Trend (%)	-1.2%



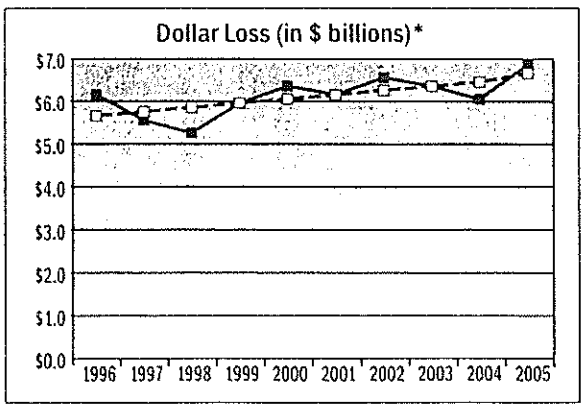
DEATHS

Year	Value
1996	4,080
1997	3,390
1998	3,250
1999	2,920
2000	3,445
2001	3,140
2002	2,695
2003	3,165
2004	3,225
2005	3,055
10-Year Trend (%)	-18.1%



INJURIES

Year	Value
1996	19,300
1997	17,775
1998	17,175
1999	16,425
2000	17,400
2001	15,575
2002	14,050
2003	14,075
2004	14,175
2005	13,825
10-Year Trend (%)	-28.9%



DOLLAR LOSS (IN $BILLIONS)*
*ADJUSTED TO 2005 DOLLARS

Year	Value
1996	$6.2
1997	$5.6
1998	$5.3
1999	$6.0
2000	$6.4
2001	$6.2
2002	$6.6
2003	$6.4
2004	$6.1
2005	$6.9
10-Year Trend (%)	17.1%

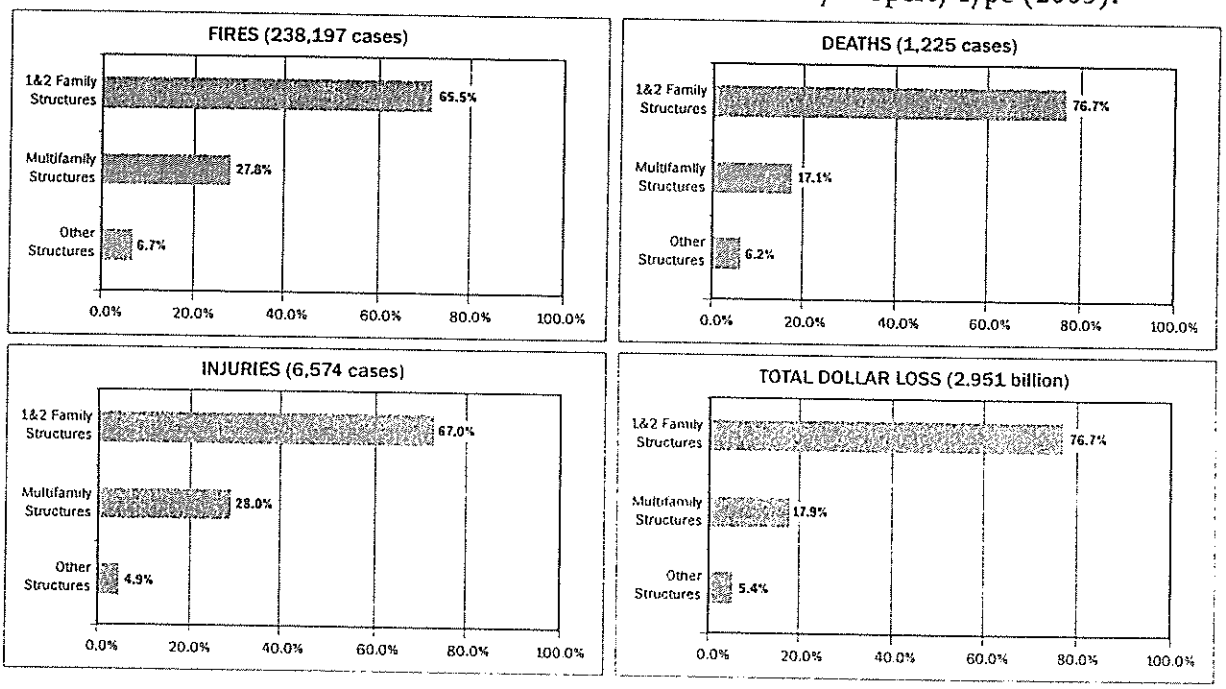
Sources: NFPA and Consumer Price Index.

Between 2003 and 2005, fires in residential structures resulted in an annual average of 3,100 civilian deaths, 14,000 injuries, and property losses amounting to $6.3 billion. Because of these statistics, the fire problem in residential structures is of significant concern.

Types of Residential Structures

Figure 2 shows the relative proportions of fires and losses among the three major residential structure categories in 2005. Each of these categories is discussed in subsequent sections of this report. The percentages shown have been relatively consistent over the years.

Figure 2. Residential Structure Fires and Fire Losses by Property Type (2005).



Source: 2005 NFIRS 5.0.

The majority of the U.S. population lives in one- and two-family residences.[16] It is not surprising then that structure fires on one- and two-family residential properties dominate the residential structure statistics: 66 percent of residential structure fires, 77 percent of residential structure fire fatalities, 67 percent of residential structure fire injuries, and 77 percent of residential structure fire dollar loss. Manufactured housing, a subset of one- and two-family structures, is included in these statistics.[17]

[16] The U.S. Census Bureau shows that in 2005, 75 percent (83.3 million) of households lived in one-unit attached and detached structures or mobile homes (http://factfinder.census.gov/servlet/STTable?_bm=y&-geo_id=01000US&-qr_name=ACS_2005_EST_G00_S2504&-ds_name=ACS_2005_EST_G00_&-redoLog=false&-format= for occupied housing). Household size is estimated at 2.6 people per household (http://factfinder.census.gov/servlet/ACSSAFFFacts?_submenuId=factsheet_1&_sse=on). Thus, 83.3 million households x 2.6 people per household = 216.5 million. With the 2005 U.S. population given as 296.5 million, (http://www.census.gov/popest/states/tables/NST-EST2006-01.xls), approximately 73.0 percent of the population lives in what NFIRS defines as one- and two-family housing.

[17] In this report, manufactured housing includes only mobile homes or motor homes situated on semipermanent sites and used as fixed residences.

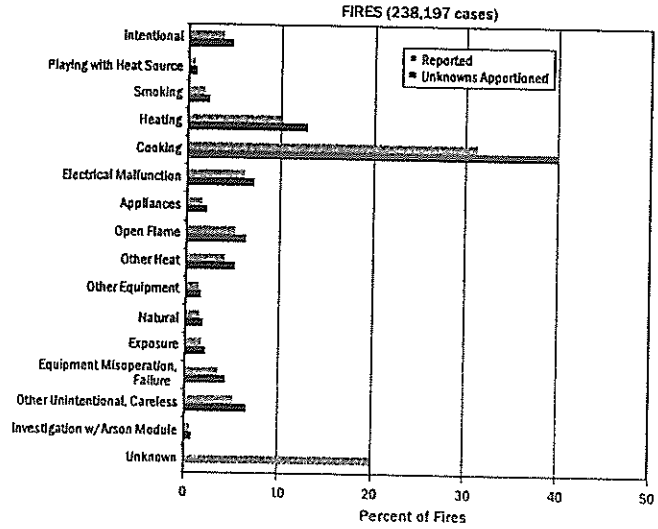
Multifamily structures account for 28 percent of residential structure fires, 17 percent of residential deaths, 28 percent of injuries, and 18 percent of residential dollar loss. The relatively high incidence of injuries in multifamily structures may be because the total space is significantly less in multifamily structures than in one- and two-family structures, and people are more quickly exposed to fire products than in a house. Other factors also may influence multifamily injuries: Potential deaths could become injuries because many multifamily structures (e.g., apartments) may be built to stricter codes, sprinklers may be installed, or smoke alarms may be hardwired to a fire station, which generates an automatic fire department response when the alarm sounds.

Other residential structures account for between 5 and 7 percent of the residential fire problem in the various measures.

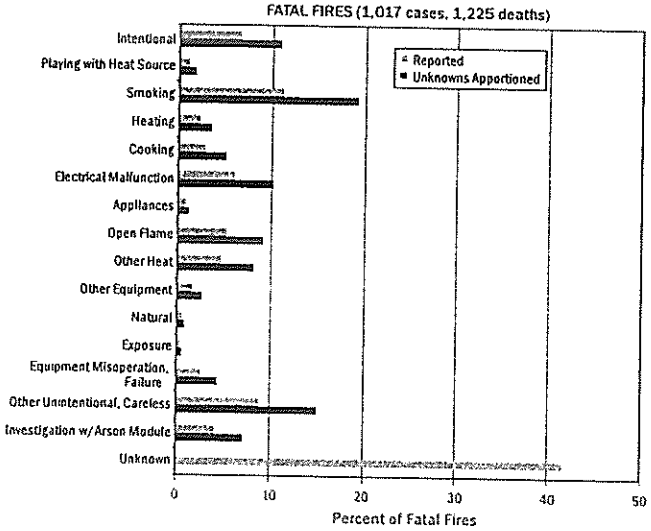
Causes of Residential Structure Fires

Figure 3 shows the causes of fires, fatal fires, fires with injuries, and fires with dollar loss in 2005. These statistics are driven by the one- and two-family dwelling property type, which accounts for the majority of residential fires. Larger differences from the overall residential causes are found as one looks at the smaller subcategories of residences—multifamily structures and other residential structures. These differences are explored later in the report.

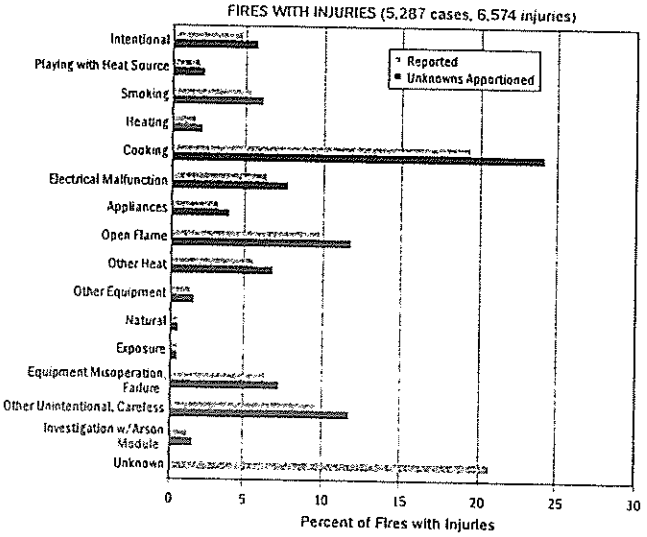
Figure 3. Fire Cause for Residential Structure Fires and Fire Losses (2005).



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	3.9	4.9
Playing with Heat Source	0.6	0.8
Smoking	1.9	2.4
Heating	10.1	12.7
Cooking	31.9	39.9
Electrical Malfunction	6.3	7.9
Appliances	1.8	2.3
Open Flame	5.1	6.4
Other Heat	4.1	5.2
Other Equipment	1.3	1.6
Natural	1.5	1.9
Exposure	1.6	2.1
Equipment Misoperation, Failure	3.5	4.4
Other Unintentional, Careless	5.3	6.7
Investigation w/Arson Module	0.6	0.8
Unknown	20.0	

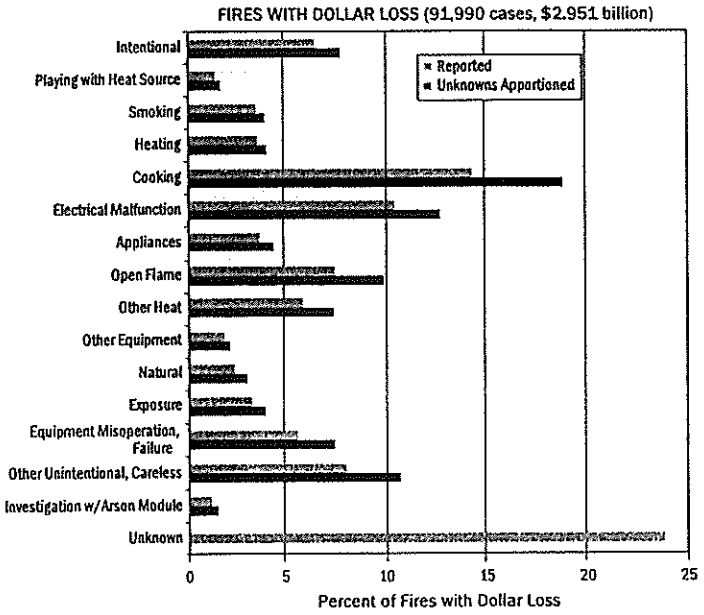


Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.6	11.3
Playing with Heat Source	1.0	1.7
Smoking	11.2	19.2
Heating	2.1	3.5
Cooking	2.9	5.1
Electrical Malfunction	6.0	10.3
Appliances	0.7	1.2
Open Flame	5.3	9.1
Other Heat	4.8	8.2
Other Equipment	1.6	2.7
Natural	0.5	0.8
Exposure	0.3	0.5
Equipment Misoperation, Failure	2.6	4.4
Other Unintentional, Careless	8.8	15.0
Investigation w/Arson Module	4.1	7.1
Unknown	41.6	



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	4.8	6.0
Playing with Heat Source	1.9	2.4
Smoking	5.7	7.2
Heating	1.9	2.4
Cooking	19.2	24.2
Electrical Malfunction	6.5	8.1
Appliances	3.0	3.8
Open Flame	9.7	12.2
Other Heat	6.0	7.5
Other Equipment	1.4	1.7
Natural	0.5	0.7
Exposure	0.5	0.6
Equipment Misoperation, Failure	6.9	8.6
Other Unintentional, Careless	9.7	12.2
Investigation w/Arson Module	1.9	2.4
Unknown	20.4	

Figure 3 (cont'd)



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.3	8.2
Playing with Heat Source	1.2	1.5
Smoking	3.2	4.2
Heating	3.0	4.0
Cooking	14.2	18.6
Electrical Malfunction	10.4	13.5
Appliances	3.2	4.2
Open Flame	7.5	9.8
Other Heat	5.8	7.6
Other Equipment	1.5	1.9
Natural	2.3	3.0
Exposure	3.0	3.9
Equipment Misoperation, Failure	5.7	7.4
Other Unintentional, Careless	8.1	10.6
Investigation w/Arson Module	1.2	1.5
Unknown	23.5	

Source: 2005 NFIRS 5.0.

With the introduction of limited reporting of confined, low-loss structure fires in NFIRS 5.0, the cause profiles for structure fires, especially residential structure fires, have undergone an important change. This reporting feature allows the fire service to capture incidents where the fire was confined to the vessel or object of origin and caused little or no loss. These are fires that are thought to have gone unreported prior to the introduction of NFIRS 5.0, or were reported, but as a nonfire fire incident, as no loss was involved. Confined fires, generally of three types (cooking, heating-related (primarily chimney), or trash-related), now account for 45 percent of residential structure fires. Cooking confined fires account for two-thirds of confined fires.

Cooking has been the leading cause of residential fires for most of the years since the inception of NFIRS. In 2005, largely as a result of these confined cooking fires, cooking fires (40 percent) were triple that of the next leading cause, heating. Heating passed cooking for a few years in the late 1970s when there was a surge in the use of alternative space heaters and wood stoves, but that heating problem has long since subsided. Cooking is the leading cause of fires with injuries (24 percent), with fires caused by open flames (candles, matches, and the like) and other unintentional or careless causes as the second leading cause (12 percent each). Many cooking fires come from unattended cooking where grease or oil ignites, or flammable materials near burners catch fire. The number of these fires can be reduced by emphasizing the importance of vigilance while cooking and by informing the public how to extinguish small cooking fires (e.g., cover with a pot lid, douse it with baking soda). Wearing loose-fitting clothing such as bathrobes can be dangerous around cooking areas.

Heating (13 percent), the second leading cause of residential fires, includes those fires where the equipment involved in ignition is central heating, fireplaces, portable space heaters, fixed room heaters, wood stoves, and water heating. The central heating and water heater portions of the problem have remained relatively steady, while the portable space heater and wood-burning stove portion of the problem, along with chimney fires, rose very sharply from the late 1970s to the early 1980s but has since abated.

Smoking continues to be the leading cause of residential structure fatal fires, accounting for 19 percent of these fires. The percentage of smoking deaths has decreased, but that decrease, in part, reflects the difference in coding methodologies between NFIRS 4.1 and NFIRS 5.0. Smoking ranks ninth in fires, seventh in fires with injuries, and eighth in fires with dollar loss.

Cooking and electrical malfunction are the first and second leading causes in fires with dollar loss.

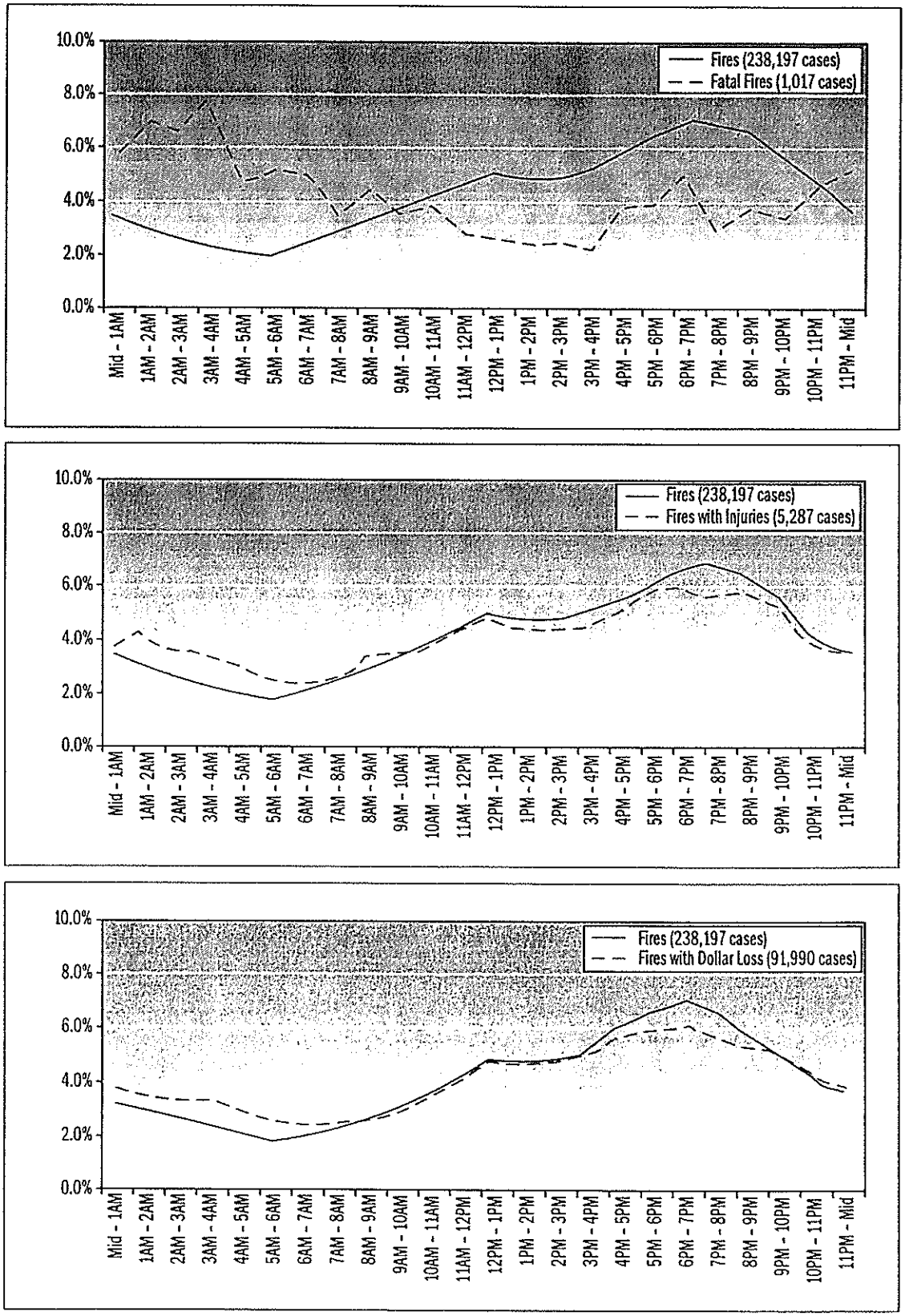
When Fires Occur

Time of Fire Alarm

Fires do not occur uniformly throughout the day, as shown in Figure 4. Residential structure fire incidents peak from 5 p.m. to 8 p.m., during dinner preparation. Although fire incidents drop when people sleep, fatal fires are at their highest late at night and in the early morning. Forty-six percent of residential fatal fires start between 10 p.m. and 6 a.m. The peak night hours are from 3 a.m. to 4 a.m., when most people are in deep sleep.[18] Early morning (1 a.m. to 4 a.m.) fatal fires are attributed to smoking, intentionally set fires, and open flame. These three fire causes account for 48 percent of the early morning fatal fires. Fires with injuries occur more uniformly throughout the day than do fatal fires, and tend to somewhat track fire incidence. Fires with injuries plateau during dinner and early evening hours when people cook, and peak slightly around noon. Fires with dollar loss also track somewhat with the number of fires, except from midnight to 6 a.m. and 4 p.m. to 10 p.m., when there is a slight separation between the two measures. These patterns for fires and losses are largely unchanged from previous years.

