



# Unwanted Fire Alarms

Marty Ahrens

# The problem

---

- More common than reported fires
- Alarm fatigue/complacency
  - Disconnections
- Includes both monitored systems and single-station alarms
  - Monitored alarms a bigger problem for the fire service

# Keep in mind

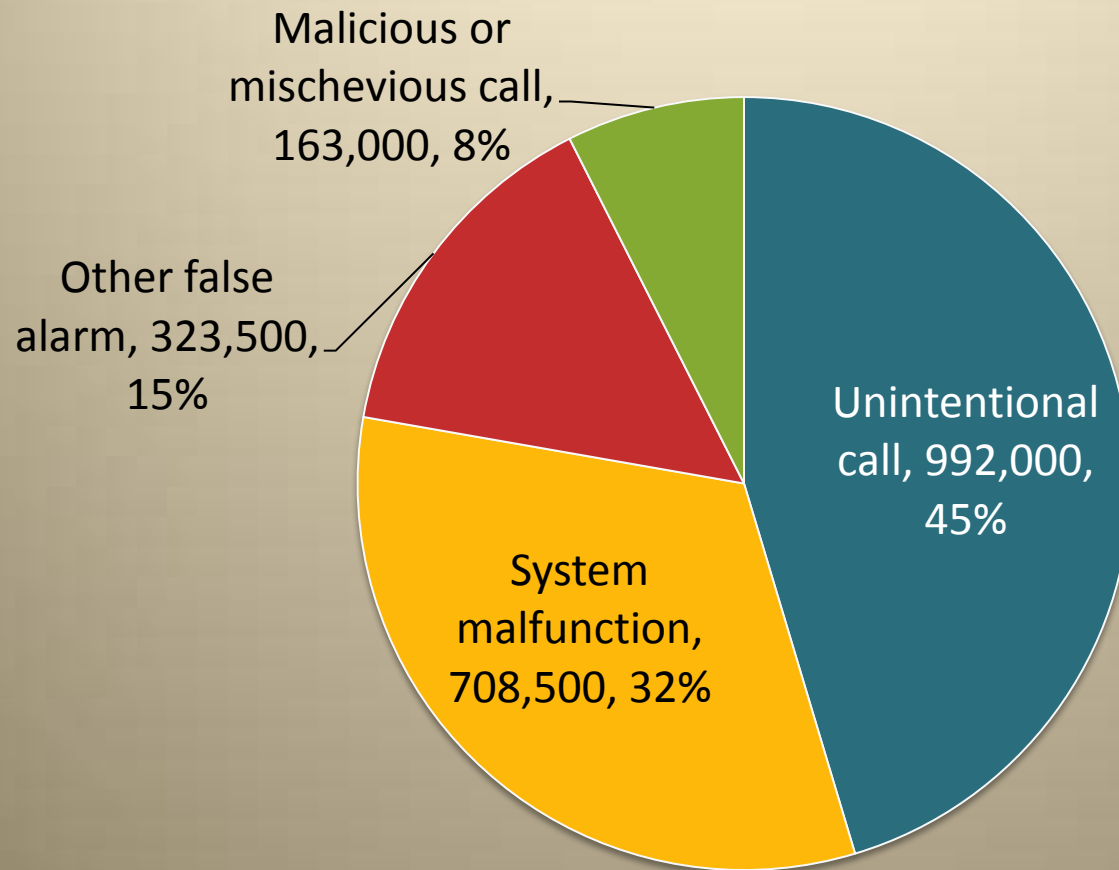
- Different studies use different terminology
- NFIRS-based statistics use NFIRS definitions, not NFPA's
  - NFIRS talks about false alarms and false calls
  - NFPA survey uses NFIRS definition
- Not all unwanted alarms are false alarms

