Johns Hopkins Bloomberg School of Public Health

Johns Hopkins Center for Injury Research and Policy

Vision 20/20

Fire is Everyone's Fight™

SMOKE ALARM SUMMIT

HOME SMOKE ALARMS: WHAT DO WE KNOW?

Marty Ahrens
NFPA
Senior Manger, Fire Analysis Services

NFPA

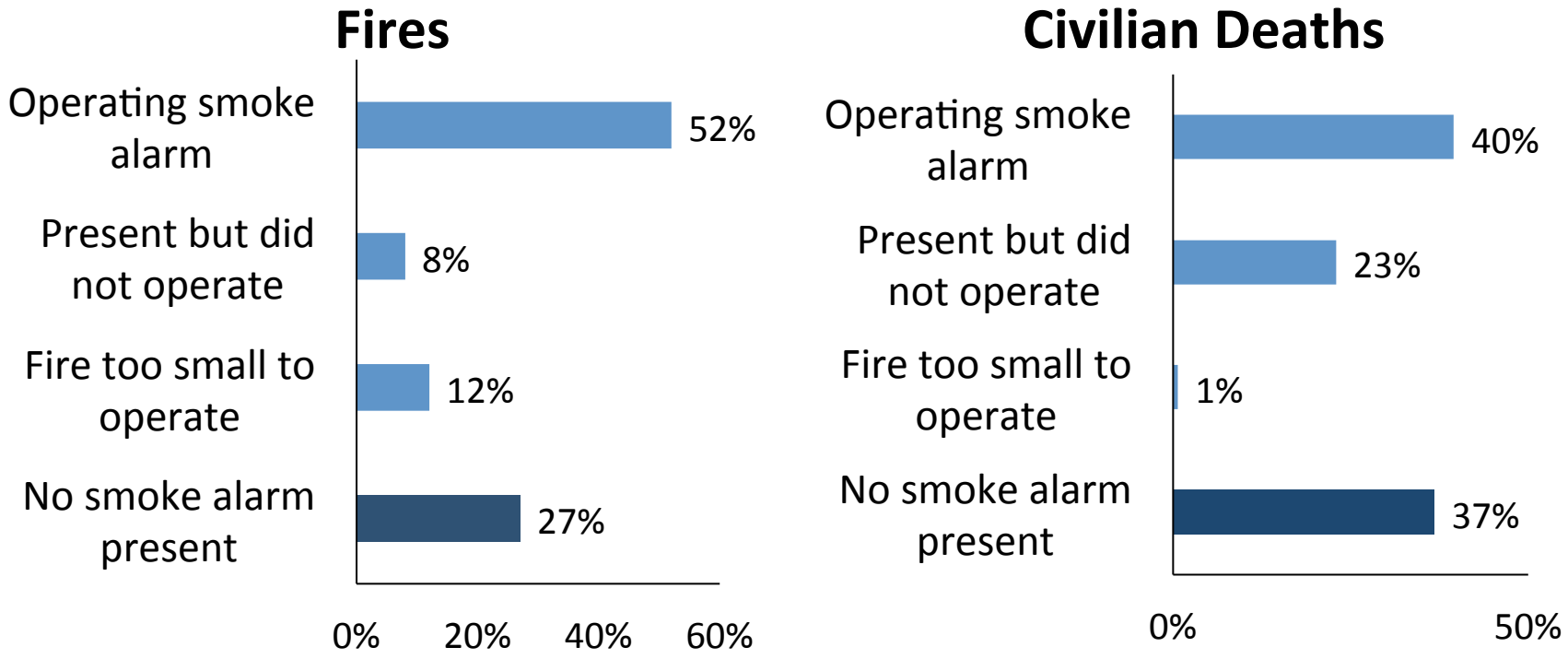
General comments

- Term “smoke alarm” is used to describe all fire detection in homes
- “Homes” include one- or two-family homes and apartments or other multi-family
- Estimates based on reported fires are for 2007-2011
  - Derived from NFIRS and NFPA survey
  - Unknowns were allocated

How common overall?