[18] Stage 3 and 4 sleep, typically called "deep sleep," occurs most often in the earlier sleep cycles. The National Institute of Neurological Disorders notes that "...It is very difficult to wake someone during stages 3 and 4, which together are called *deep sleep*... People awakened during deep sleep do not adjust immediately and often feel groggy and disoriented for several minutes after they wake up..." (http://www.ninds.nih.gov/disorders/brain_basics/understanding_sleep.htm). An informative graphic of the typical sleep cycle that shows the prevalence of deep sleep in the first 4 to 5 hours of sleep can be found at http://www.helpguide.org/life/sleeping.htm or http://hil4ry.files.wordpress.com/2007/09/sleep_cycle-01.jpg

Figure 4. Time of Fire Alarm of Residential Structure Fires and Fires with Losses (2005).

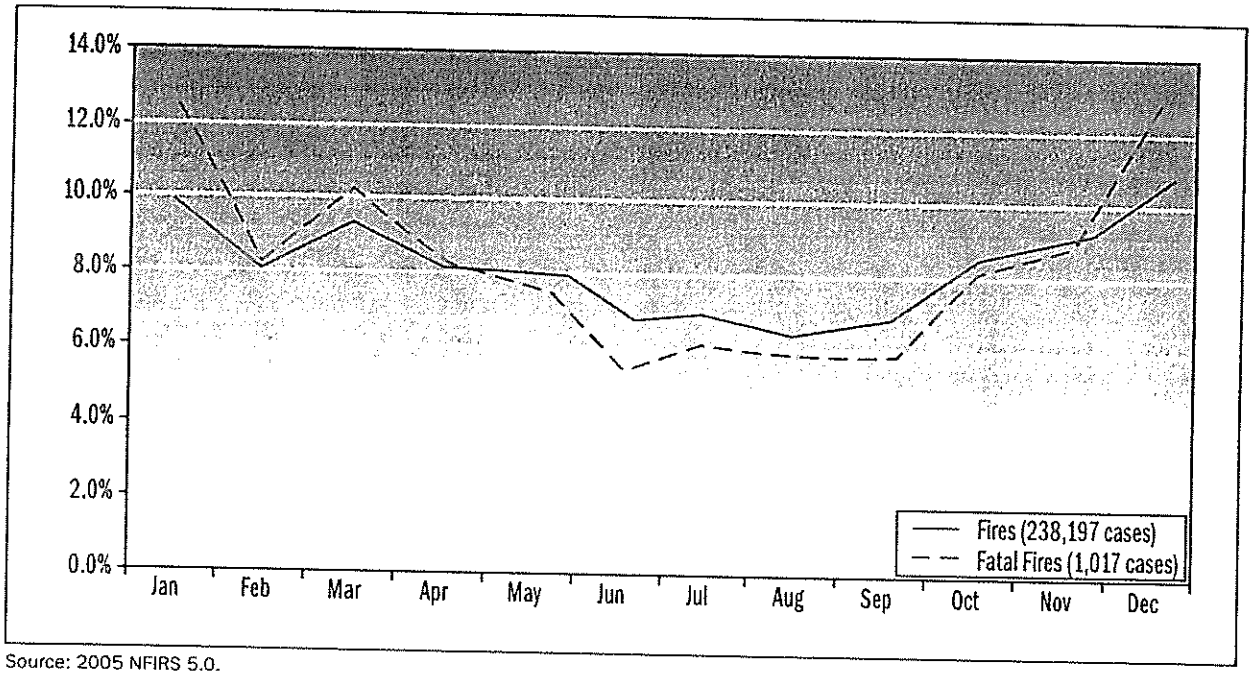


Source: 2005 NFIRS 5.0.

Month of Year

The number of residential structure fires increases considerably in the winter months, with the largest numbers of fires in December and January. Fatal fires follow a similar but more pronounced pattern. Fatal fires are most frequent during winter months, when heating systems add to other causes. Thirty-four percent of all fatal fires occur in the quarter of the year from December through February (Figure 5). This is essentially the same pattern as in 2001.

Figure 5. Month of Year of Residential Structure Fires and Fatal Fires (2005).

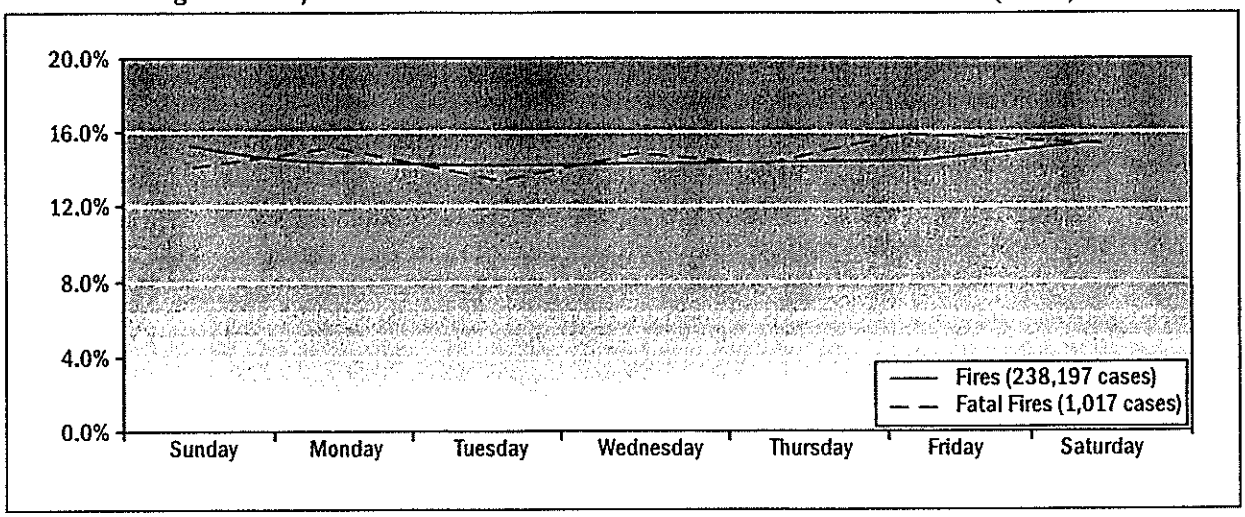


Source: 2005 NFIRS 5.0.

Day of Week

There is a slight difference in the incidence of residential structure fires by day of the week (Figure 6). Fires are lowest during weekdays, with a slight increase on the weekends. Fatal fires do not exhibit a consistent trend, but do appear to be lowest on Sundays and Tuesdays and highest on Fridays and Saturdays.

Figure 6. Day of Week of Residential Structure Fires and Fatal Fires (2005).



Source: 2005 NFIRS 5.0.

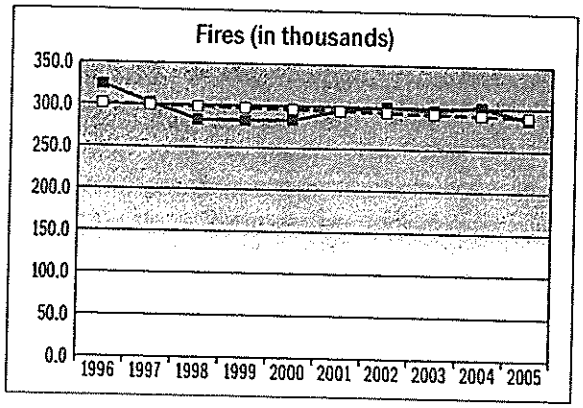
One- and Two-Family Residential Structures

As noted previously, the residential structure fire profile is dominated by one- and two-family residential properties. Manufactured housing (mobile homes used as fixed residences) is included here in the profile for one- and two-family structures.

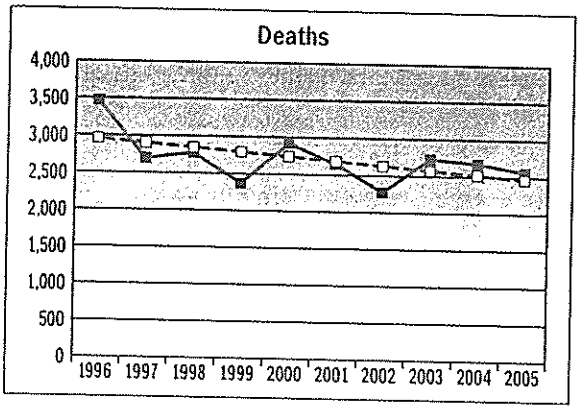
Trends

As with the residential structure trends, one- and two-family fires, deaths, and injuries declined during the 10-year period (4, 17, and 24 percent respectively), and dollar loss increased (19 percent) as shown in Figure 7. The increased use of smoke alarms is thought to be a major factor in the reduction in the number of reported fires. Fires detected early often are extinguished before they are reported to the fire department, so the number of reported fires decreases. When smoke alarms are not present, the fire burns longer before detection and does more damage.

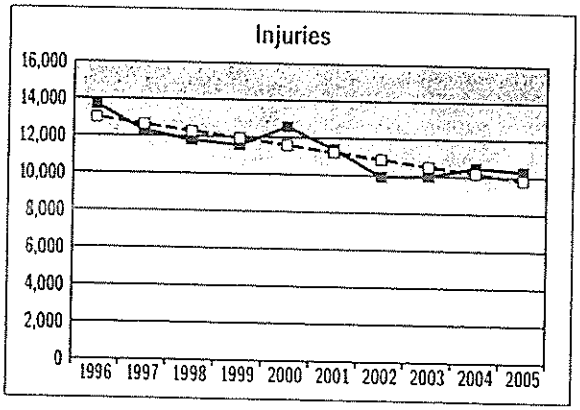
Figure 7. Trends in One- and Two-Family Residential Structure Fires and Fire Losses (1996–2005).



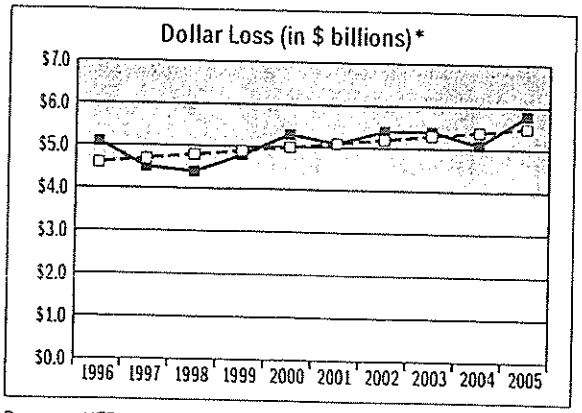
FIRES (IN THOUSANDS)	
Year	Value
1996	324.0
1997	302.5
1998	283.0
1999	282.5
2000	283.5
2001	295.5
2002	300.5
2003	297.0
2004	301.5
2005	287.0
10-Year Trend (%)	-3.7%



DEATHS	
Year	Value
1996	3,470
1997	2,700
1998	2,776
1999	2,375
2000	2,920
2001	2,650
2002	2,280
2003	2,735
2004	2,680
2005	2,570
10-Year Trend (%)	-16.6%



INJURIES	
Year	Value
1996	13,700
1997	12,300
1998	11,800
1999	11,550
2000	12,575
2001	11,400
2002	9,950
2003	10,000
2004	10,500
2005	10,300
10-Year Trend (%)	-24.4%



DOLLAR LOSS (IN $BILLIONS)* *ADJUSTED TO 2005 DOLLARS	
Year	Value
1996	$5.1
1997	$4.5
1998	$4.4
1999	$4.8
2000	$5.3
2001	$5.1
2002	$5.4
2003	$5.4
2004	$5.1
2005	$5.8
10-Year Trend (%)	19.4%

Sources: NFPA and Consumer Price Index.

Multifamily Residential Structures

Multifamily residential structures include those structures on apartment, town house, rowhouse, condominium, and tenement properties.[19] Multifamily residential structures tend to be regulated by stricter building codes than one- and two-family structures. Many multifamily residences are rental properties, often falling under more stringent fire prevention statutes. Many of these properties have a homogeneous socioeconomic mix of residents. They may have more low-income families in housing projects, more high-income families in luxury highrises, or they may be centers of living for the elderly. In large cities, all of these groups are represented in these properties.

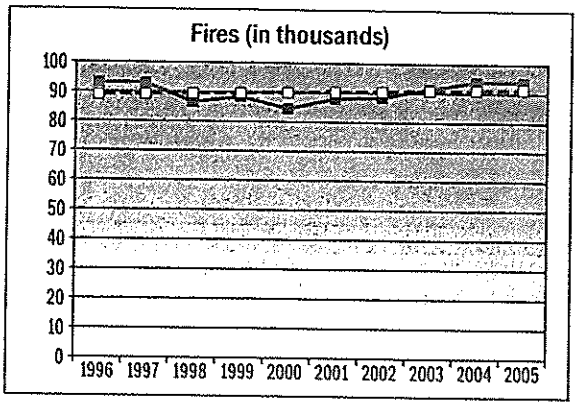
Trends

Figure 8 shows the 10-year trends in multifamily residential structure fires and losses. The number of multifamily fires increased (3 percent), while fire deaths and injuries declined. Fire deaths dropped by 25 percent; injuries were down 43 percent. Multifamily fire injuries reached their lowest level in 2005, with 3,000 injuries. Dollar losses resulting from multifamily residential structure fires continued the upward trends shown in the previous 10-year period (1992–2001): adjusted dollar losses were up 9 percent in multifamily residential structures.

The declines in multifamily deaths and injuries may be due to compliance with stricter building codes, the required presence of smoke alarms, and the increase in the number of sprinkler systems. More detailed studies of socioeconomic and demographic changes over time might reveal some of the factors involved in fire incidence.

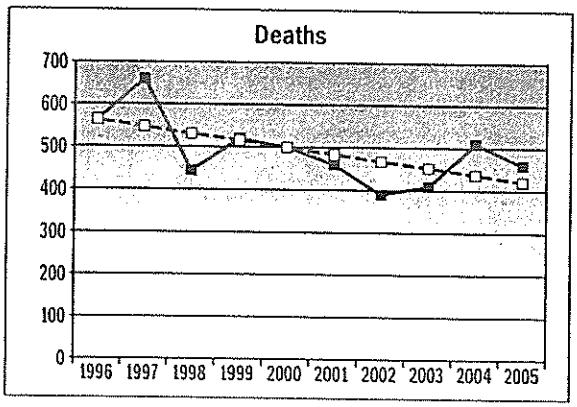
[19] In previous reports, apartments, apartment-style condominiums, and tenement properties were a separate category. Town house and rowhouse properties were included in the one- and two-family category.

Figure 8. Trends in Multifamily Residential Structure Fires and Fire Losses (1996–2005).



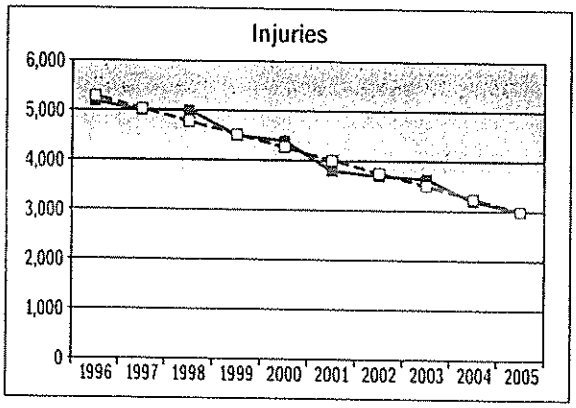
FIRES (IN THOUSANDS)

Year	Value
1996	93.0
1997	93.0
1998	86.5
1999	88.5
2000	84.5
2001	88.0
2002	88.5
2003	91.5
2004	94.0
2005	94.0
10-Year Trend (%)	2.7%



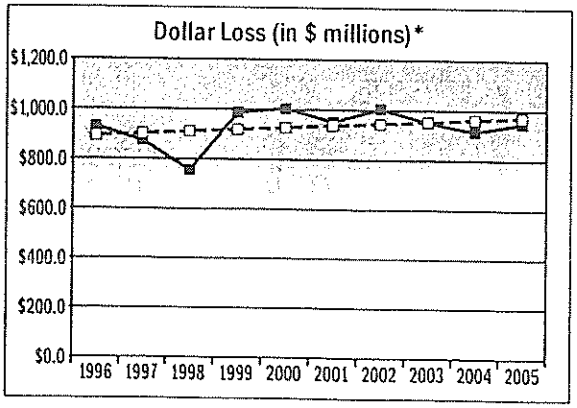
DEATHS

Year	Value
1996	565
1997	660
1998	445
1999	520
2000	500
2001	460
2002	390
2003	410
2004	510
2005	460
10-Year Trend (%)	-25.2%



INJURIES

Year	Value
1996	5,175
1997	5,000
1998	5,000
1999	4,500
2000	4,400
2001	3,800
2002	3,700
2003	3,650
2004	3,200
2005	3,000
10-Year Trend (%)	-43.3%



DOLLAR LOSS (IN $MILLIONS)*
*ADJUSTED TO 2005 DOLLARS

Year	Value
1996	$931.1
1997	$873.7
1998	$756.0
1999	$987.1
2000	$1,004.9
2001	$952.8
2002	$1,005.3
2003	$952.1
2004	$915.0
2005	$948.0
10-Year Trend (%)	8.7%

Sources: NFPA and Consumer Price Index.

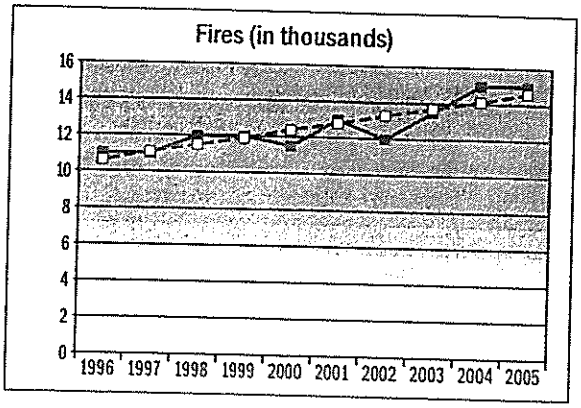
Other Residential Structures

Other residential structure properties include rooming houses, dormitories, home hotels, halfway houses, hotels and motels, and miscellaneous and unclassified structures reported as residences. This category does not include homes for the elderly, prisons, orphanages, or other institutions as these categories are considered "institutional" structures.

Trends

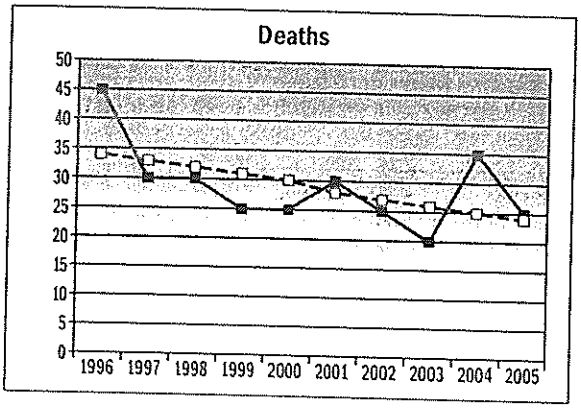
Figure 9 shows a large 10-year increase (38 percent) in the number of other residential fires while showing a substantial decrease in the number of fire deaths (30 percent). Injuries increased by 16 percent, reversing the downward trend shown in the *Fourteenth edition of Fire in the United States*. Fire deaths ranged from 20 to 45 a year; injuries ranged from 375 to 525. Adjusted dollar loss has trended down 5 percent over 10 years, with a low of $116 million in 1996 and a high of $169 million in 2000.

Figure 9. Trends in Other Residential Structure Fires and Fire Losses (1996–2005).