# Overview

---

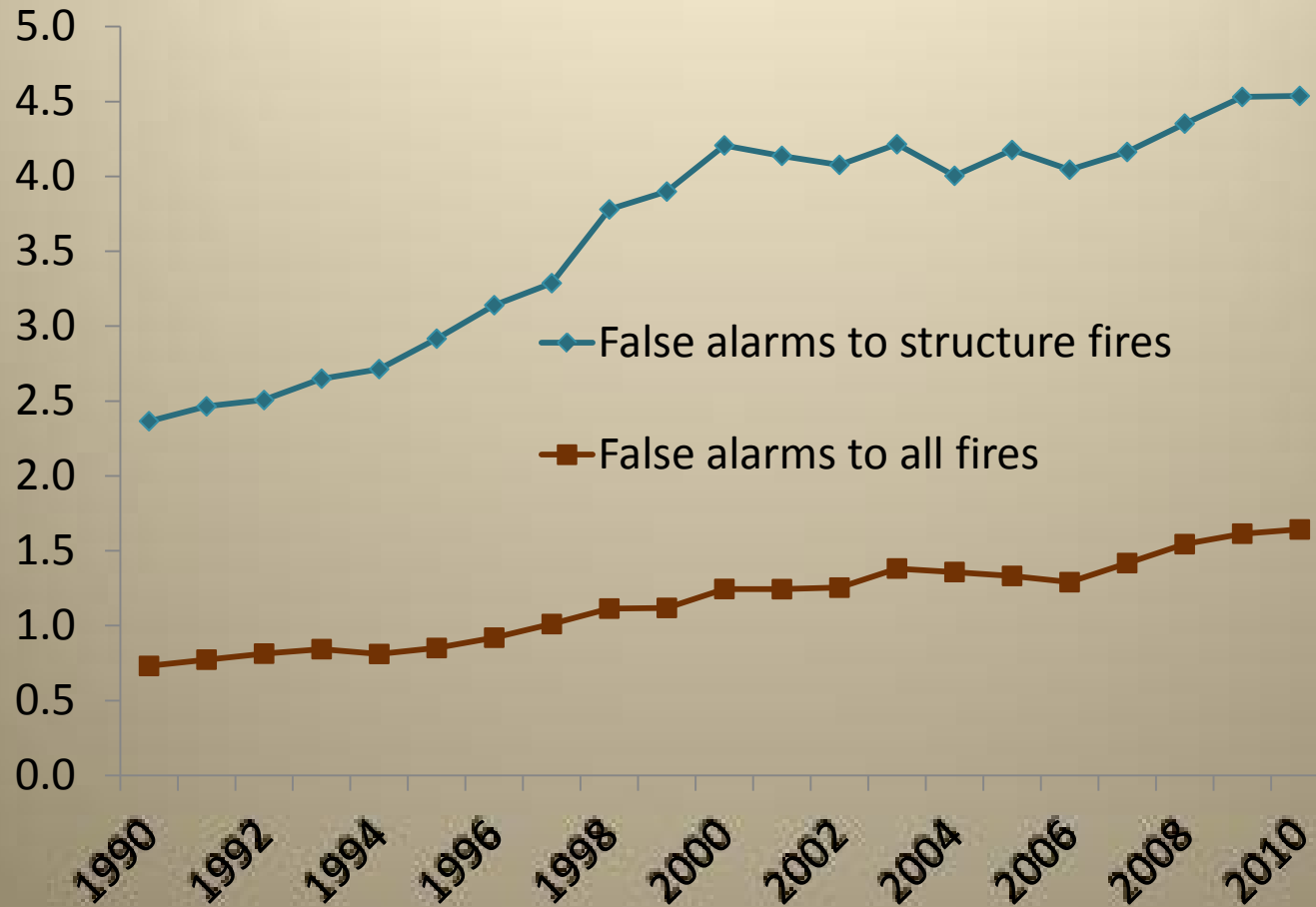
- National data about fire department responses to false alarms
- Which activations are problems for whom?
  - Definitions
- Causes of false alarms
- Possible approaches
- NFPA projects
- Conclusions and questions