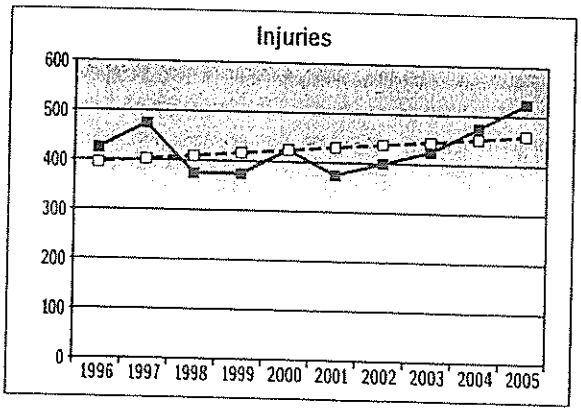
FIRES (IN THOUSANDS)

Year	Value
1996	11.0
1997	11.0
1998	12.0
1999	12.0
2000	11.5
2001	13.0
2002	12.0
2003	13.5
2004	15.0
2005	15.0
10-Year Trend (%)	37.5%



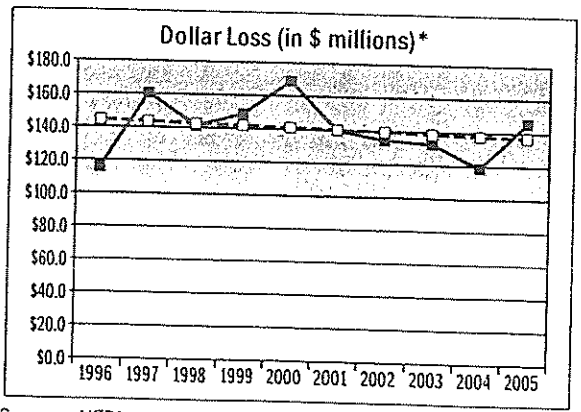
DEATHS

Year	Value
1996	45
1997	30
1998	30
1999	25
2000	25
2001	30
2002	25
2003	20
2004	35
2005	25
10-Year Trend (%)	-30.3%



INJURIES

Year	Value
1996	425
1997	475
1998	375
1999	375
2000	425
2001	375
2002	400
2003	425
2004	475
2005	525
10-Year Trend (%)	16.2%



DOLLAR LOSS (IN $MILLIONS)*
*ADJUSTED TO 2005 DOLLARS

Year	Value
1996	$115.8
1997	$160.6
1998	$141.4
1999	$148.9
2000	$169.0
2001	$140.1
2002	$134.6
2003	$132.7
2004	$118.9
2005	$146.0
10-Year Trend (%)	-5.1%

Sources: NFPA and Consumer Price Index.

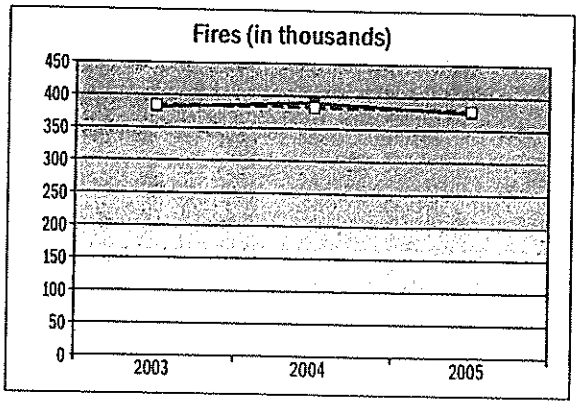
RESIDENTIAL BUILDINGS

Residential building fires comprise the vast majority of fires and fires with losses in residential structures. Fires in residential buildings account for 95 percent of residential structure fires and fatal fires, 97 percent of residential structure fires with injuries, and 95 percent of fires with dollar loss. Residential building losses are disproportionate to the numbers of fires that occur. During the period from 2003 to 2005, an estimated 382,500 residential building fires were reported each year. This estimate reflects 24 percent of all fires, yet these fires cause 78 percent of fire deaths, 75 percent of fire injuries, and 54 percent of dollar loss, adjusted for inflation.

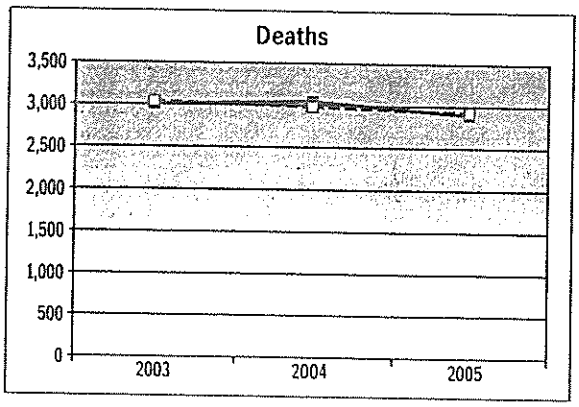
Overview of Trends

Figure 10, based on national estimates of the residential building fire problem, shows the 3-year trend in residential building fires, deaths, injuries, and dollar loss. The trends in numbers of residential fires, deaths, and injuries declined 1, 4, and 0 percent, respectively. Dollar loss increased by 8 percent.

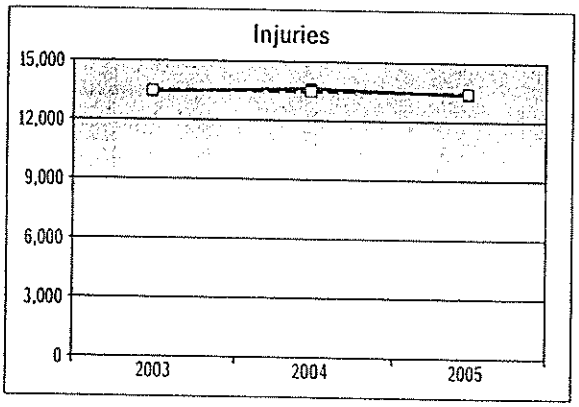
Figure 10. Trends in Residential Building Fires and Fire Losses (2003–2005).



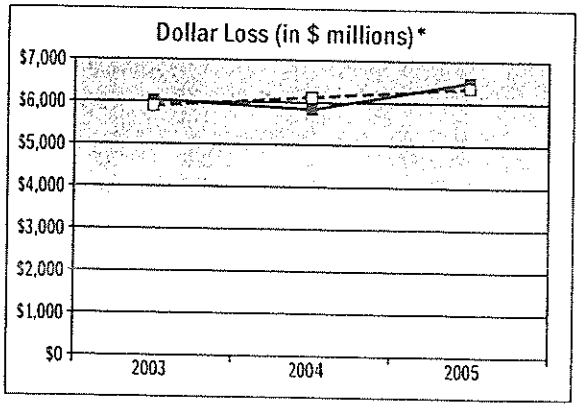
FIRES (IN THOUSANDS)	
Year	Value
2003	381.3
2004	389.8
2005	376.5
3-Year Trend (%)	-1.2%



DEATHS	
Year	Value
2003	3,005
2004	3,050
2005	2,895
3-Year Trend (%)	-3.6%



INJURIES	
Year	Value
2003	13,425
2004	13,650
2005	13,375
3-Year Trend (%)	-0.4%



DOLLAR LOSS (IN $MILLIONS)* *ADJUSTED TO 2005 DOLLARS	
Year	Value
2003	$6,041
2004	$5,836
2005	$6,505
3-Year Trend (%)	7.9%

Sources: 2003–2005 NFIRS 5.0, NFPA, and Consumer Price Index.

Causes

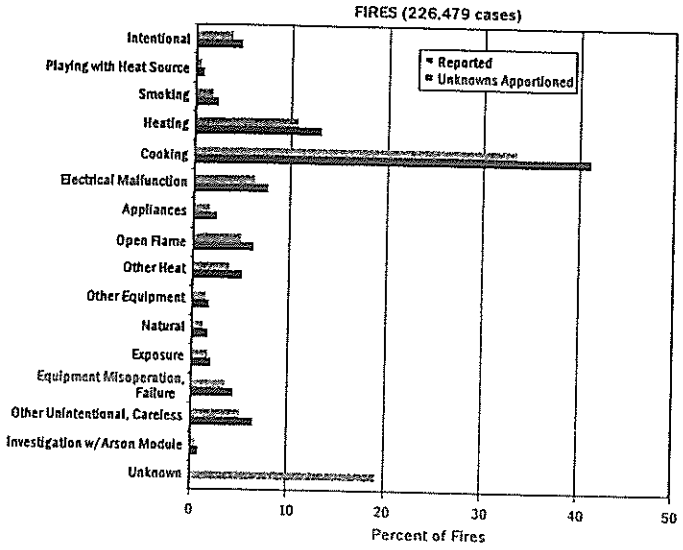
It is important to note that the leading causes are different, depending on what measure is used, as can be seen from Figure 11, which shows the causes of fires, fatal fires, fires with injuries, and fires with dollar loss in 2005. As with structure fires, these statistics are driven by the one- and two-family dwelling property type (one- and two-family residences account for 65 percent of residential building fires).

As in the past, cooking is the leading cause of residential building fires (41 percent). Confined cooking fires (discussed earlier in this report) are a large portion of cooking fires, making cooking more than three times that of the next leading cause, heating. As a result of the prevalence of cooking fires, more cooking fires result in property loss than any other cause. Cooking is also the leading cause of fires that injure civilians. Twenty-five percent of fires that result in injuries are cooking fires.

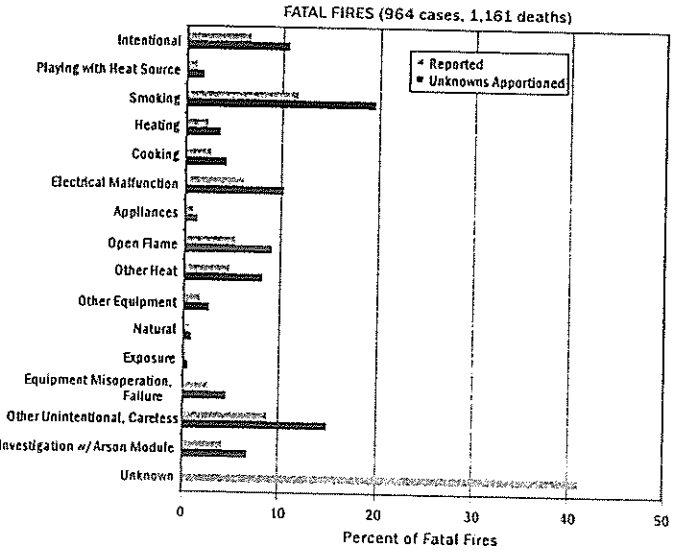
Fires involving cooking and electrical malfunction are the first and second leading causes of fires with dollar loss, respectively.

Smoking is the leading cause of fatal residential building fires, accounting for 20 percent of these fatal fires. Similar to residential structures, smoking fires rank sixth in fires with injuries and ninth in both fires and fires with dollar loss.

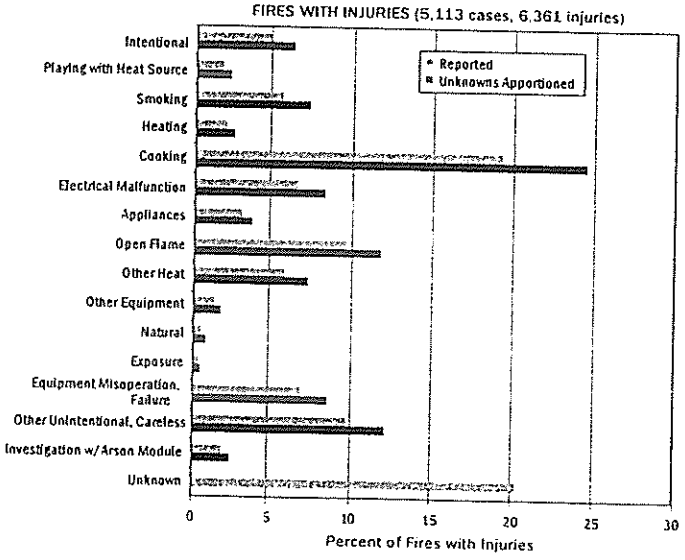
Figure 11. Fire Cause for Residential Building Fires and Fires with Losses (2005).



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	3.9	4.8
Playing with Heat Source	0.6	0.8
Smoking	1.9	2.3
Heating	10.6	13.2
Cooking	33.4	41.3
Electrical Malfunction	6.2	7.7
Appliances	1.8	2.3
Open Flame	5.0	6.1
Other Heat	3.9	4.8
Other Equipment	1.3	1.6
Natural	1.4	1.8
Exposure	1.6	2.0
Equipment Misoperation, Failure	3.5	4.3
Other Unintentional, Careless	5.1	6.3
Investigation w/Arson Module	0.6	0.8
Unknown	19.3	

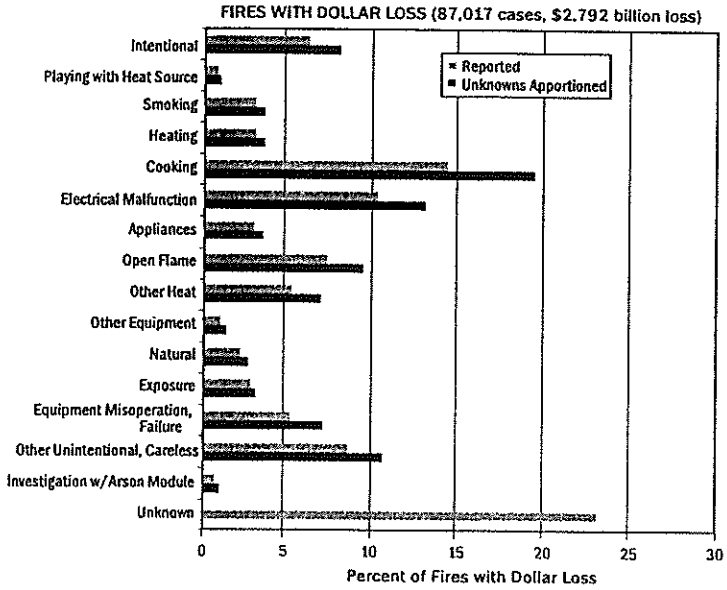


Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.8	11.6
Playing with Heat Source	0.9	1.6
Smoking	11.6	19.7
Heating	2.2	3.7
Cooking	2.6	4.4
Electrical Malfunction	6.1	10.4
Appliances	0.7	1.2
Open Flame	5.3	9.0
Other Heat	4.8	8.1
Other Equipment	1.6	2.6
Natural	0.4	0.7
Exposure	0.3	0.5
Equipment Misoperation, Failure	2.7	4.6
Other Unintentional, Careless	8.8	15.0
Investigation w/Arson Module	4.0	6.9
Unknown	41.1	



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	4.9	6.1
Playing with Heat Source	1.9	2.3
Smoking	5.8	7.3
Heating	2.0	2.5
Cooking	19.7	24.7
Electrical Malfunction	6.5	8.1
Appliances	3.1	3.8
Open Flame	9.5	11.9
Other Heat	5.8	7.2
Other Equipment	1.3	1.7
Natural	0.5	0.7
Exposure	0.4	0.5
Equipment Misoperation, Failure	6.9	8.6
Other Unintentional, Careless	9.7	12.2
Investigation w/Arson Module	1.9	2.3
Unknown	20.2	

Figure 11 (cont'd)



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.3	8.2
Playing with Heat Source	1.2	1.5
Smoking	3.2	4.1
Heating	3.2	4.1
Cooking	14.7	19.2
Electrical Malfunction	10.4	13.5
Appliances	3.2	4.2
Open Flame	7.5	9.8
Other Heat	5.6	7.3
Other Equipment	1.5	1.9
Natural	2.3	2.9
Exposure	3.0	3.9
Equipment Misoperation, Failure	5.7	7.4
Other Unintentional, Careless	8.1	10.5
Investigation w/Arson Module	1.1	1.5
Unknown	23.1	

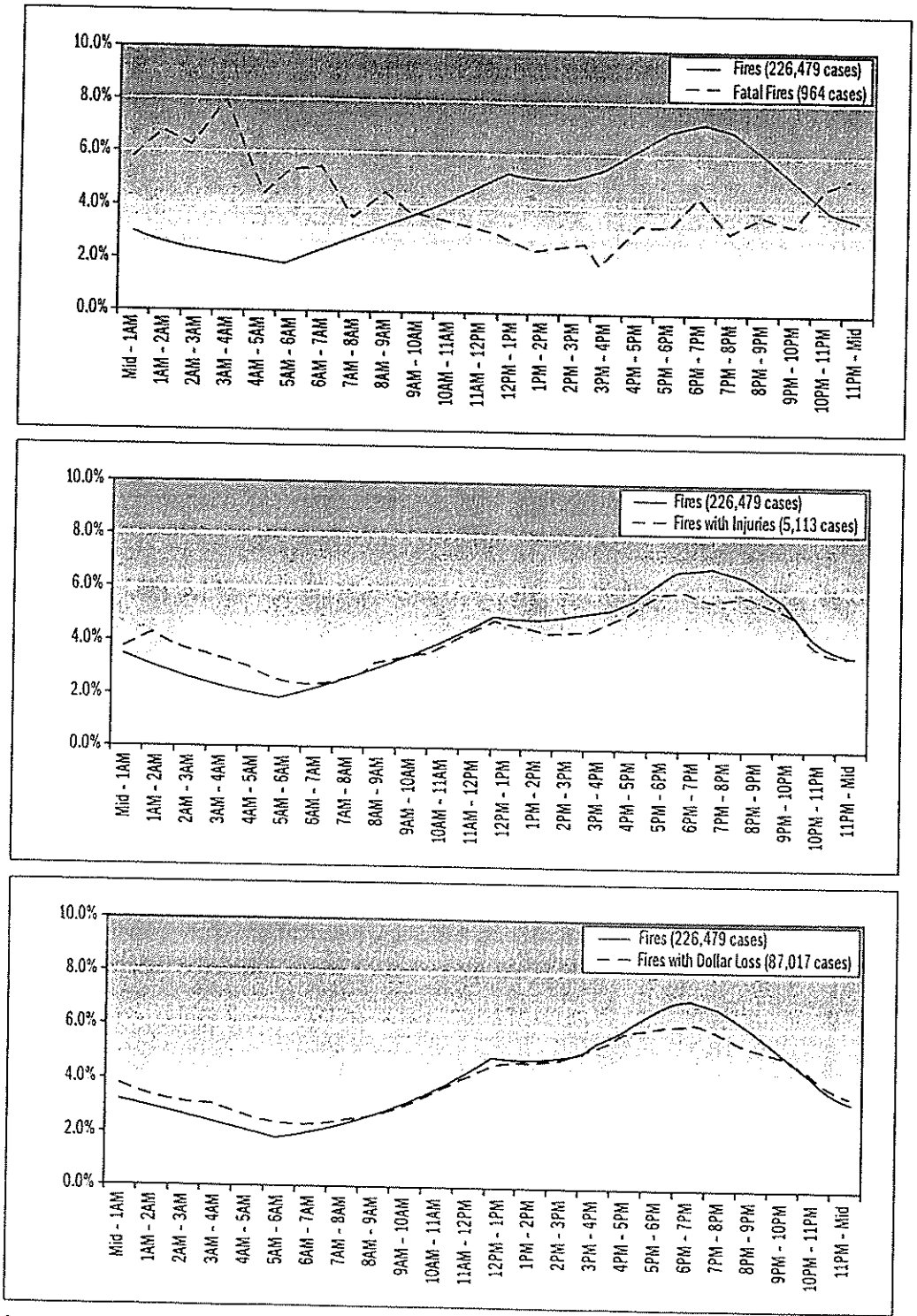
Sources: 2005 NFIRS 5.0.

When Fires Occur

Time of Fire Alarm

As residential building fires dominate the overall residential structure fire problem, the time-of-day profiles are nearly identical, as shown in Figure 12. Residential building fire incidents peak from 5 p.m. to 8 p.m., during dinner preparation. Although fire incidents drop at night when people sleep and there is little activity, fatal fires are at their highest. Fatal fires peak late at night and in the early morning. Twenty-one percent of residential building fatal fires occur between 1 a.m. and 4 a.m., when most people are asleep. Fires resulting in injuries occur more uniformly throughout the day and, like residential structure fires in general, follow the incidence of fires, decreasing slightly during morning hours. Fires with property losses track closely with the number of fires except in the early morning hours, when the occurrence of fires with property loss is higher, and in the afternoon and evening, when it is lower.

Figure 12. Time of Fire Alarm of Residential Building Fires and Fires with Losses (2005).

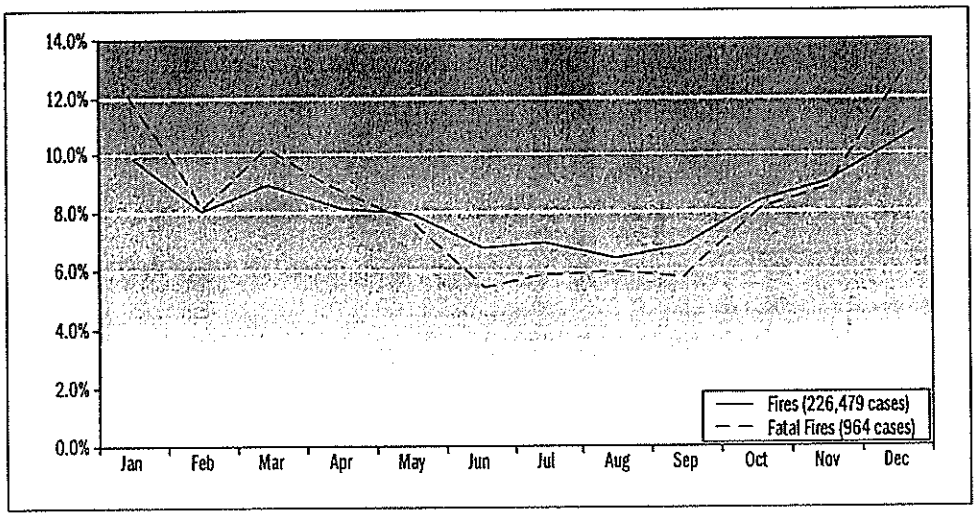


Source: 2005 NFIRS 5.0.

Month of Year

Residential building fires are lowest in late summer and highest in the winter months. Residential building fatal fires are most frequent during winter months, largely the result of miscellaneous unintentionally caused fires and smoking fires. Thirty-three percent of all fatal fires occur in the cold months from December through February (Figure 13).

Figure 13. Month of Year of Residential Building Fires and Fatal Fires (2005).

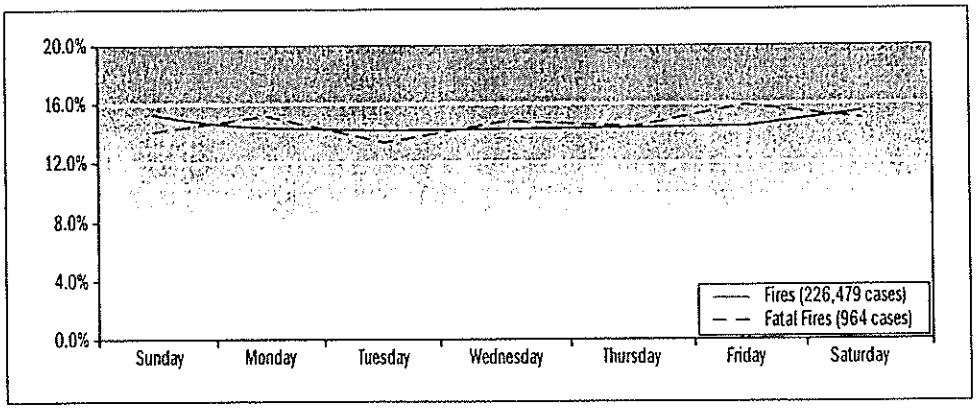


Source: 2005 NFIRS 5.0.

Day of Week

Residential building fires rise slightly on weekends (Figure 14). Fatal fires are more variable during the week, increasing marginally on Fridays.

Figure 14. Day of Week of Residential Building Fires and Fatal Fires (2005).



Source: 2005 NFIRS 5.0.

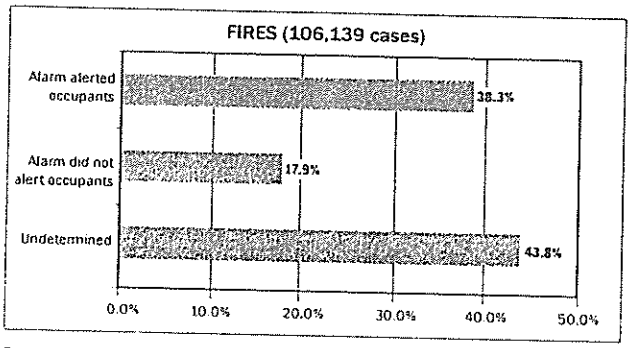
Smoke Alarm Performance

The term "smoke alarm" encompasses a variety of devices intended to warn occupants of the presence of fire. Smoke alarms are thought to play a significant role in the decrease in reported fires and fire deaths since their installation. Their use began to increase in the mid-1970s and has continued to increase since then. As of 2004, 96 percent of all homes reported having at least one smoke alarm.[20]

Smoke Alarm Effectiveness in Confined Fires

Smoke alarms were present and effective in alerting the household in 38 percent of confined residential building fires—low-loss fires typically confined to the container of origin. Occupants were not alerted by a smoke alarm in 18 percent of these confined fires. In a large portion of residential confined building fires, 44 percent, there is no information on the alert status and effectiveness of the smoke alarm (Figure 15).[21]

Figure 15. Smoke Alarm Alert Status in Confined Residential Building Fires (2005).



Source: 2005 NFIRS 5.0.

Notes: 1) The category "Alarm did not alert occupants" does not indicate the presence of a smoke alarm. It only indicates that the occupants were not alerted by an alarm, for whatever reason.

2) Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

[20] Harris Interactive *Fire Prevention Week Survey* conducted for the National Fire Protection Association, Public Affairs Division, Fall 2004 (http://www.nfpa.org/assets/images/Public%20Education/FPWSurvey.pdf). Previous smoke alarm usage statistics have been published by the Consumer Product Safety Commission. The Commission's 2004–2005 Residential Fire Survey had not been released officially as of the publication of this document.

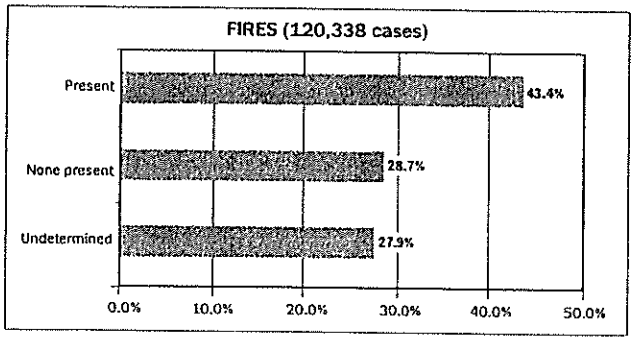
[21] While the number of "Undetermined" entries is high, this data item may be misleading. If the fire was very small and confined to the item of origin, the alarm may not have sounded. In this case, it is not clear how this data item would be filled in correctly. If the occupant was present at the time of the confined fire, there may have been no need for a smoke alarm to notify the occupants. Again, it is unclear what the coding would be, and how the NFIRS instructions are interpreted.

Smoke Alarm Effectiveness in Nonconfined Fires

To be effective, a working smoke alarm must alert the occupants. The first step is to determine if the alarm was present and whether it operated.

Smoke alarms were present in only 43 percent of nonconfined residential building fires (Figure 16). Nonconfined fires are those fires that spread beyond the original object of origin—what is typically envisioned as a "fire." The presence or absence of alarms was not reported to NFIRS in 28 percent of nonconfined residential building fires.

Figure 16. Presence of Smoke Alarms in Nonconfined Residential Building Fires (2005).



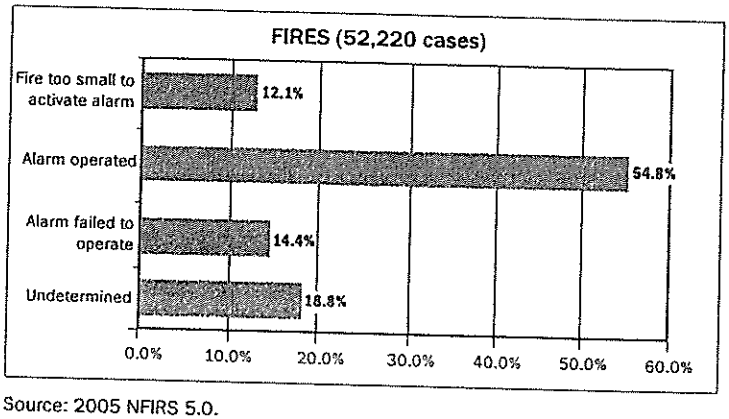
Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

When smoke alarms were present in nonconfined residential building fires, the alarms operated in 55 percent of the incidents. In the remaining 45 percent of incidents, smoke alarms failed to operate (14 percent), the fire was too small to activate the system (12 percent), or no information on smoke alarm operation was available (19 percent) (Figure 17).[22]

[22] Looking at the percentage of operational smoke alarms from another perspective, at a minimum, smoke alarms were known to be present and operated in 24 percent of all nonconfined residential building fires (present 43.4% x operated 54.8% = 23.8%).

Figure 17. Smoke Alarm Operation When Alarm was Present in Nonconfined Residential Building Fires (2005).



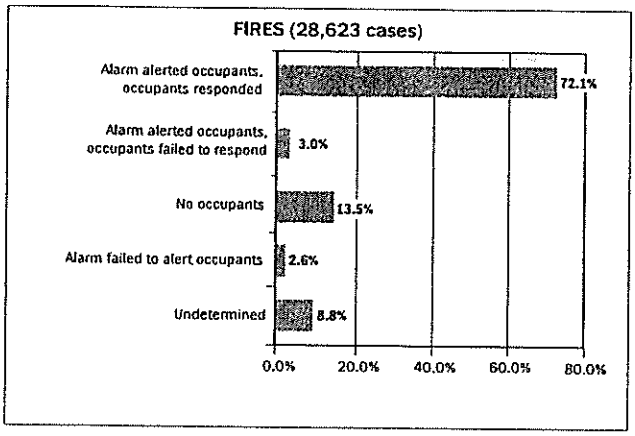
Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Figure 18 shows that, in nearly three-quarters of the nonconfined residential building fires where alarms were present and operated, occupants were alerted to the fire by the smoke alarm: 72 percent of occupants were alerted and were able to respond to the warning, and an additional 3 percent were alerted but did not respond to the warning. Occupants were not alerted in 3 percent of nonconfined residential building fires, and no occupants were in the residence at the time of the fire in 14 percent of these incidents. Alarm alert effectiveness information was not available in 9 percent of nonconfined residential building fires.[23]

[23] At a minimum, smoke alarms were effective at alerting occupants in 18 percent of all nonconfined residential building fires (present 43.4% x operated 54.8% x alerted occupants 75.1% = 17.9%).

Figure 18. Smoke Alarm Effectiveness When Alarm was Operational in Nonconfined Residential Building Fires (2005).



Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Widespread public awareness programs that focus on the proper maintenance of alarms are needed to ensure that they operate properly. A number of initiatives are focused directly on this problem. Messages are broadcast nationally when daylight savings time goes into effect, reminding the public to check and maintain their alarms. Some local fire departments in urban areas distribute free smoke alarms to households that are unprotected. All these initiatives have helped, but residences without smoke alarms and residences with nonworking alarms still have reported fires.

Current guidelines published by the CPSC recommend placing working smoke alarms on every level of the home, outside sleeping areas, and inside bedrooms. These guidelines also encourage residents to replace batteries annually and test smoke alarms monthly.[14]

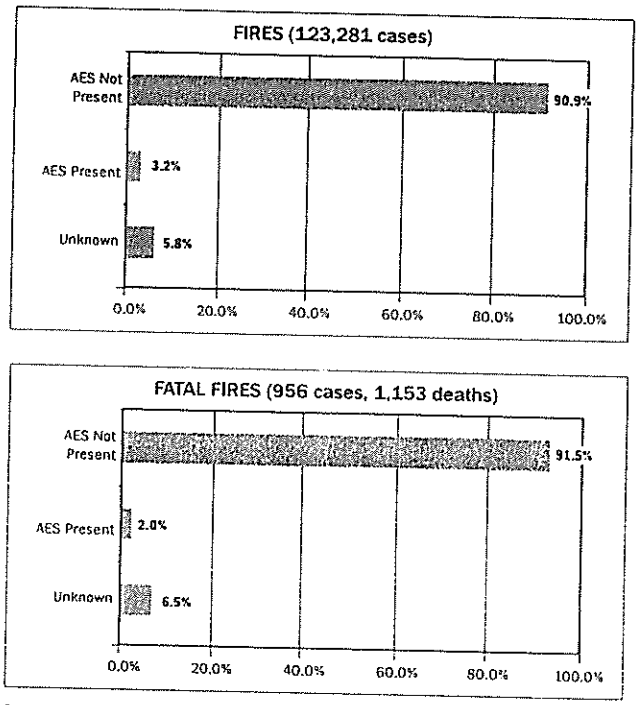
Presence of Automatic Extinguishing Systems

Other protection types fall in the category of automatic extinguishment systems (AESs). AESs encompass sprinkler, dry chemical, foam, halogen, and carbon dioxide systems. When found in residences, sprinkler systems are the most common type of AES. Residential sprinklers, however, are found today in only a small fraction of residences other than hotels, newer multifamily buildings, and newer high-value custom homes. It is no surprise that they are reported to be present in only 3 percent of residential buildings

[14] Consumer Product Safety Commission, "Smoke Alarms," March 2008, http://www.cpsc.gov/CPSCPUB/PUBS/smokealarms.pdf and "CPSC Daylight Saving Time Alert: Working Smoke Alarms Are Key to Surviving Home Fires," March 2008, http://www.cpsc.gov/cpscpub/prerel/prhtml08/08211.html

fires nationally and 2 percent of fatal residential building fires (Figure 19). Residential AESs represent a great potential in the future.[25] In residences, sprinklers are widely thought to be the most effective type of system, not only alerting residents of the presence of fire, but helping to extinguish it. As a note, if a fire is extinguished by a sprinkler or other AES, it may never be reported to the fire service, and the statistics below may underrepresent the presence of AES.

Figure 19. Presence of Automatic Extinguishing Systems in Residential Buildings (2005).



Source: 2005 NFIRS 5.0.

Note: Percentages reflect only those incidents with structure types 1 (enclosed building) or 2 (fixed portable or mobile structures).

[25] The presence of AESs includes only those fires with a structure fire module in NFIRS. While confined fires are allowed abbreviated reporting, some fire departments have filled out the fire and structure fire modules voluntarily for some confined fires, and AES information is collected for these incidents. Generally speaking, less than 3 percent of residential building fires are confined fires with a structure fire module.

One- and Two-Family Residential Buildings

One- and two-family residential buildings dominate the fire profile for residential buildings as well as for residential structures in general.[26, 27]

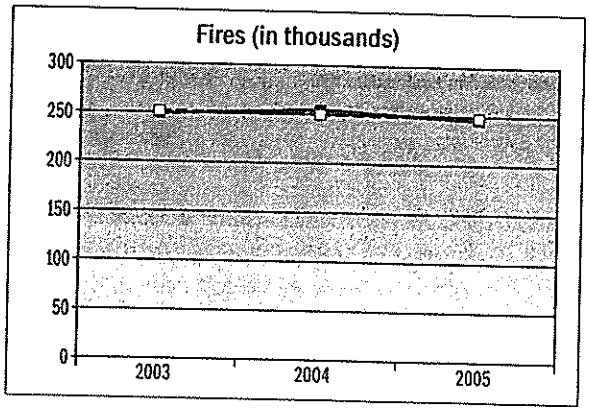
Trends

Trends for one- and two-family residential building fires, deaths, and injuries declined during the 3-year period (2003–2005), 1, 10, and 3 percent respectively. Property loss increased 5 percent (Figure 20). Because the numbers of deaths and injuries dropped more than fires, the statistics per fire improved, with fewer deaths and injuries per fire. Dollar losses, however, increased during this period, and the dollar loss statistics per fire worsened. Smoke alarms are thought to play a major role in the reduction in the number of reported fires and the resulting civilian casualties.

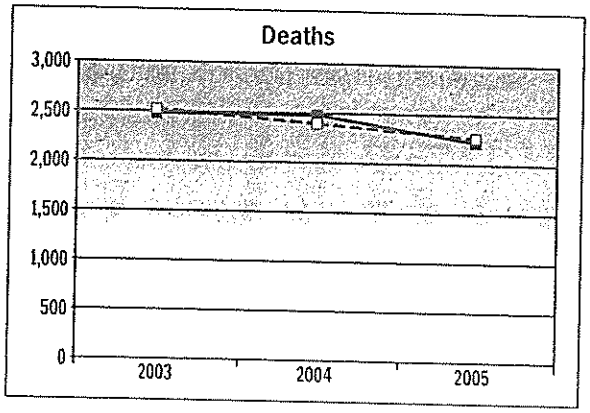
[26] See the discussion on the U.S. population and one- and two-family homes in the section on *Types of Residential Structures*.

[27] Manufactured housing (mobile homes used as fixed residences) is included here.

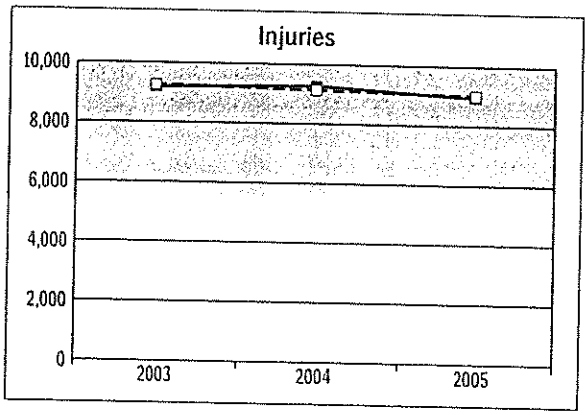
Figure 20. Trends in One- and Two-Family Building Fires and Fire Losses (2003–2005).



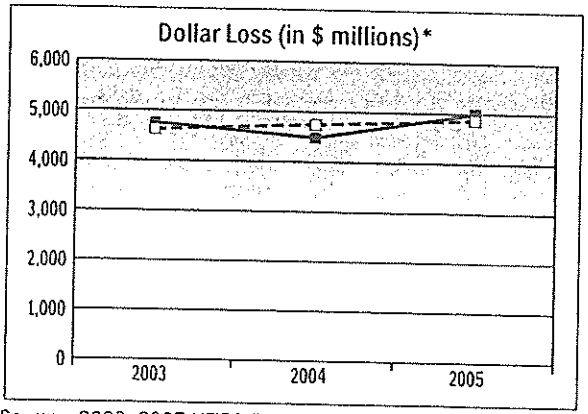
FIRES (IN THOUSANDS)	
Year	Value
2003	249.4
2004	254.6
2005	245.9
3-Year Trend (%)	-1.4%



DEATHS	
Year	Value
2003	2,480
2004	2,485
2005	2,225
3-Year Trend (%)	-10.1%



INJURIES	
Year	Value
2003	9,200
2004	9,275
2005	8,950
3-Year Trend (%)	-2.7%



DOLLAR LOSS (IN $MILLIONS)* *ADJUSTED TO 2005 DOLLARS	
Year	Value
2003	$4,761
2004	$4,489
2005	$5,002
3-Year Trend (%)	5.2%

Sources: 2003–2005 NFIRS 5.0, NFPA, and Consumer Price Index.

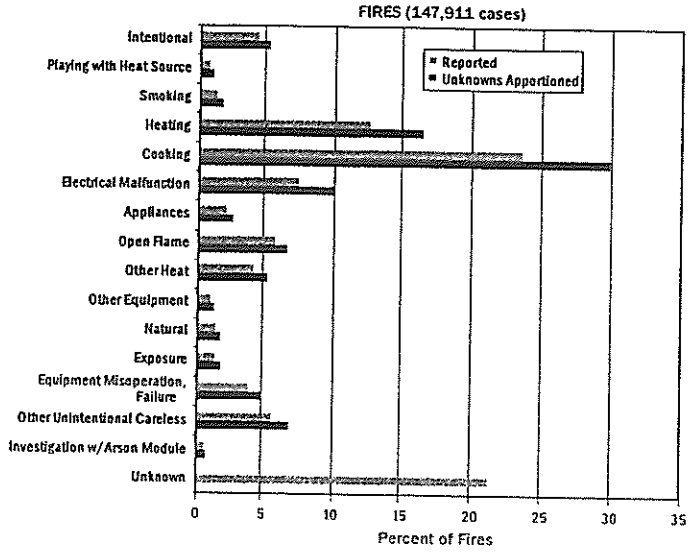
Causes

Thirty percent of all fires in one- and two-family buildings are caused by cooking incidents (Figure 21). The most common cooking fires result from misuse of materials or products, abandoned or discarded materials, and the heat source too close to combustibles when food (most often grease or cooking oils) catches fire. Heating (17 percent) and electrical malfunction (10 percent) are the second and third leading causes of fires.

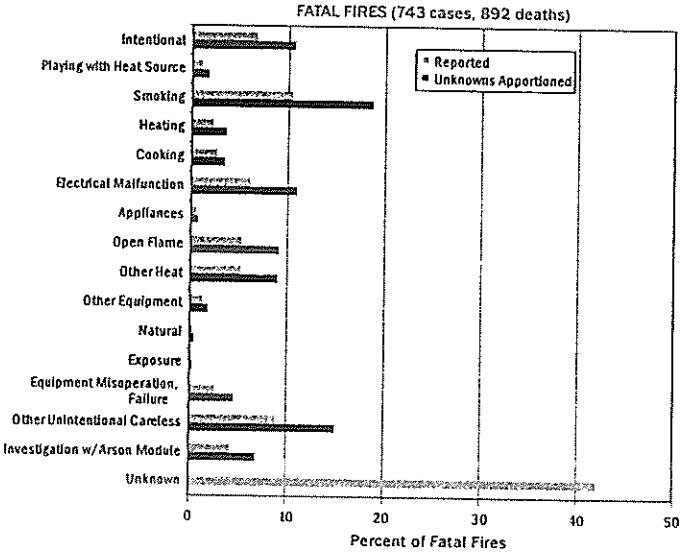
The first and second leading causes of fatal fires in 2005 are smoking (18 percent) and other unintentional, careless action (16 percent). Two-thirds of the fatal smoking fires come from cigarettes dropped on upholstered furniture, bedding, mattresses, or pillows. Studies and anecdotal evidence suggest that alcohol consumption may have a role in these fires.[28] Electrical malfunction and intentional causes tied at third with 11 percent. These four causes account for 57 percent of the fatal fires and 59 percent of fatalities in 2005.