# In 2010, 482,000 reported structure fires, but 2,187,000 false alarms

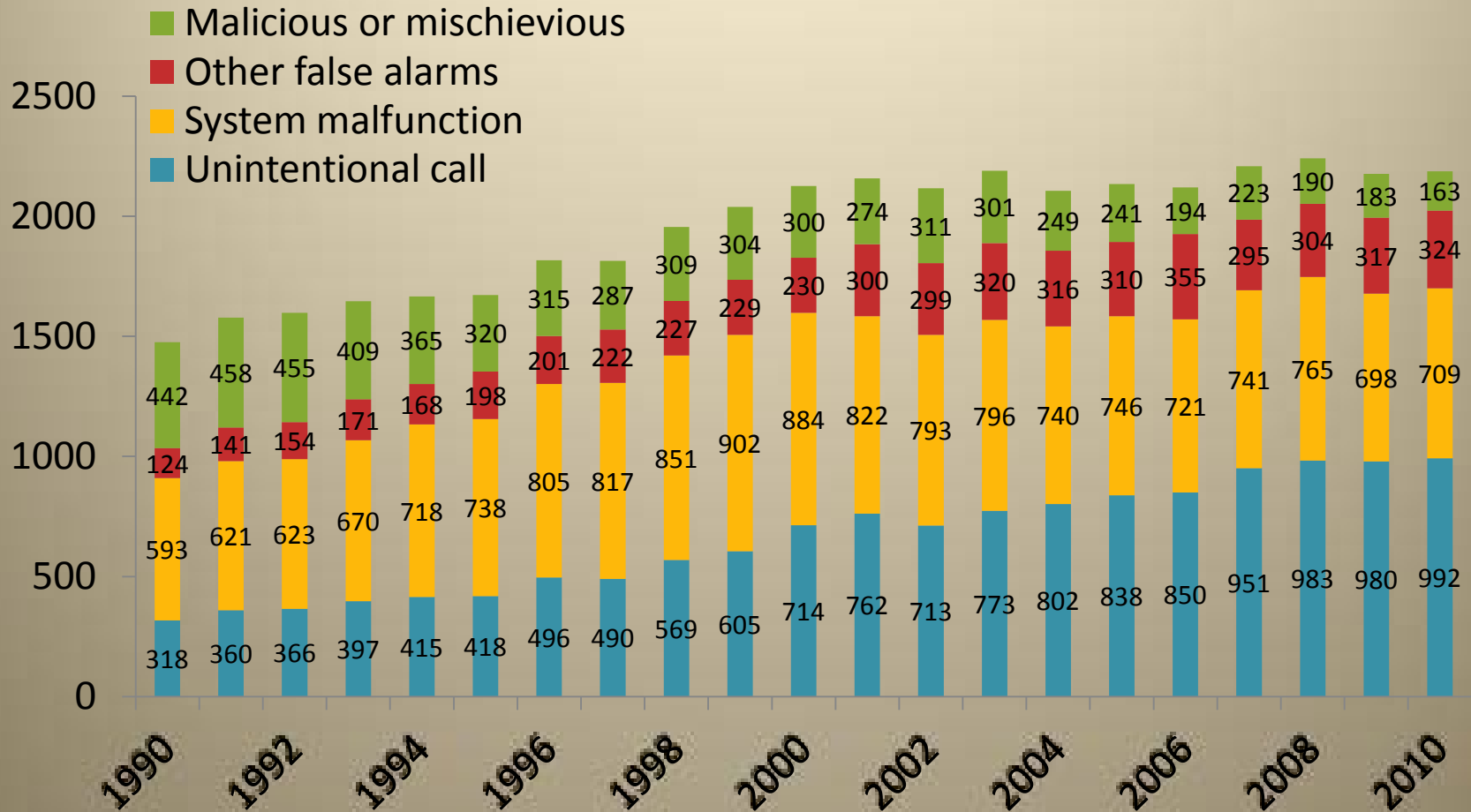


Source: Michael J. Karter, Jr., *Fire Loss in the United States During 2010*

# Ratio of Reported False Alarms to Structure Fires and All Fires

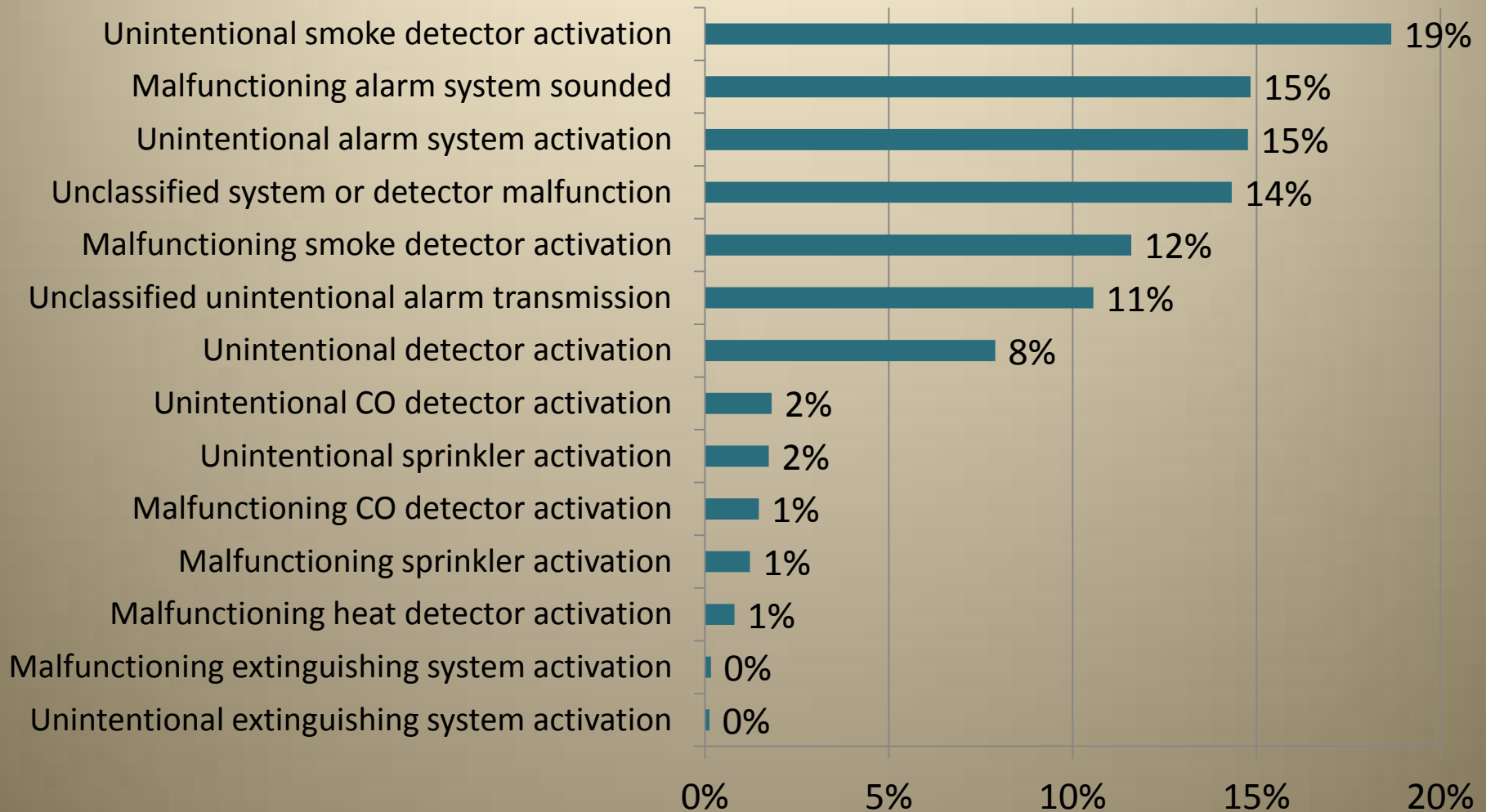


# Fire Department False Alarm Call Trends



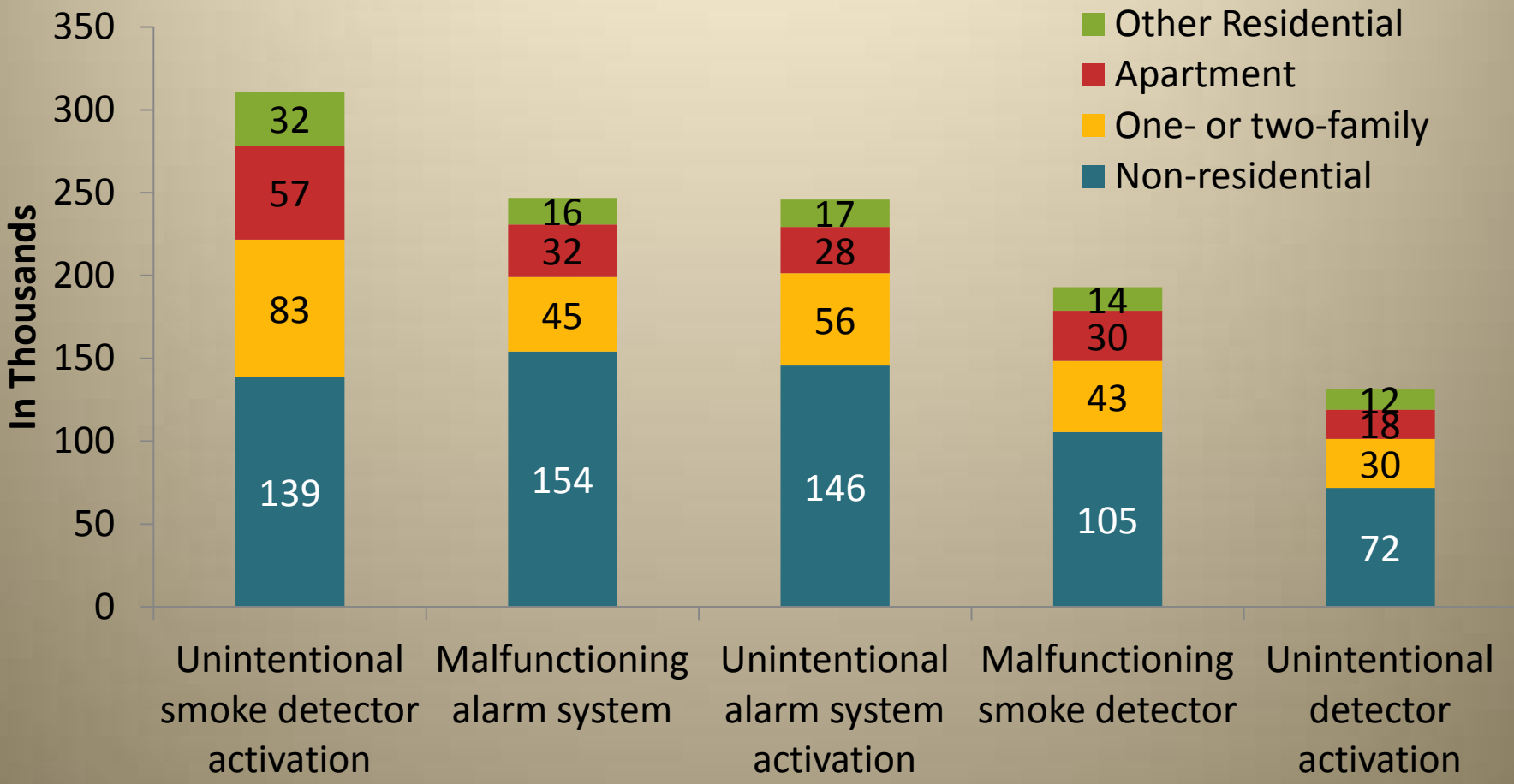
Source: Karter, 2011

# 2003 Fire Department Responses to False Alarms from Malfunctioning or Unintentional Activation of Fire Protection Equipment



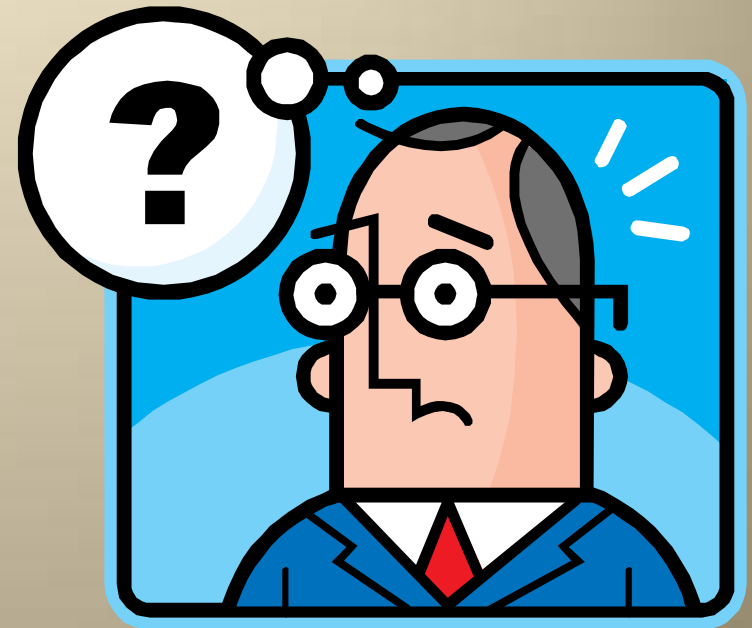


# Fire Department Responses in 2003 to False Alarms by Property Use for Selected Incident Types



# What is an unwanted alarm?

- Depends on who you ask



# What is an unwanted alarm?

- Building occupants
  - Disruption for no good reason
  - More disruption than necessary
- Fire service and automatic alarms