[13] Several of the published studies on the effect of alcohol abuse in U.S. fires are listed in *Other Resources on the Fire Problem* at http://www.usfa.dhs.gov/statistics/reports/fius.shtm

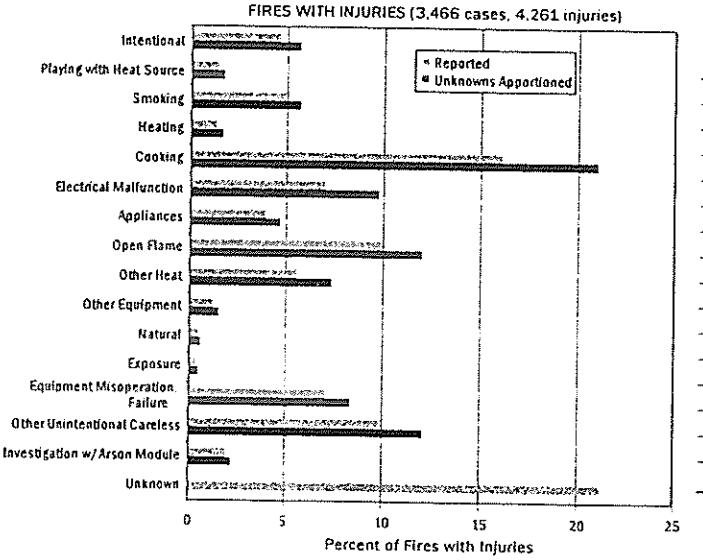
Figure 21. Fire Cause for One- and Two-Family Building Fires and Fires with Losses (2005).



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	4.3	5.6
Playing with Heat Source	0.7	0.9
Smoking	1.7	2.2
Heating	12.9	16.5
Cooking	23.4	29.9
Electrical Malfunction	7.8	10.0
Appliances	2.1	2.7
Open Flame	5.7	7.2
Other Heat	4.3	5.5
Other Equipment	1.1	1.4
Natural	1.9	2.4
Exposure	1.9	2.4
Equipment Misoperation, Failure	3.8	4.9
Other Unintentional, Careless	5.8	7.5
Investigation w/Arson Module	0.7	0.9
Unknown	21.7	

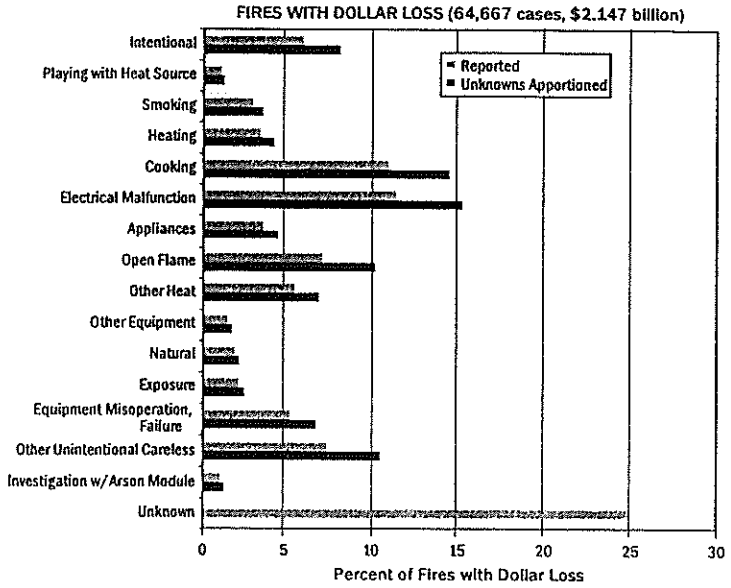


Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.5	11.4
Playing with Heat Source	0.8	1.4
Smoking	10.1	17.9
Heating	2.6	4.5
Cooking	2.3	4.0
Electrical Malfunction	6.5	11.4
Appliances	0.7	1.2
Open Flame	4.4	7.9
Other Heat	4.6	8.1
Other Equipment	1.6	2.9
Natural	0.4	0.7
Exposure	0.1	0.2
Equipment Misoperation, Failure	2.6	4.5
Other Unintentional, Careless	9.3	16.4
Investigation w/Arson Module	4.2	7.4
Unknown	43.5	



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	4.6	5.8
Playing with Heat Source	1.8	2.2
Smoking	4.8	6.2
Heating	1.9	2.4
Cooking	16.5	21.0
Electrical Malfunction	7.6	9.7
Appliances	3.5	4.4
Open Flame	10.1	12.8
Other Heat	6.1	7.8
Other Equipment	1.8	2.2
Natural	0.6	0.7
Exposure	0.4	0.6
Equipment Misoperation, Failure	7.0	8.8
Other Unintentional, Careless	10.1	12.9
Investigation w/Arson Module	1.8	2.3
Unknown	21.4	

Figure 21 (cont'd)



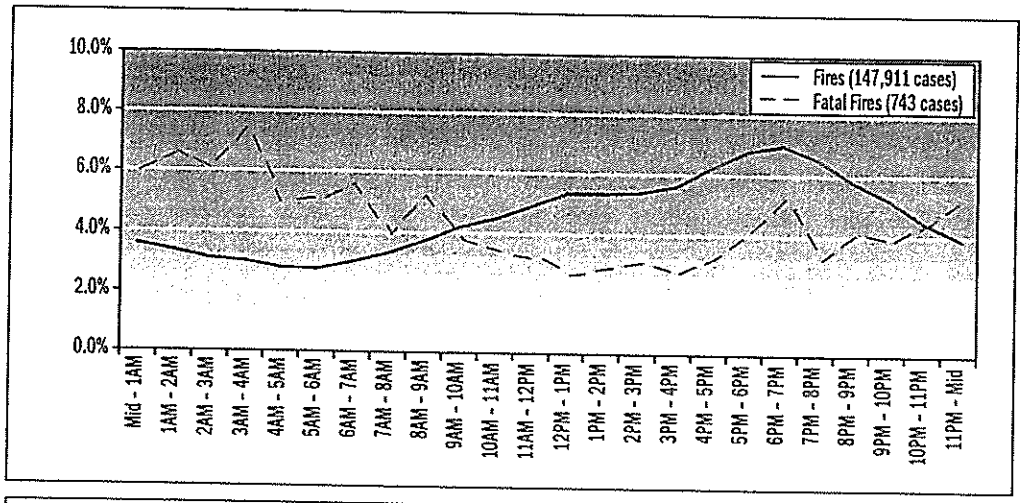
Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.3	8.3
Playing with Heat Source	1.2	1.6
Smoking	2.6	3.5
Heating	3.5	4.6
Cooking	11.0	14.6
Electrical Malfunction	11.6	15.4
Appliances	3.3	4.4
Open Flame	7.6	10.2
Other Heat	5.7	7.6
Other Equipment	1.6	2.2
Natural	2.6	3.5
Exposure	3.2	4.3
Equipment Misoperation, Failure	5.5	7.4
Other Unintentional, Careless	8.2	11.0
Investigation w/Arson Module	1.1	1.5
Unknown	24.9	

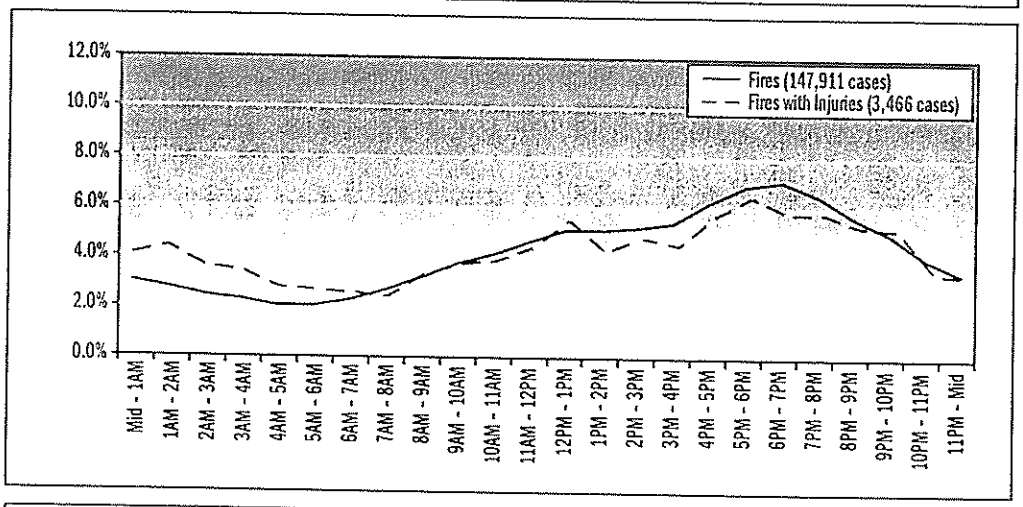
Source: 2005 NFIRS 5.0.

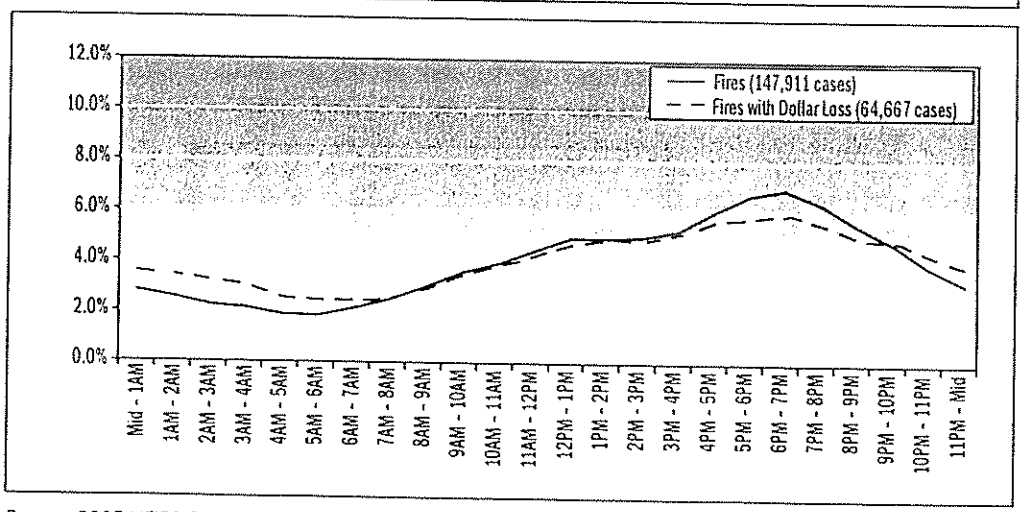
When Fires Occur

Time of Fire Alarm. Figure 22 mirrors Figure 12 (all residential buildings). Fires in one- and two-family residences are highest between 4 p.m. and 8 p.m., when cooking fires sharply increase. Fires with injuries follow the overall fire incidence, and peak during the dinner hour, largely as a result of cooking fires. Fatal fires, on the other hand, are highest in the early morning hours, from 1 a.m. to 4 a.m., with a peak between 3 a.m. to 4 a.m. These early morning hours are when most people are in deep sleep and are not easily awakened in time to escape. Causes of fatal fires during this period are intentional, smoking-related, and miscellaneous unintentional causes. Smoke and flames have a greater opportunity to grow larger while people are asleep and unable to respond quickly to warning signs. Fires with dollar loss reported are relatively consistent with the incidence of fires.

Figure 22. Time of Fire Alarm for One- and Two-Family Building Fires and Fires with Losses (2005).



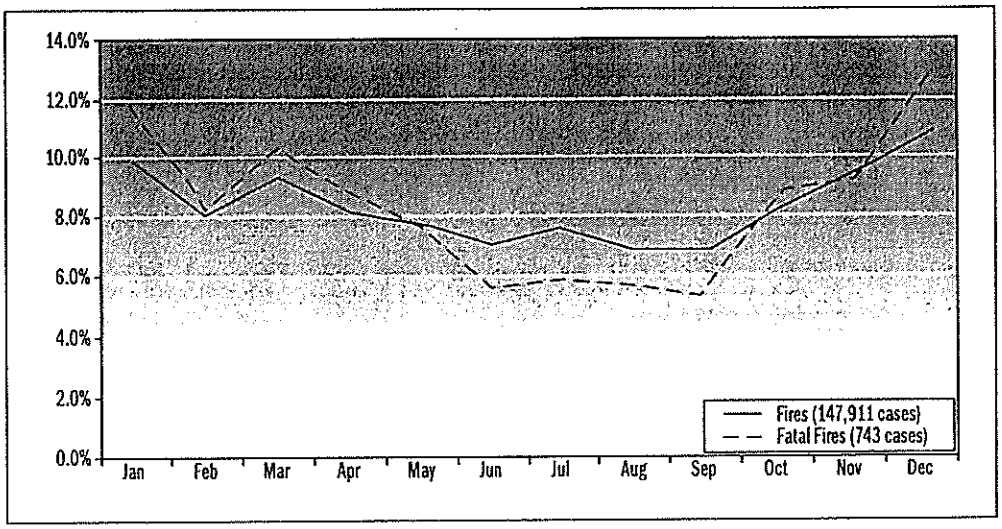




Source: 2005 NFIRS 5.0.

Month Of Year. Fires and fatal fires in one- and two-family homes peak in midwinter, when heating fires are added to the other types of year-round fires (Figure 23). Fatal fires are at their lowest in the summer months.

Figure 23. Month of Year of One- and Two-Family Building Fires and Fires with Losses (2005).



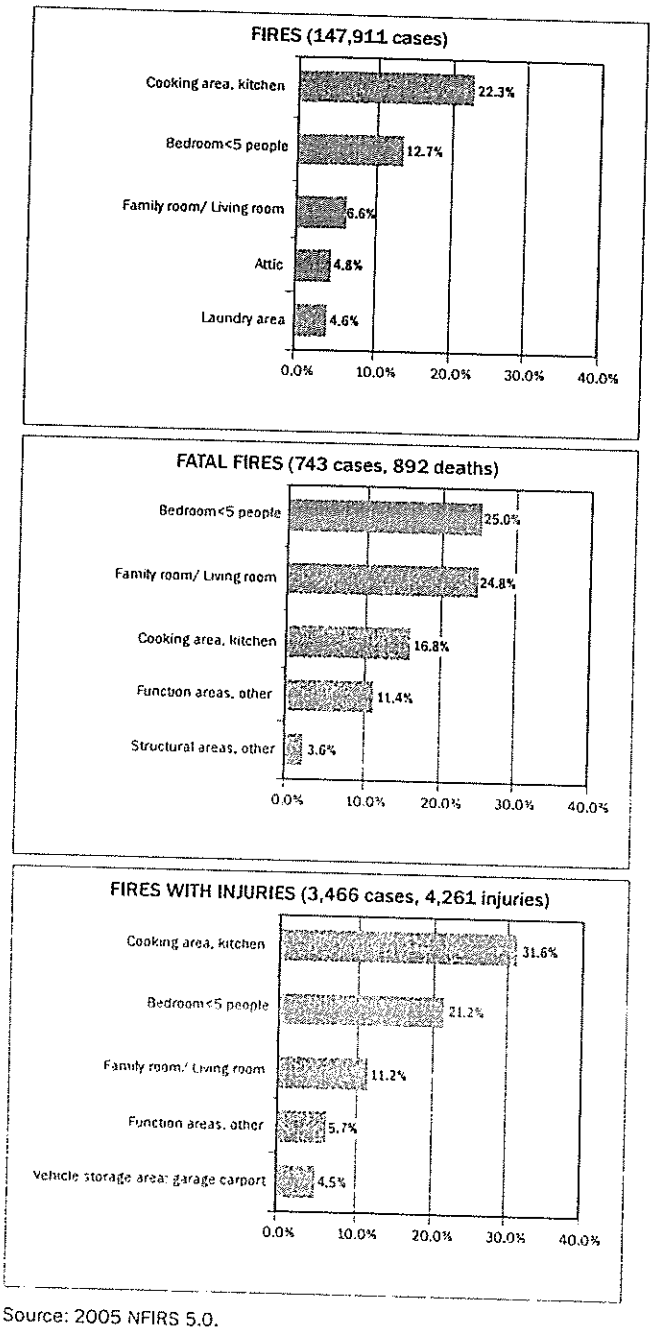
Source: 2005 NFIRS 5.0.

Area of Fire Origin

To help visualize the fire problem more personally, it is useful to describe it in terms of where different types of fires occur in the home, and what types of fires occur in each room. Figure 24 shows the leading rooms where fires, fatal fires, and fires resulting in injuries originated in one- and two-family homes in 2005. The rankings of the top three rooms for all three measures have remained relatively constant over the years. Kitchens, bedrooms, and lounge areas (e.g., living rooms, family rooms) are the rooms where most fires originate—42 percent of fires—and result in 67 percent of fatal fires, and 64 percent of fires with injuries.

Twenty-two percent of fires in one- and two-family homes occur in the kitchen, with 43 percent of these fires caused by cooking. Fifty percent of fatal fires in one- and two-family homes occur in lounge areas and bedrooms, with nearly one-quarter (23 percent) of these fires due to smoking, and 32 percent of fires with injuries occur in the kitchen, again with most as the result of cooking (41 percent).

Figure 24. Leading Locations of Fire Origin in One- and Two-Family Building Fires, Fatal Fires, and Fires with Injuries (2005).



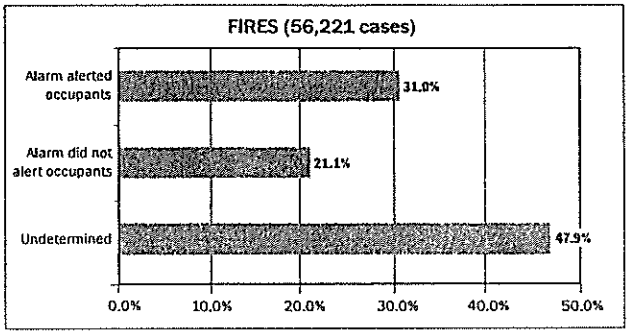
Source: 2005 NFIRS 5.0.

Note: Percentages reflect distribution of those incidents where area of fire origin was unknown.

Smoke Alarm Performance

Smoke Alarm Effectiveness in Confined Fires. Smoke alarms were present and effective in alerting the household occupants in 31 percent of small, low-loss confined one- and two-family building fires. Occupants were not alerted by a smoke alarm in 21 percent of these confined fires. In a large portion of confined one- and two-family building fires (48 percent) there is no information on the alert status and effectiveness of the smoke alarm (Figure 25).

Figure 25. Smoke Alarm Alert Status in Confined One- and Two-Family Building Fires (2005).



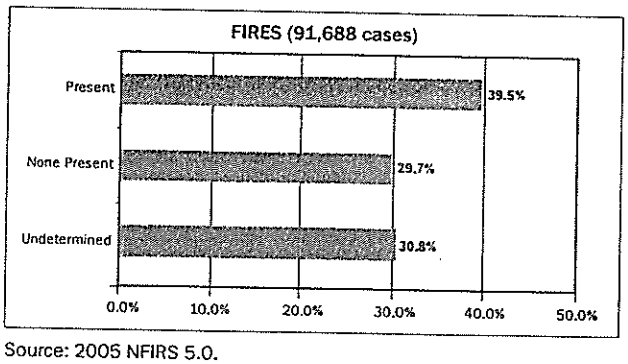
Source: 2005 NFIRS 5.0.

Notes: 1) The category "Alarm did not alert occupants" does not indicate the presence of a smoke alarm. It only indicates that the occupants were not alerted by an alarm, for whatever reason.

2) Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Smoke Alarm Effectiveness in Nonconfined Fires. Alarms must be present and must operate to determine effectiveness. As shown in Figure 26, smoke alarms were present in less than half of larger, nonconfined one- and two-family building fires (40 percent). The presence or absence of alarms was not reported to NFIRS in 31 percent of nonconfined one- and two-family building fires.

Figure 26. Presence of Smoke Alarms in Nonconfined One- and Two-Family Building Fires (2005).

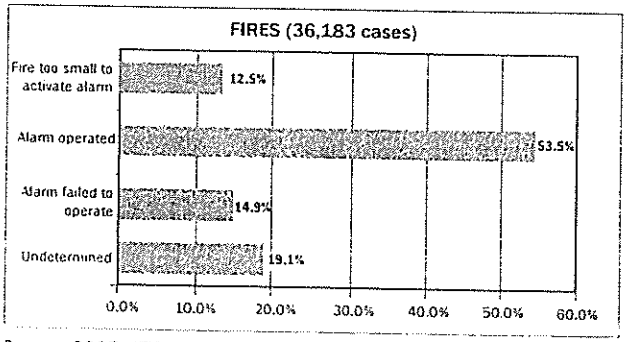


Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

When smoke alarms were present in nonconfined one- and two-family building fires, the alarms operated in 54 percent of the incidents. In the remaining 46 percent of incidents, smoke alarms failed to operate (15 percent), the fire was too small to activate the system (13 percent), or no information on smoke alarm operation was available (19 percent) (Figure 27).[29]

Figure 27. Smoke Alarm Operation When Alarm was Present in Nonconfined One- and Two-Family Building Fires (2005).