  - No indication of emergency
  - No need for assistance
  - May include very small fires out on arrival

# Proposed definitions for NFPA 72, 2013 edition (3.3.307)

- Unwanted alarm
  - Any alarm that occurs that is not the result of a potentially hazardous condition
- Malicious alarm...
- Nuisance alarm
  - An unwanted activation of a signaling system or an alarm initiating device in response to a stimulus or condition that is not the result of a potentially hazardous condition

# More proposed 72 definitions

---

- Unintentional alarm
  - An unwanted activation of an alarm initiating device caused by a person acting without malice
- Unknown alarm
  - An unwanted activation of an alarm initiating device or system output where the cause has not been identified

# Activation continuum

Alarm  
malfunction

*No hazard*

Nuisance  
activation  
Normal  
activities

*No hazard*

Pre-fire  
condition  
Useful alert

Maybe  
investigation  
only

Earliest fire  
stage  
Useful alert

Maybe  
investigation  
or defensive  
only

Dangerous  
fire

Full  
immediate  
response  
required

CPSC's Greene and Andres -- Fire departments went to only 3.4% of home fires in 2004-2005

# How much evacuation or response?

- NFPA Life Safety Code<sup>®</sup>: Inside private areas of residential occupancies
  - Alarm shall sound only within individual dwelling unit, suite, or rooms...
  - Shall not actuate the building fire alarm system
  - Unless permitted by AHJ
- Location of common area detectors?

# Fire department response policies

---

- AHJ permitting, NFPA 72 allows verification of household fire alarm systems before fire department notification
  - Reporting delay must be less than 90 seconds
- Should provision be expanded for non-residential occupancies?