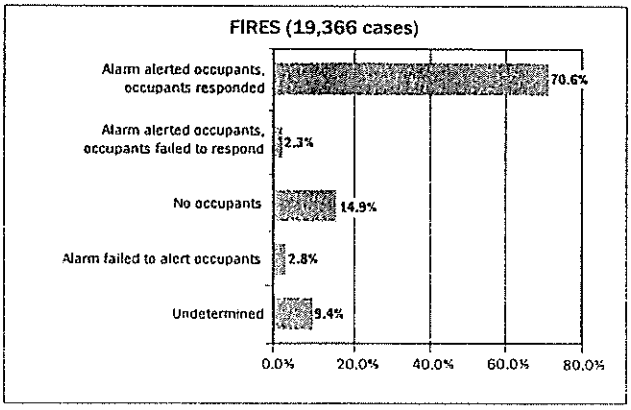
Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

[29] Looking at the percentage of operational smoke alarms from another perspective, at a minimum, smoke alarms were known to be present and operated in 21 percent of all nonconfined one-and two-family building fires (present 39.5% x operated 53.5% = 21.1%).

The effectiveness of working smoke alarms in nonconfined one- and two-family building fires is shown in Figure 28. In nearly three-quarters of the nonconfined one- and two-family building fires where alarms were present and operated, occupants were alerted to the fire by the smoke alarm: 71 percent of occupants were alerted and were able to respond to the warning, and an additional 2 percent were alerted but did not respond to the warning. Occupants were not alerted in 3 percent of nonconfined one- and two-family building fires, and no occupants were in the residence at the time of the fire in 15 percent of these incidents. Alarm alert effectiveness information was not available in 9 percent of nonconfined one- and two-family building fires.[30]

Figure 28. Smoke Alarm Effectiveness When Alarm was Operational in Nonconfined One- and Two-Family Building Fires (2005).



Source: 2005 NFIRS 5.0.

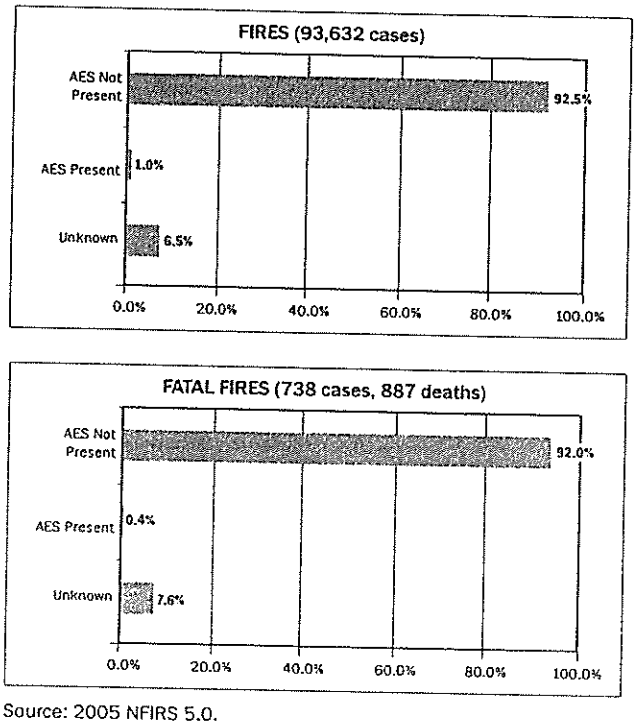
Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Presence of Automatic Extinguishing Systems

AESs were present in only 1 percent of fires, and much less than 1 percent of fatal fires in one- and two-family homes in 2005 (Figure 29). Although this is a small amount from which to draw conclusions, the proportion of reported fires in homes with AESs, such as sprinklers, is largely unchanged since the advent of NFIRS 5.0. Further investigation into these results is needed.

[30] At a minimum, smoke alarms were effective at alerting occupants in 15 percent of all nonconfined one-and two-family building fires (present 39.5% x operated 53.5% x alerted occupants 72.9% = 15.4%).

Figure 29. Presence of Automatic Extinguishing Systems in One- and Two-Family Buildings (2005).



Source: 2005 NFIRS 5.0.

Note: Percentages reflect only those incidents with structure types 1 (enclosed building) or 2 (fixed portable or mobile structures).

Multifamily Buildings

Formerly addressed as "apartments", multifamily buildings tend to be regulated by stricter building codes than one- and two-family residences. The category now includes condominiums, town houses, row-houses, and tenements, as well as the traditional apartment (lowrise or highrise apartment). In addition, many multifamily residences are rental properties, frequently falling under more stringent fire prevention statutes. Often these properties have a reasonably homogeneous socioeconomic mix of residents. They may be suburban town house communities, rent-subsidized low-income housing projects, high-income families in luxury highrises, or centers of living for the elderly. In large cities, all of these groups are represented in these buildings.

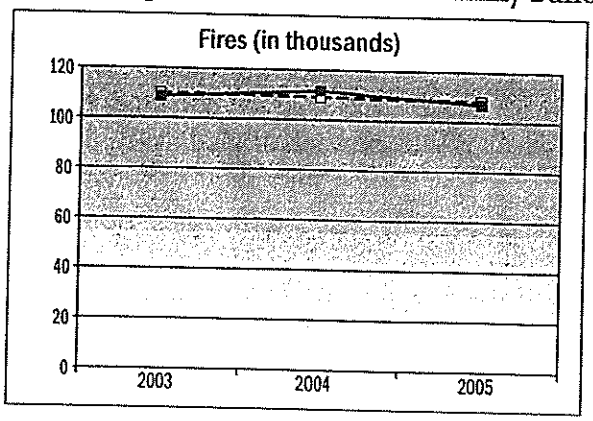
Because multifamily buildings tend to have large clusters of similar people, prevention programs can be tailored specially to the cause profiles of multifamily buildings in different areas of the community.

Trends

Figure 30 shows the 3-year trends in multifamily building fires, deaths, injuries, and losses. The number of multifamily building fires dropped 2 percent. The same was not true of the death trend in multifamily buildings, which was up 35 percent. The trend for multifamily building injuries increased 4 percent. Adjusted dollar losses were up 21 percent in multifamily buildings. Property losses in multifamily residences continued the overall national upward trend.[31]

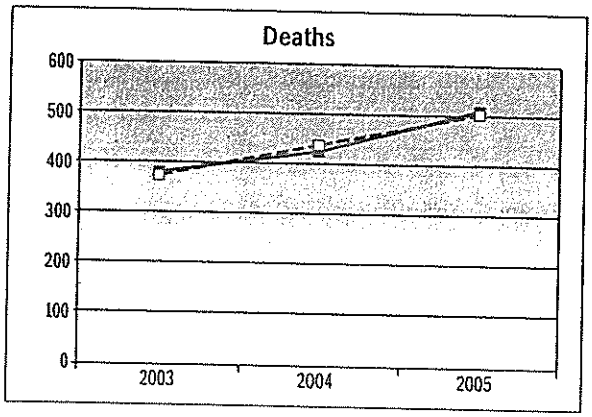
[31] *Fire in the United States 1995-2004, Fourteenth Edition*, United States Fire Administration, August 2007.

Figure 30. Trends in Multifamily Building Fires and Fire Losses (2003–2005).



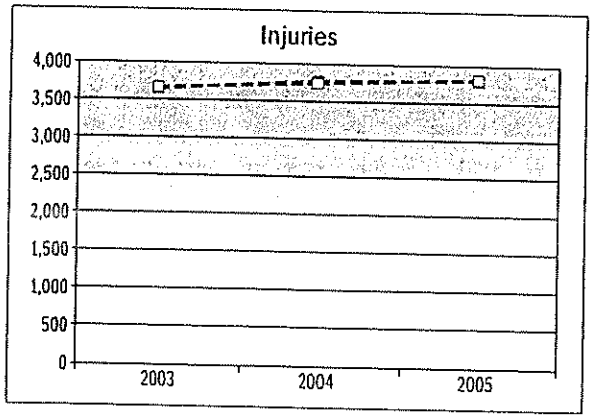
FIRES (IN THOUSANDS)

Year	Value
2003	108.8
2004	111.7
2005	107.0
3-Year Trend (%)	-1.6%



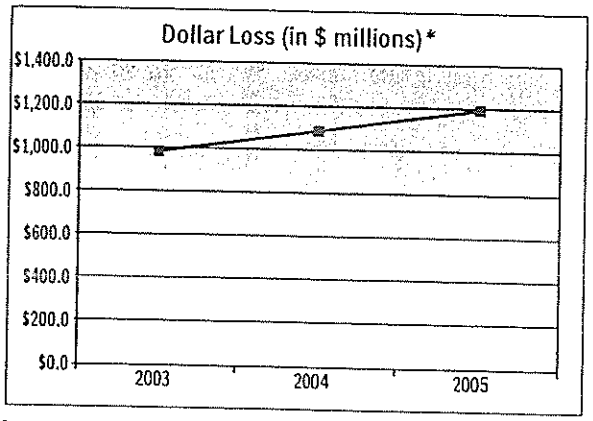
DEATHS

Year	Value
2003	380
2004	425
2005	510
3-Year Trend (%)	34.8%



INJURIES

Year	Value
2003	3,650
2004	3,775
2005	3,800
3-Year Trend (%)	4.1%



DOLLAR LOSS (IN $MILLIONS)*
*ADJUSTED TO 2005 DOLLARS

Year	Value
2003	$983
2004	$1,088
2005	$1,193
3-Year Trend (%)	21.4%

Sources: 2003–2005 NFIRS 5.0, NFPA, and Consumer Price Index.

The steep increase in multifamily building deaths is perplexing. Because of stricter building codes, the required presence of smoke alarms, and the increase in the number of sprinkler systems, deaths in multifamily buildings typically do not exhibit marked increases. It simply may be that the 3-year trend is what is known as a "local high" and that subsequent years' data may moderate the trend. On the other hand, it may be that there are socioeconomic and demographic forces at work. A more detailed study of socioeconomic and demographic changes over time might reveal some of the factors involved in fire incidence.

Causes

The fire problem in multifamily buildings generally is similar to that of one- and two-family structures, with the exception of one major category: cooking fires. Because multifamily buildings often have central heating systems that are maintained regularly, there are fewer heating fires from misuse and poor maintenance in multifamily buildings than in one- and two-family dwellings.[32] In addition, the general lack of fireplaces, chimneys, and fireplace-related equipment reduces the heating fire problem in multifamily buildings, especially apartments,[33] and, because of construction materials, codes, and professional maintenance, electrical problems cause a smaller percentage of fires in multifamily buildings. These factors change the proportions of the causes for multifamily buildings, with heating and electrical becoming less noteworthy and cooking—the leading cause of residential building fires—to move up in importance.

In terms of numbers of reported fires in 2005, cooking in multifamily buildings leads by a factor of at least 8 over the second leading cause (Figure 31). Cooking accounts for more than 60 percent of all multifamily building fires; heating is a distant second at 7 percent, and open flame is third at 4 percent.

The leading cause of fatal fires in multifamily buildings is smoking, accounting for 26 percent of fatal fires. The second and third leading causes of fatal fires are intentional at 12 percent, and open flame at 11 percent. These three leading causes account for just under half of all fatal fires in multifamily buildings.

For fires with injuries, cooking leads at 34 percent; other unintentional, careless, is second at 11 percent, and open flame is third at 10 percent.

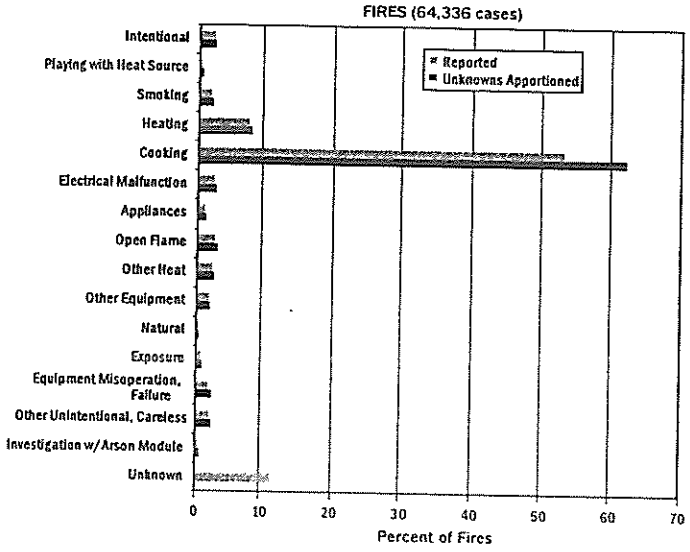
Cooking is the leading cause for fires with dollar loss, followed by open-flame fires and miscellaneous unintentionally set fires.

Cooking fires in multifamily buildings represent a substantial challenge, as they have resulted in more than half of all multifamily fires, 34 percent of fires with injuries, 33 percent of fires with dollar loss, and 7 percent of fatal fires. The percentage of fatal fires is low because cooking fires tend to occur during the day or evening hours during meal times when most people are awake and responsive. Deaths are less likely under these circumstances.

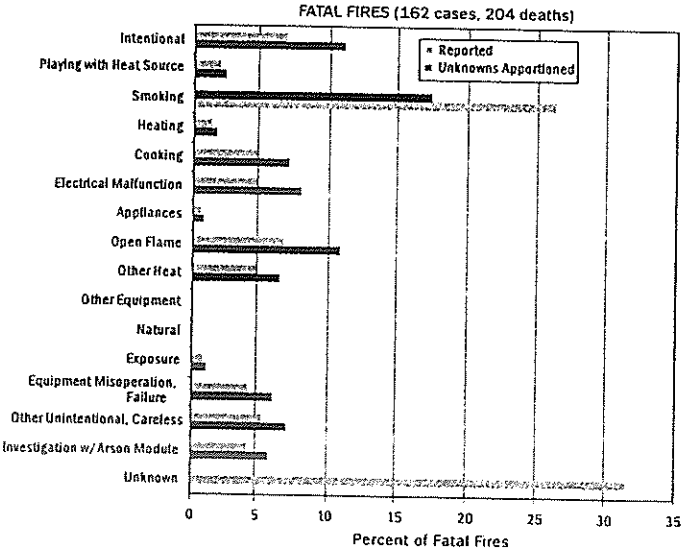
[32] Multifamily buildings include town houses, rowhouses, and other units (e.g., highrise condominiums) that do not necessarily have central heating units that fall under joint maintenance agreements. Nonetheless, central heating units play a much smaller role in multifamily buildings than in one- and two-family buildings.

[33] Fireplace-related equipment is involved in 56 percent of one- and two-family heating fires, but only 39 percent of multifamily heating fires.

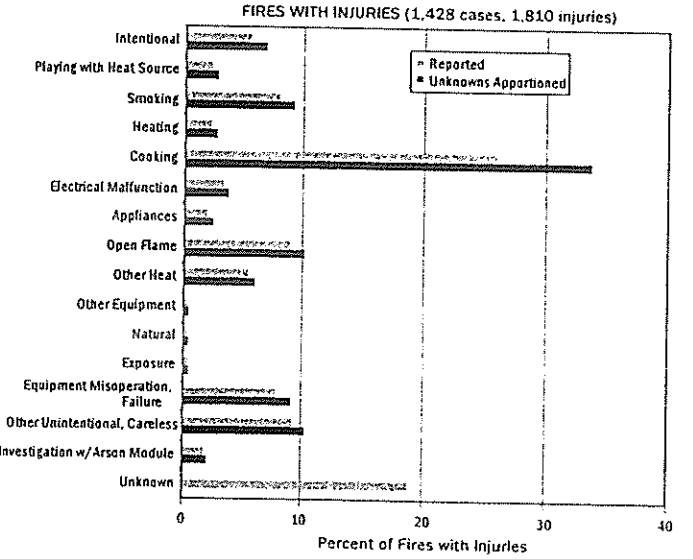
Figure 31. Fire Cause for Multifamily Building Fires and Fires with Losses (2005).



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	2.7	3.1
Playing with Heat Source	0.5	0.6
Smoking	2.1	2.4
Heating	6.1	7.1
Cooking	54.2	62.8
Electrical Malfunction	2.9	3.3
Appliances	1.3	1.5
Open Flame	3.7	4.2
Other Heat	2.8	3.3
Other Equipment	1.9	2.2
Natural	0.4	0.5
Exposure	1.1	1.2
Equipment Misoperation, Failure	2.8	3.3
Other Unintentional, Careless	3.5	4.0
Investigation w/Arson Module	0.4	0.5
Unknown	13.8	

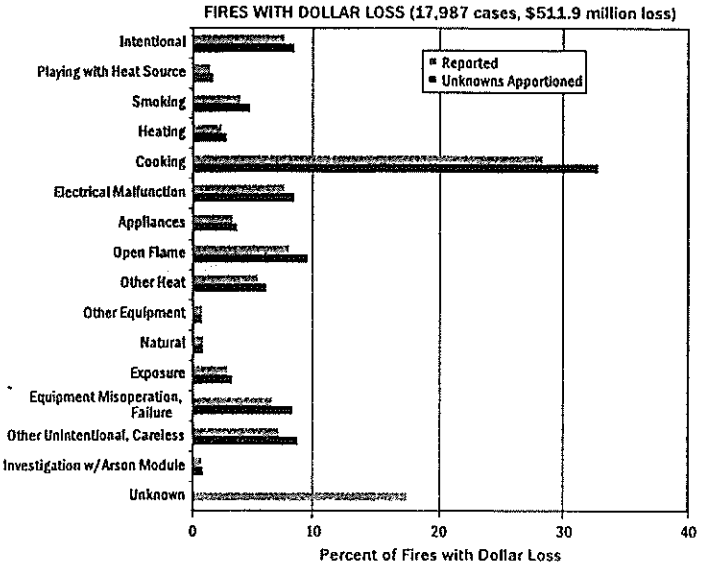


Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	8.0	11.8
Playing with Heat Source	1.9	2.7
Smoking	17.9	26.4
Heating	1.2	1.8
Cooking	4.9	7.3
Electrical Malfunction	5.6	8.2
Appliances	0.6	0.9
Open Flame	7.4	10.9
Other Heat	4.9	7.3
Other Equipment	0.0	0.0
Natural	0.0	0.0
Exposure	1.2	1.8
Equipment Misoperation, Failure	4.3	6.4
Other Unintentional, Careless	5.6	8.2
Investigation w/Arson Module	4.3	6.4
Unknown	32.1	



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	5.3	6.5
Playing with Heat Source	2.0	2.5
Smoking	7.2	8.8
Heating	1.8	2.2
Cooking	27.8	33.8
Electrical Malfunction	3.5	4.3
Appliances	2.0	2.4
Open Flame	8.5	10.3
Other Heat	4.9	6.0
Other Equipment	0.4	0.4
Natural	0.4	0.5
Exposure	0.5	0.6
Equipment Misoperation, Failure	7.1	8.7
Other Unintentional, Careless	9.0	10.9
Investigation w/Arson Module	1.8	2.1
Unknown	17.9	

Figure 31 (cont'd)



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	6.2	7.4
Playing with Heat Source	1.2	1.4
Smoking	4.8	5.7
Heating	2.1	2.5
Cooking	27.8	33.4
Electrical Malfunction	6.4	7.7
Appliances	2.8	3.4
Open Flame	7.5	9.0
Other Heat	5.4	6.4
Other Equipment	0.9	1.1
Natural	0.9	1.1
Exposure	2.3	2.8
Equipment Misoperation, Failure	6.5	7.8
Other Unintentional, Careless	7.3	8.8
Investigation w/Arson Module	1.1	1.3
Unknown	16.9	

Source: 2005 NFIRS 5.0.