# Question

- What alarms *should* be transmitted to the fire department?
  - Tualatin Valley Fire and Rescue Fire Alarm Verification FAQ
    - More than 10,000 automatic commercial fire alarms in 2003-2007
    - Only 2 working fires
    - Now requires verification before sending more than 1 person
  - Las Vegas now requires verification or confirmation before responding to most properties

# Decision Factors for residential verification

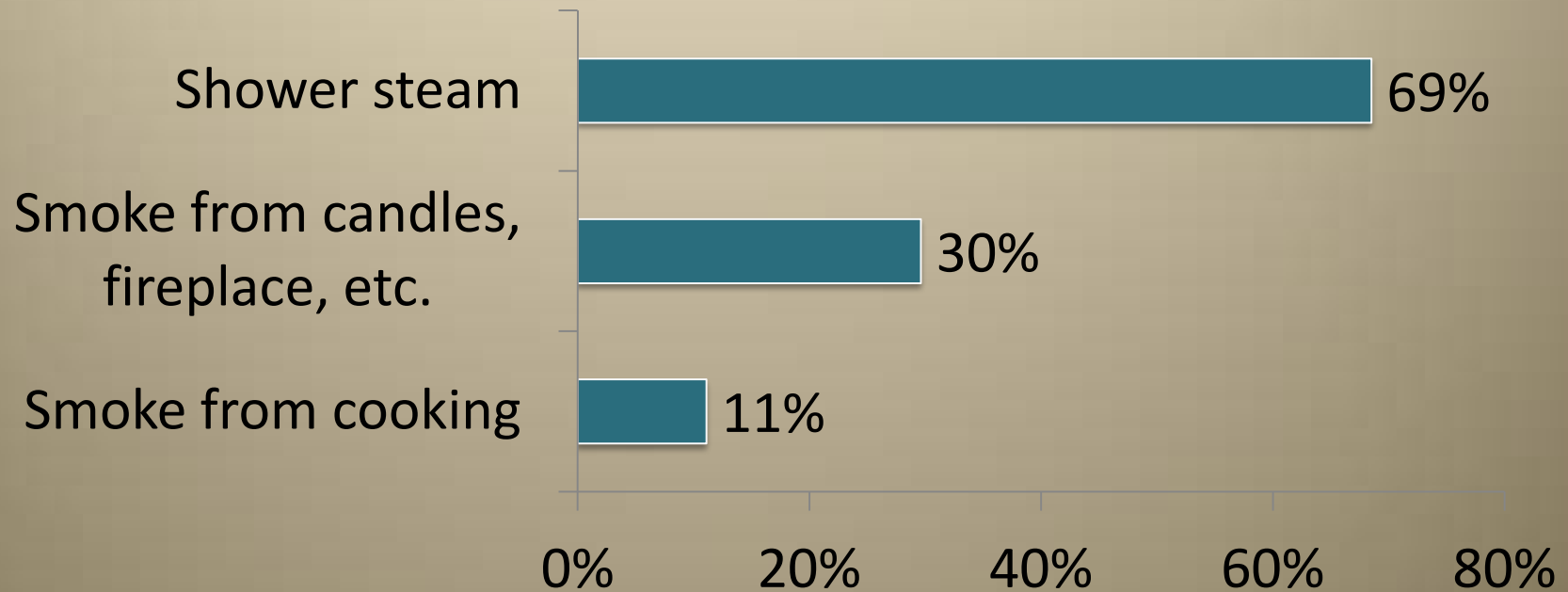
- Peter Finley's 2001 EFO paper, *Residential Fire Alarm Systems: the Verification and Response Dilemma*
- [www.usfa.dhs.gov/pdf/efop/tr\\_02pf.pdf](http://www.usfa.dhs.gov/pdf/efop/tr_02pf.pdf)
- Surveyed
  - Departments in communities of 47,000 to 67,000
  - Households that had fire department responses

# Finley: Fire department policies on residential alarms

- 78% did not permit verification
- 62% : Threat of liability from civilian decision making
  - 38%: Response mode for every alarm a greater risk
- 93%: Property protection an important function of alarm systems
- 88% would modify response if informed alarm was false

# Is it a false alarm?

- Unwanted vs. false
- Of 54 surveyed fire departments, percent saying specific residential activation was false

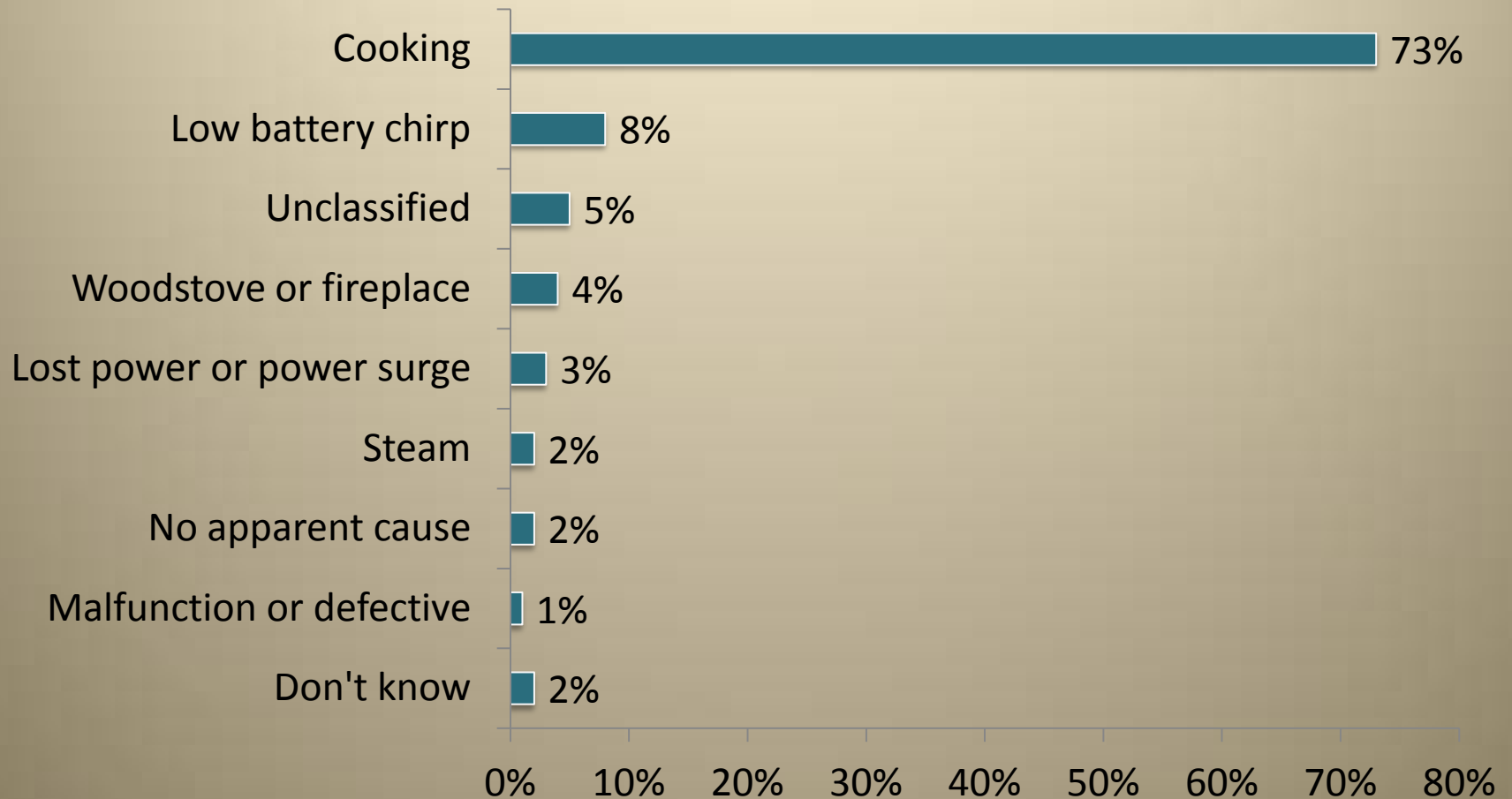


# 2010 Harris Poll findings

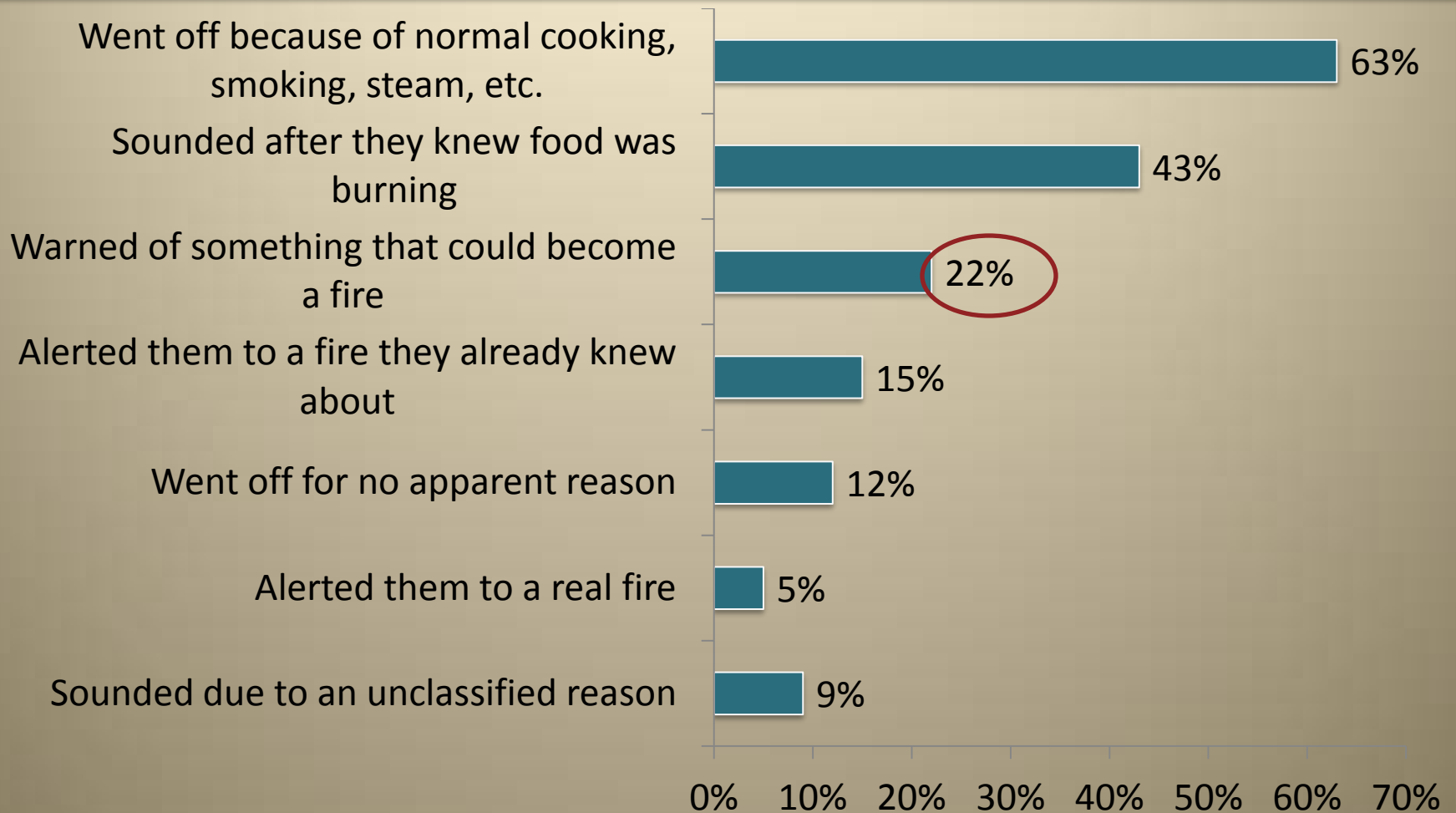
---

- 96% of US households had at least 1 smoke alarm
  - Half had one in kitchen
  - 43% had at least one activation in past year

# Reasons Given for Home Smoke Alarm Activations in Past Year



# Last time a home smoke alarm sounded, it...



Source: Harris Poll for NFPA 2010

# False alarm causes in different studies

Results Minneapolis (in Reece, 2007)	Brookfield Properties-Kitteringham	VAMCs Dubivsky & Bukowski 1989	Residential, (Finley fire dept. survey, 2001)
Maintenance, construction, and dust	User error	Smoking	Cooking, burnt food
Proper response to stimuli	Work done w/out notification	Unknown	Shower steam
Malfunction	System malfunction	Dust	Fireplace, candles, etc.
No reason found	Damage to system	High air velocity	Other accidental
Malicious – pull station		Humidity	System malfunction
Heat detector- no heat		Construction work	
		Housekeeping	
		Cooking & baking	



# 3 High-rise commercial buildings in Calgary

- Total of 244 fire alarms in 2002-2006
  - 21% legitimate, 79% false
  - Fines proposed after 3 or more false alarms
- Building management
  - Expanded training on fire alarm system for building staff
  - Security, building engineers, and contractors met daily when system worked on
    - Fines passed on to contractors or tenants who caused them
  - Training sheets on panels, taking one point off, etc.