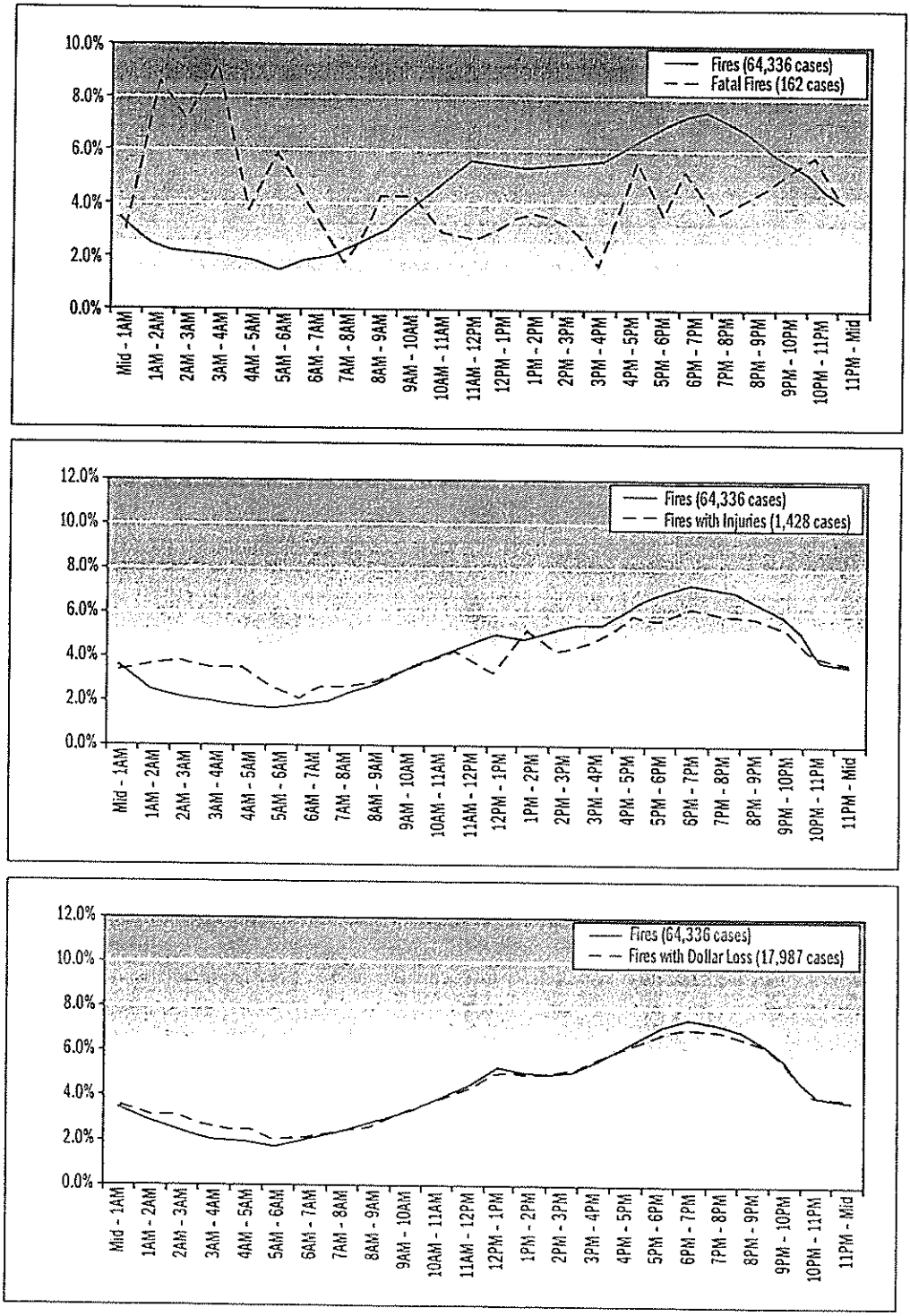
When Fires Occur

TIME OF FIRE ALARM. Figure 32 shows the alarm times for fires and fires with losses in multifamily buildings. The profiles are not as smooth as those for one- and two-family buildings due to the smaller numbers of incidents involved.

As in one- and two-family buildings, multifamily building fires peak during the evening cooking hours—here from 5 p.m. to 8 p.m.—and are at their lowest point from 4 a.m. to 7 a.m. The early morning hours from 1 a.m. to 4 a.m. are the most dangerous in terms of fatal fires, especially those fires associated with latent smoldering materials from smoking. Thirty-six percent of fatal fires at this time are the result of smoking.

Fires with injuries are spread somewhat evenly throughout the day, generally rising from 8 a.m. throughout the day and falling at night. Fires with dollar loss track closely with fire incidence.

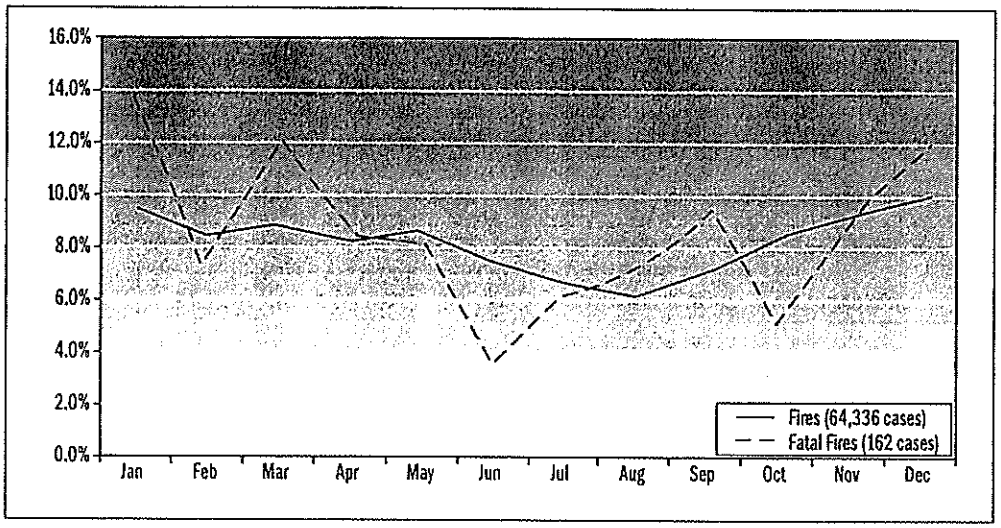
Figure 32. Time of Fire Alarm for Multifamily Building Fires and Fires with Losses (2005).



Source: 2005 NFIRS 5.0.

Month Of Year. Fires and fatal fires in multifamily buildings (Figure 33) track closely with those in one- and two-family buildings. Both are somewhat more common in colder months than in warmer months when heating fires increase. Another seasonal factor probably plays a role in winter fires and deaths: simply the greater propensity to stay indoors.

Figure 33. Month of Year of Multifamily Building Fires and Fatal Fires (2005).

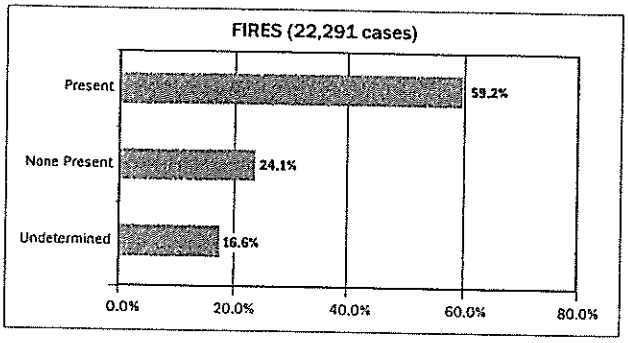


Source: 2005 NFIRS 5.0.

Area of Fire Origin

The leading locations where multifamily building fires started in 2005 are shown in Figure 34. The kitchen, with cooking as the cause, is the most common place for fires to start. The kitchen also is the leading area of fire origin for those fires with injuries. The bedroom is the most common place for a fatal fire to originate, largely due to smoking fires and open flame fires from candles and lighters. The top three leading locations of all three measures are the same as in one- and two-family dwellings.

Figure 36. Presence of Smoke Alarms in Nonconfined Multifamily Building Fires (2005).

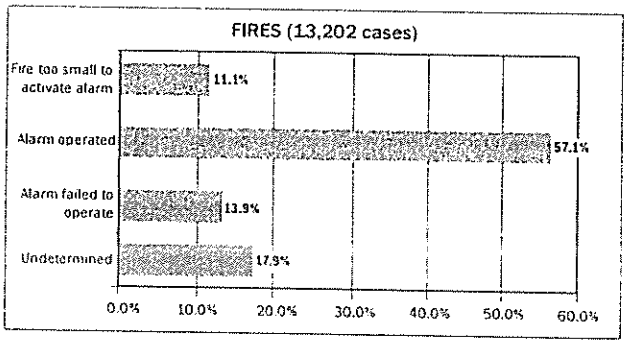


Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

When smoke alarms were present in nonconfined multifamily building fires, the alarms operated in 57 percent of multifamily incidents. Smoke alarms failed to operate in 14 percent of fires, the fire was too small to activate the system in another 11 percent of fires, and no information on smoke alarm operation was available in 18 percent of fires (Figure 37).[34]

Figure 37. Smoke Alarm Operation When Alarm was Present in Nonconfined Multifamily Building Fires (2005).



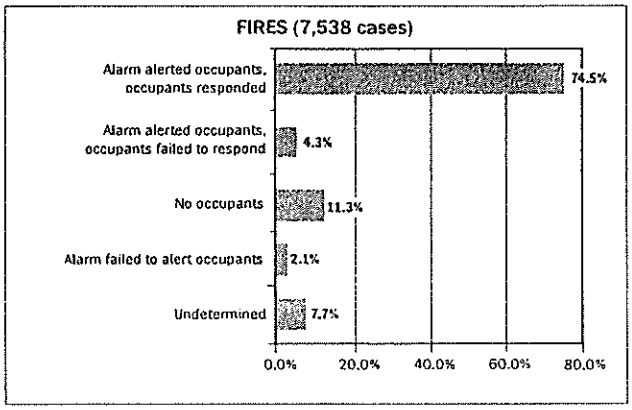
Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

[34] Looking at the percentage of operational smoke alarms from another perspective, at a minimum smoke alarms were known to be present and operated in 34 percent of all nonconfined multifamily building fires (present 59.2% x operated 57.1% = 33.8%).

The effectiveness of working smoke alarms in nonconfined multifamily building fires is shown in Figure 38. In 79 percent of the nonconfined multifamily building fires where alarms were present and operated, occupants were alerted to the fire by the smoke alarm: 75 percent of occupants were alerted and were able to respond to the warning, and an additional 4 percent were alerted but did not respond to the warning. Occupants were not alerted in 2 percent of nonconfined multifamily building fires, and no occupants were in the residence at the time of the fire in 11 percent of these incidents. Alarm alert effectiveness information was not available in 8 percent of nonconfined residential building fires.[35]

Figure 38. Smoke Alarm Effectiveness When Alarm was Operational in Nonconfined Multifamily Building Fires (2005).



Source: 2005 NFIRS 5.0.

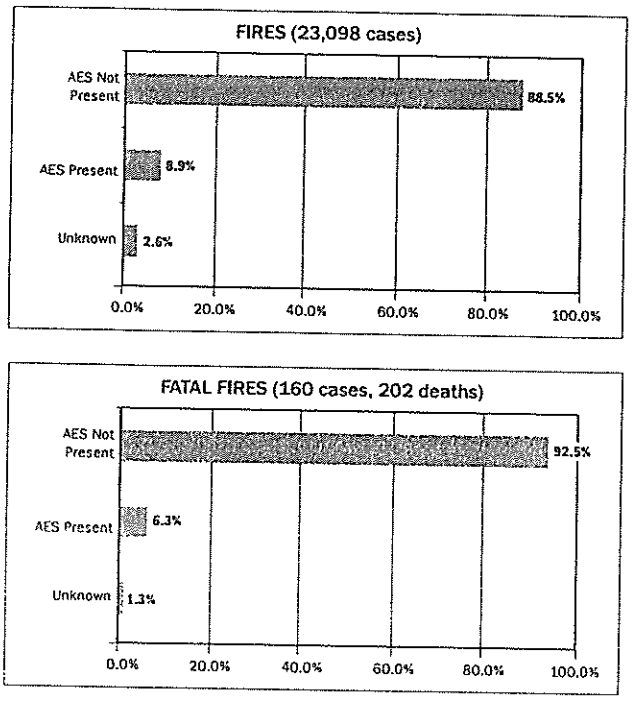
Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Presence of Automatic Extinguishing Systems

Figure 39 shows the presence of AESs in multifamily buildings in 2005. As is to be expected, a much higher percentage of multifamily buildings that experienced fires were equipped with sprinklers than in one- and two-family homes. As town houses, rowhouses, and the like are considered by many codes as single-family dwellings, AESs are not required. NFIRS includes these occupancies in the multifamily category, and this inclusion may affect the statistics for the presence of AES in multifamily buildings.

[35] At a minimum, smoke alarms were effective at alerting occupants in 27 percent of all nonconfined multifamily building fires (present 59.2% x operated 57.1% x alerted occupants 78.9% = 26.7%).

Figure 39. Presence of Automatic Extinguishing Systems in Multifamily Buildings (2005).



Source: 2005 NFIRS 5.0.

Note: Percentages reflect only those incidents with structure types 1 (enclosed building or 2 (fixed portable or mobile structures).

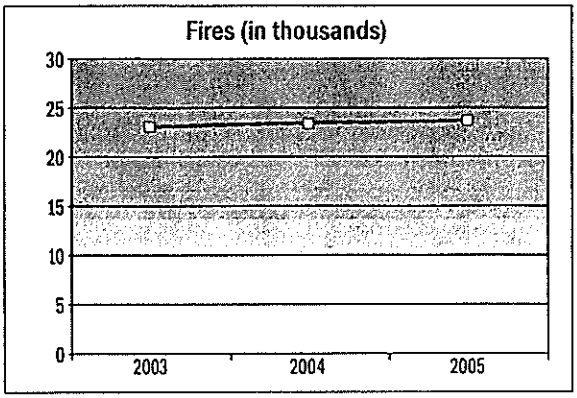
Other Residential Buildings

Other residential properties include rooming houses, dormitories, fraternities and sororities, home hotels, halfway houses, hotels and motels, assisted living facilities, and miscellaneous and unclassified properties reported as residences. The other residential properties category does not include homes for the elderly, prisons, orphanages, or other institutions, as these building types are considered nonresidential institutions.

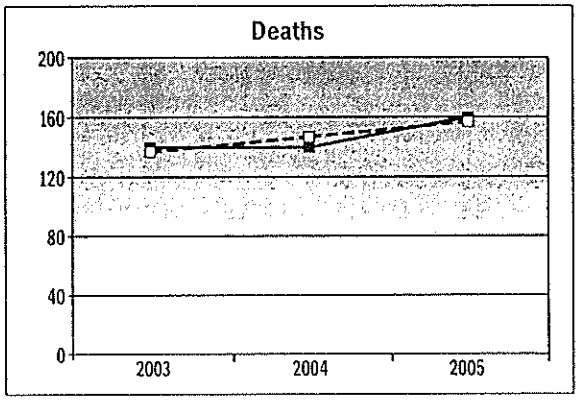
Trends

Figure 40 shows increasing trends in the numbers of other residential fires, deaths, injuries, and property loss (3, 15, 4, and 5 percent, respectively). Civilian fire deaths ranged from 140 to 160 a year, and injuries ranged from 575 to 600. Adjusted dollar loss ranged from a low of $259 million in 2004 to a high of $310 million the following year, 2005.

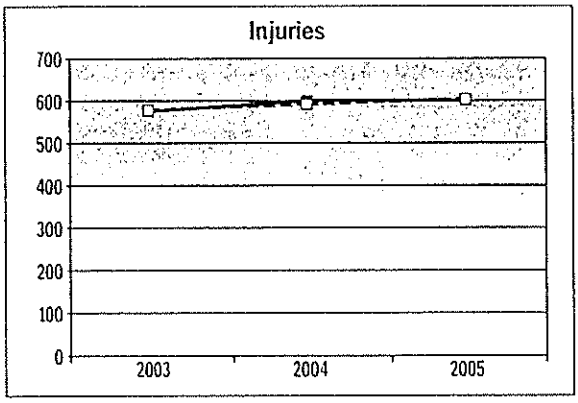
Figure 40. Trends in Other Residential Building Fires and Fire Losses (2003–2005).



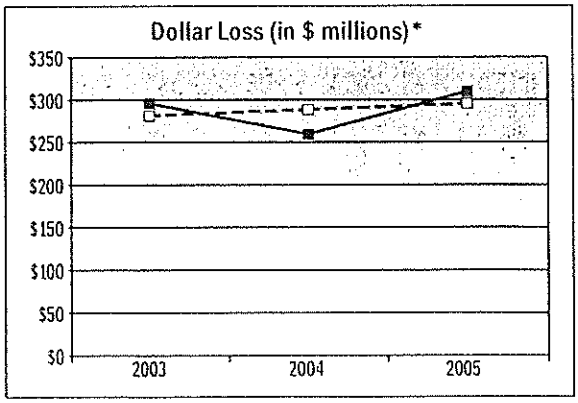
FIRES (THOUSANDS)	
Year	Value
2003	23.1
2004	23.5
2005	23.7
3-Year Trend (%)	2.6%



DEATHS	
Year	Value
2003	140
2004	140
2005	160
3-Year Trend (%)	14.6%



INJURIES	
Year	Value
2003	575
2004	600
2005	600
3-Year Trend (%)	4.3%



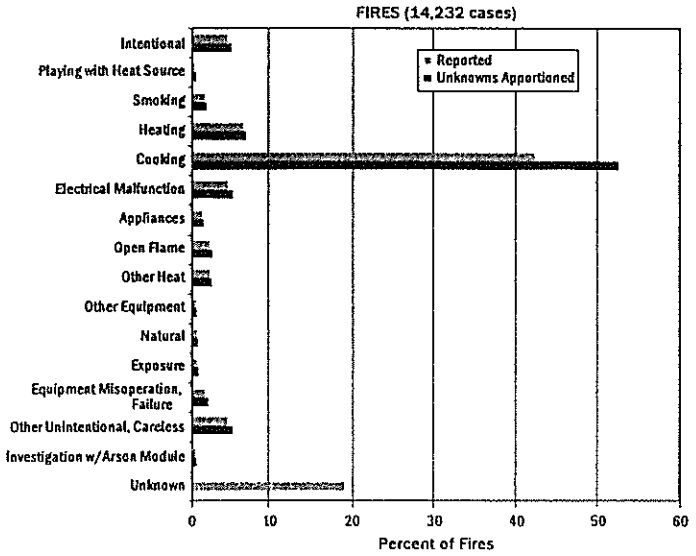
DOLLAR LOSS ($M)* *ADJUSTED TO 2005 DOLLARS	
Year	Value
2003	$296.1
2004	$259.5
2005	$310.0
3-Year Trend (%)	4.9%

Sources: 2003-2005 NFIRS 5.0, NFPA, and Consumer Price Index.

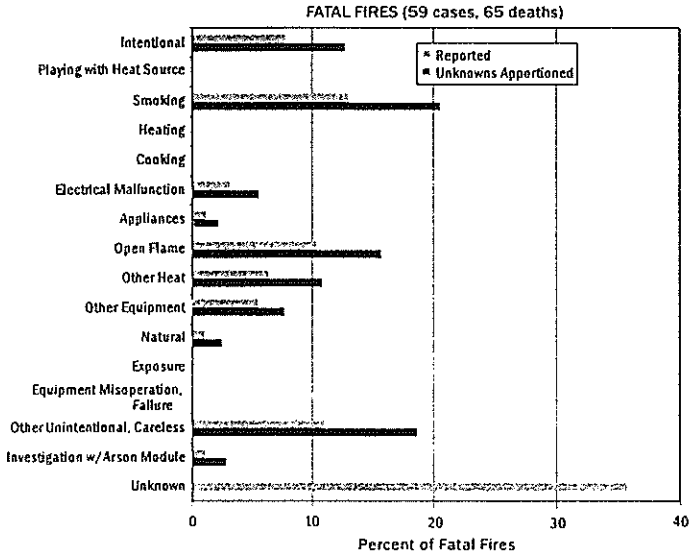
Causes

In 2005, cooking was the leading cause of fires, fires with injuries, and fires with dollar loss in other residential properties (Figure 41). Smoking was the leading cause of fatal fires and the second leading cause of fires with injuries. The cause of fatal fires was not reported in more than one-third of the cases. Because of the small numbers of reported fatal fires and fires with injuries, the cause distributions shown may not reflect the true cause distribution. In addition, conclusions drawn from these distributions may not be reliable. A multiyear aggregation of these fatal fires and fires with injuries, to increase the sample size, would be recommended in this case.

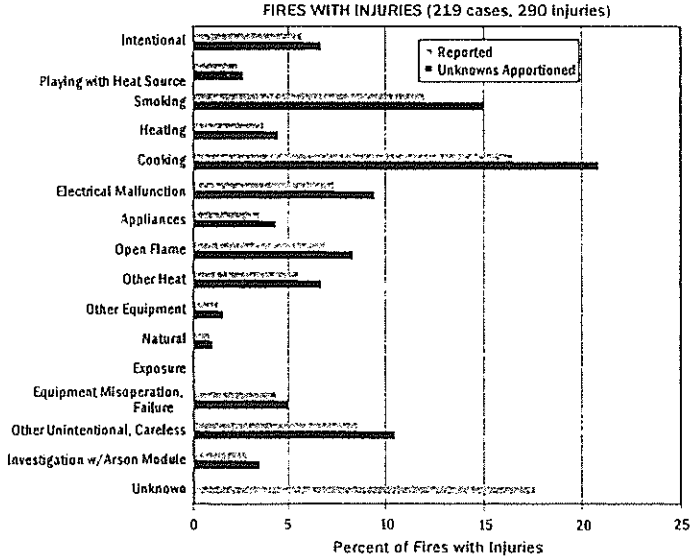
Figure 41. Fire Cause for Other Residential Building Fires and Fires with Losses (2005).



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	4.3	5.3
Playing with Heat Source	0.3	0.4
Smoking	2.2	2.8
Heating	7.0	8.7
Cooking	42.4	52.2
Electrical Malfunction	4.7	5.8
Appliances	1.7	2.1
Open Flame	3.5	4.3
Other Heat	3.4	4.2
Other Equipment	1.2	1.4
Natural	1.2	1.5
Exposure	1.3	1.6
Equipment Misoperation, Failure	2.6	3.2
Other Unintentional, Careless	4.7	5.8
Investigation w/Arson Module	0.7	0.8
Unknown	18.8	

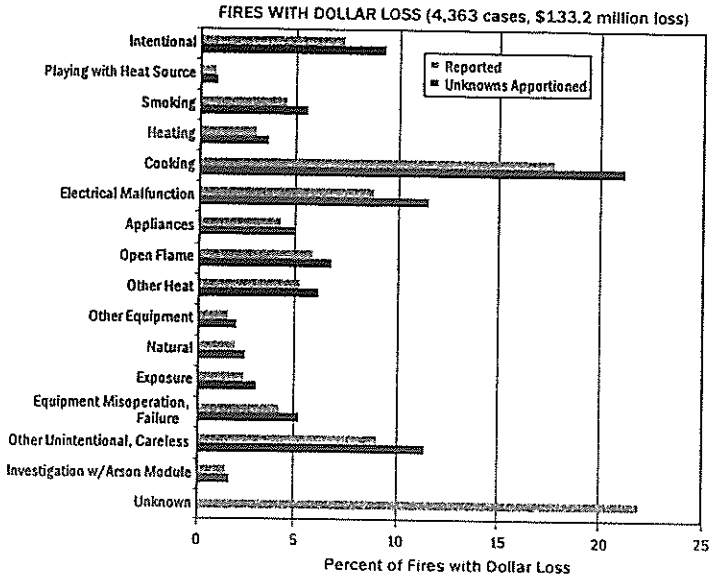


Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	8.5	13.2
Playing with Heat Source	0.0	0.0
Smoking	13.6	21.1
Heating	0.0	0.0
Cooking	0.0	0.0
Electrical Malfunction	3.4	5.3
Appliances	1.7	2.6
Open Flame	10.2	15.8
Other Heat	6.8	10.5
Other Equipment	5.1	7.9
Natural	1.7	2.6
Exposure	0.0	0.0
Equipment Misoperation, Failure	0.0	0.0
Other Unintentional, Careless	11.9	18.4
Investigation w/Arson Module	1.7	2.6
Unknown	35.6	



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	5.9	7.2
Playing with Heat Source	2.3	2.8
Smoking	12.3	15.0
Heating	3.7	4.4
Cooking	16.9	20.6
Electrical Malfunction	7.8	9.4
Appliances	3.2	3.9
Open Flame	6.8	8.3
Other Heat	5.5	6.7
Other Equipment	1.4	1.7
Natural	0.9	1.1
Exposure	0.0	0.0
Equipment Misoperation, Failure	4.1	5.0
Other Unintentional, Careless	8.7	10.6
Investigation w/Arson Module	2.7	3.3
Unknown	17.8	

Figure 41 (cont'd)



Cause	Reported (Percent)	Unknowns Apportioned (Percent)
Intentional	7.2	9.2
Playing with Heat Source	0.6	0.8
Smoking	4.6	5.9
Heating	3.0	3.8
Cooking	17.1	22.0
Electrical Malfunction	9.2	11.8
Appliances	3.9	5.0
Open Flame	6.0	7.7
Other Heat	5.3	6.8
Other Equipment	1.6	2.1
Natural	2.0	2.6
Exposure	2.9	3.7
Equipment Misoperation, Failure	4.4	5.6
Other Unintentional, Careless	8.7	11.2
Investigation w/Arson Module	1.4	1.7
Unknown	22.4	

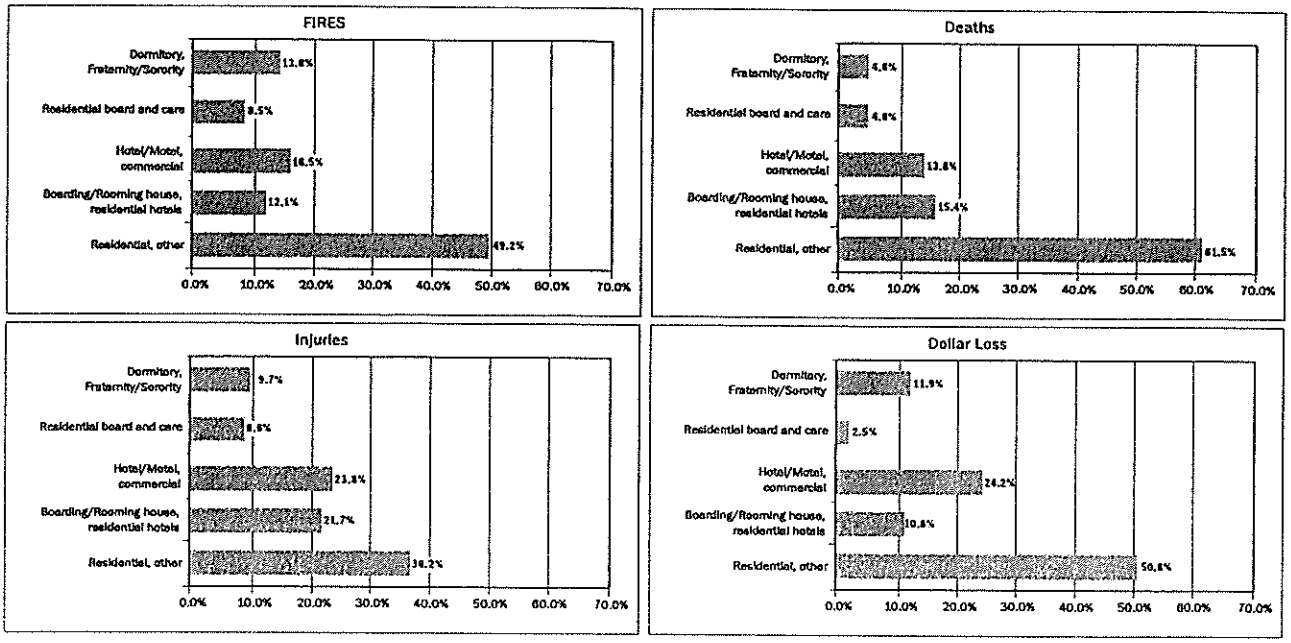
Source: 2005 NFIRS 5.0.

Types of Other Residential Buildings

Figure 42 shows that, in 2005, hotels and motels accounted for more fires, injuries, and dollar loss than other residential properties in this category, and was second to boarding/rooming houses for most deaths.[16]

[16] The "other" category tends to be a catchall category for any residential property that does not fit neatly into the main residential categories.

Figure 42. Types of Other Residential Building Fires and Fire Losses by Property Type (2005).



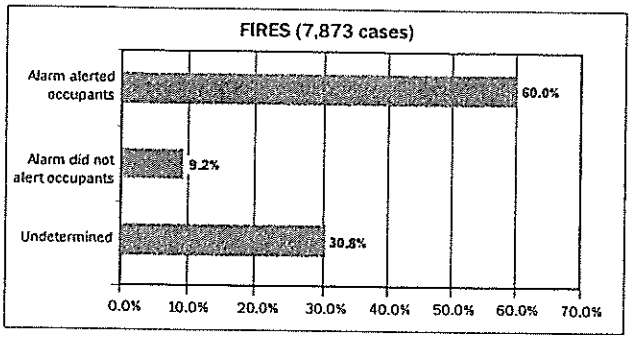
Source: 2005 NFIRS 5.0.

Smoke Alarm Performance

Smoke Alarm Effectiveness in Confined Fires. Smoke alarms were present and alerted occupants in 60 percent of confined other residential building fires; occupants were not alerted by a smoke alarm in only 9 percent of confined other residential building fires. The alert status was undetermined in 31 percent of confined other residential building fires (Figure 43). While this category is a catch-all, those included tend to be buildings such as dormitories that, like some of the multifamily properties, have strict fire codes.

There appears to be a pattern of an increasing proportion of alarms present and alerting occupants in these small, low-loss fires across the three major property types: from 31 percent in one- and two-family buildings to 44 percent in multifamily buildings to 60 percent in other residential buildings.

Figure 43. Smoke Alarm Alert Status in Confined Other Residential Building Fires (2005).



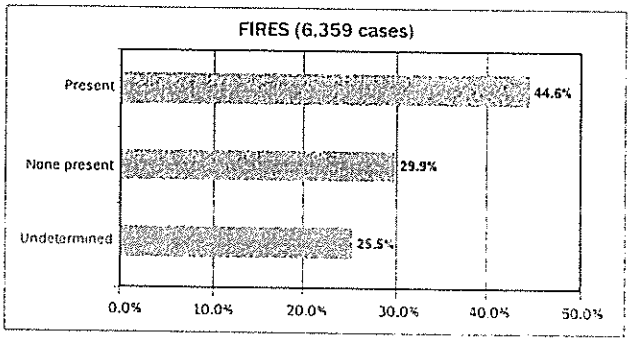
Source: 2005 NFIRS 5.0.

Notes: 1) The category "Alarm did not alert occupants" does not indicate the presence of a smoke alarm. It only indicates that the occupants were not alerted by an alarm, for whatever reason.

2) Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Smoke Alarm Effectiveness in Nonconfined Fires. Smoke alarms must be present and must operate to determine effectiveness. Smoke alarms were present in 45 percent of nonconfined other residential building fires (Figure 44), and alarms were not present in 30 percent of these fires. The presence or absence of alarms was undetermined in 25 percent of nonconfined other residential building fires.

Figure 44. Presence of Smoke Alarms in Nonconfined Other Residential Building Fires (2005).

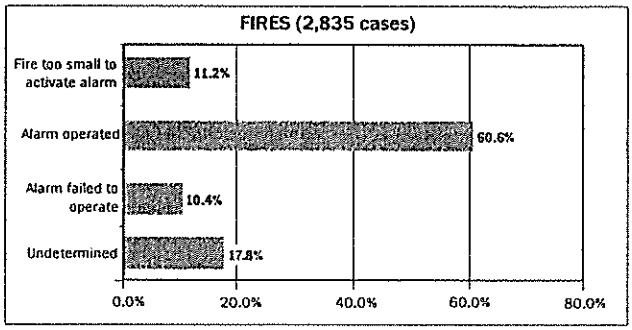


Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

When smoke alarms were present in nonconfined other residential building fires, alarms operated in 61 percent of incidents. Smoke alarms failed to operate in 10 percent of fires, the fire was too small to activate the system in another 11 percent of fires, and no information on smoke alarm operation was available in 18 percent of fires (Figure 45).[17]

Figure 45. Smoke Alarm Operation When Alarm was Present in Nonconfined Other Residential Building Fires (2005).



Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

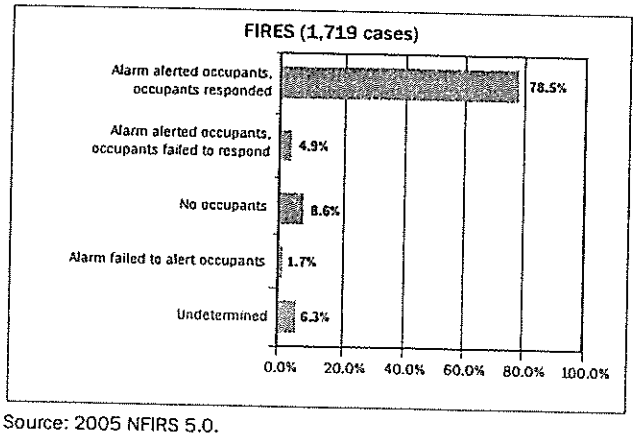
The effectiveness of working smoke alarms in nonconfined other residential building fires is shown in Figure 46. In 83 percent of the nonconfined other residential building fires where alarms were present and operated, occupants were alerted to the fire by the smoke alarm: 79 percent of occupants were alerted and were able to respond to the warning, and an additional 5 percent were alerted but did not respond to the warning.[18] Occupants were not alerted in 2 percent of nonconfined other residential building fires, and no occupants were in the residence at the time of the fire in 9 percent of these incidents. Alarm alert effectiveness information was not available in only 6 percent of nonconfined other residential building fires.[19]

[17] Looking at the percentage of operational smoke alarms from another perspective, at a minimum, smoke alarms were known to be present and operated in 27 percent of all nonconfined other residential building fires (present 44.6% x operated 60.6% = 27.0%).

[18] Percentages do not add due to rounding.

[19] At a minimum, smoke alarms were effective at alerting occupants in 23 percent of all nonconfined other residential building fires (present 44.6% x operated 60.6% x alerted occupants 83.4% = 22.6%).

Figure 46. Smoke Alarm Effectiveness When Alarm was Operational in Nonconfined Other Residential Building Fires (2005).



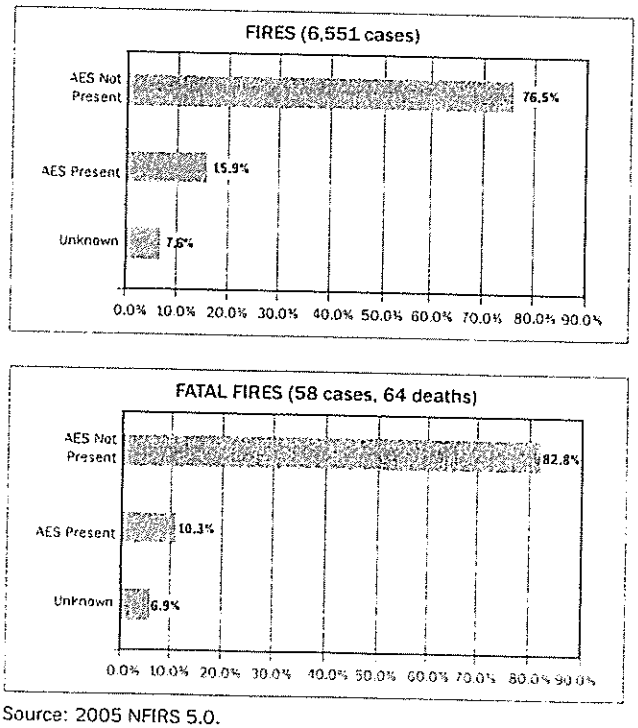
Source: 2005 NFIRS 5.0.

Note: Raw NFIRS 5.0 counts for smoke alarm data are contained in the Appendix.

Presence of Automatic Extinguishing Systems

Figure 47 shows the presence of AESs in other residential buildings in 2005. Sixteen percent of other residential building fire incidents have AESs present.

Figure 47. Presence of Automatic Extinguishing Systems in Other Residential Buildings (2005).



Source: 2005 NFIRS 5.0.

Note: Percentages reflect only those incidents with structure types 1 (enclosed building) or 2 (fixed portable or mobile structures).

APPENDIX

Smoke Alarm Data

RESIDENTIAL BUILDINGS

Nonconfined Fires

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count
Present	Fire too small to activate smoke alarm		6,295
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	20,649
		Smoke alarm alerted occupants, occupants failed to respond	854
		No occupants	3,874
		Smoke alarm failed to alert occupants	733
		Undetermined	2,512
		Null or blank	1
	Smoke alarm failed to operate		7,504
	Undetermined		9,798
None present			34,517
Undetermined			33,572
Null or blank			29
Total incidents			120,338

Source: 2005 NFIRS 5.0.

Confined Fires

Smoke Alarm Effectiveness	Count
Smoke alarm alerted occupants	40,668
Smoke alarm did not alert occupants	18,983
Unknown	46,487
Null or blank	1
Total incidents	106,139

Source: 2005 NFIRS 5.0.

ONE- AND TWO-FAMILY BUILDINGS

Nonconfined Fires

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count
Present	Fire too small to activate smoke alarm		4,510
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	13,680
		Smoke alarm alerted occupants, occupants failed to respond	445
		No occupants	2,876
		Smoke alarm failed to alert occupants	542
		Undetermined	1,822
		Null or blank	1
	Smoke alarm failed to operate		5,379
	Undetermined		6,928
None present			27,234
Undetermined			28,249
Null or blank			22
Total incidents			91,688

Source: 2005 NFIRS 5.0.

Confined Fires

Smoke Alarm Effectiveness	Count
Smoke alarm alerted occupants	17,424
Smoke alarm did not alert occupants	11,874
Unknown	26,922
Null or blank	1
Total incidents	56,221

Source: 2005 NFIRS 5.0.

MULTIFAMILY BUILDINGS

Nonconfined Fires

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count
Present	Fire too small to activate smoke alarm		1,468
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	5,619
		Smoke alarm alerted occupants, occupants failed to respond	325
		No occupants	851
		Smoke alarm failed to alert occupants	162
		Undetermined	581
	Smoke alarm failed to operate		1,831
	Undetermined		2,365
None present			5,380
Undetermined			3,706
Null or blank			3
Total incidents			22,291

Source: 2005 NFIRS 5.0.

Confined Fires

Smoke Alarm Effectiveness	Count
Smoke alarm alerted occupants	18,522
Smoke alarm did not alert occupants	6,382
Unknown	17,141
Total incidents	42,045

Source: 2005 NFIRS 5.0.

OTHER RESIDENTIAL BUILDINGS

Nonconfined Fires

Presence of Smoke Alarms	Smoke Alarm Operational Status	Smoke Alarm Effectiveness	Count
Present	Fire too small to activate smoke alarm		317
	Smoke alarm operated	Smoke alarm alerted occupants, occupants responded	1,350
		Smoke alarm alerted occupants, occupants failed to respond	84
		No occupants	147
		Smoke alarm failed to alert occupants	29
		Undetermined	109
	Smoke alarm failed to operate		294
	Undetermined		505
None present			1,903
Undetermined			1,617
Null or blank			4
Total incidents			6,359

Source: 2005 NFIRS 5.0.

Confined Fires

Smoke Alarm Effectiveness	Count
Smoke alarm alerted occupants	4,722
Smoke alarm did not alert occupants	727
Unknown	2,424
Total incidents	7,873

Source: 2005 NFIRS 5.0.

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: THOMAS PAPA

Address: 4 SWEET BRIAR PATH - LAKE GROVE, NY

I represent: NEW YORK FIRE ALARM ASSOCIATION

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: Susan Santanello

Address: 1413 Hayes Drive Yorktown NY

I represent: Lifishes.com

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Chief Thomas Jensen

Address: FDNY

I represent: 9 Metrotech Ctr

Address: Bklyn NY 11201

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Chief Richard Tobin

Address: FDNY

I represent: 9 Metrotech Ctr.

Address: Bklyn NY 11201

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THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: Julian Byzel

Address: FDNY

I represent: 9 Metrotech Ctr

Address: Bklyn NY 11201

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

FAVOR

I intend to appear and speak on Int. No. _____ Res. No. _____

☑ in favor ☐ in opposition

Date: _____

(PLEASE PRINT)

Name: JOHN C. DEAN

Address: MAINE

I represent: NATIONAL ASSOCIATION OF STATE FIRE MARSHALS

Address: D.C.

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☐ in opposition

Date: Feb 10, 2009.

(PLEASE PRINT)

Name: EDWARD Kescheck

Address: 33 Beach Avenue S.I.

I represent: NY Fire Alarm Association

Address: _____

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THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☐ in favor ☒ in opposition

Date: _____

(PLEASE PRINT)

Name: XUE JIE WONG

Address: 158 LAFAYETTE ST. #2nd Fl., NY, NY 10013

I represent: Product Safety Associates International

Address: _____

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. _____ Res. No. _____

☒ in favor ☐ in opposition

Date: 2/10/09

(PLEASE PRINT)

Name: ZYGMUNT STASZEWSKI

Address: _____

I represent: NEW YORK FIRE ALARM ASSOC.

Address: BROOKLYN N.Y.

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 884-A Res. No. _____

☒ in favor ☐ in opposition

Date: 2/10/09

(PLEASE PRINT)

Name: Bill Webb

Address: 900 Second St NE WDC 20002

I represent: Congressional Fire Services Inst

Address: _____

Please complete this card and return to the Sergeant-at-Arms

THE COUNCIL
THE CITY OF NEW YORK

Appearance Card

I intend to appear and speak on Int. No. 884-A Res. No. _____

☒ in favor ☐ in opposition

Date: 2/10/09

(PLEASE PRINT)

Name: David H Baker

Address: Washington DC

I represent: Lighter Association Inc

Address: Washington D.C.

Please complete this card and return to the Sergeant-at-Arms