  - Internal reporting process on alarm frequency, cause & fix
- Alarms fell from 60 in 2003 to 30 in 2006

# Some possible approaches to address false alarms

Aspect	Work on	Follow-up
Plan design	Designer qualifications	
Plan reviewer	Reviewer qualifications	
System installation	Installer qualifications	
System testing & maintenance	Technicians qualifications, post-activation response	
Inspection	Inspector qualification	Communication w/FD , alarm company, and owner
Investigation	Investigator training	Record keeping, communication
Educate property owners	Materials and approach	Record keeping
Fines after X alarms	Statute, violation?	Tracking, incentive if fixed?
Educate contractors re hot work and alarms	Materials and approach- Can they be fined?	Tracking

# NFPA efforts

---

- Fire Protection Research Foundation
  - Create a fire department tool for risk-based decision-making of managing unwanted alarms
- NFPA staff working on a manual for fire departments using existing NFPA 72 provisions to reduce unwanted alarms

# Conclusions

---

- Long-standing problems
- Pre-alerts and alarms of tiny fire are useful to occupants
  - How far should alarm go?
- “Cry wolf” reduces benefit
- Need interdisciplinary cooperation to address
  - Resources?

# Contact information

---

Marty Ahrens

Manager, Fire Analysis Services

NFPA

1 Batterymarch Park

Quincy, MA 02169-7471

(617) 984-7463

[mahrens@nfpa.org](mailto:mahrens@nfpa.org)