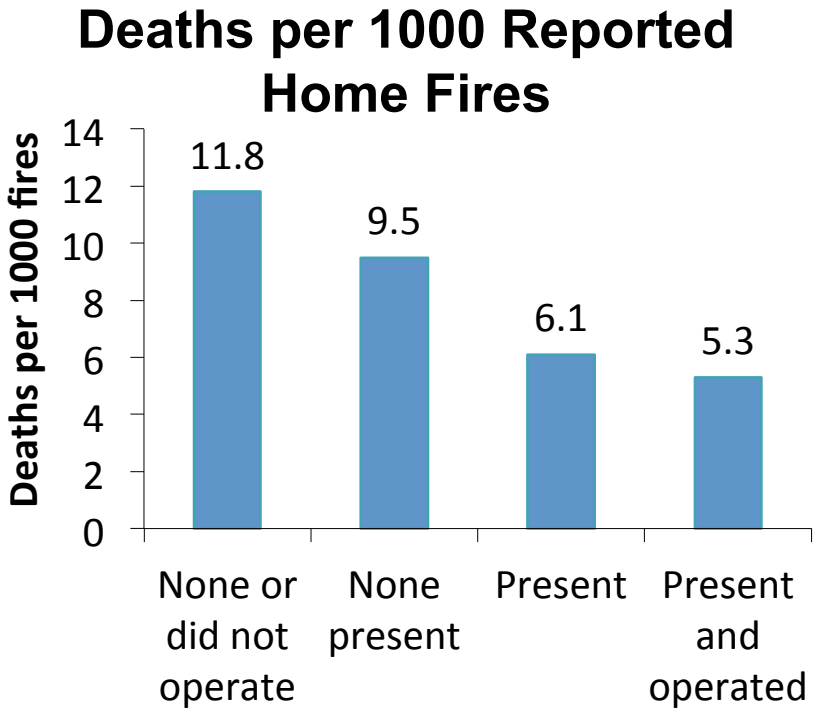
- According to phone surveys, almost all homes have them
- Data issues
  - Very little national data based on home visits and testing

Presence and operation in reported fires



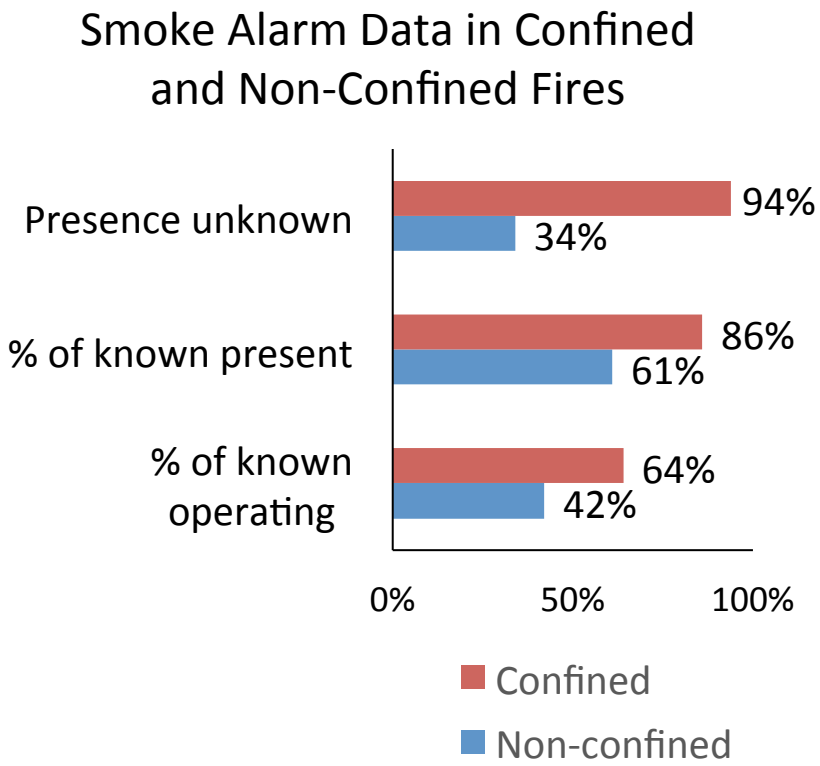
Risk of dying is cut in half in homes with working smoke alarms

- With working alarms, risk is 55% lower compared to no working alarms
- Risk is 36% lower when present compared with not

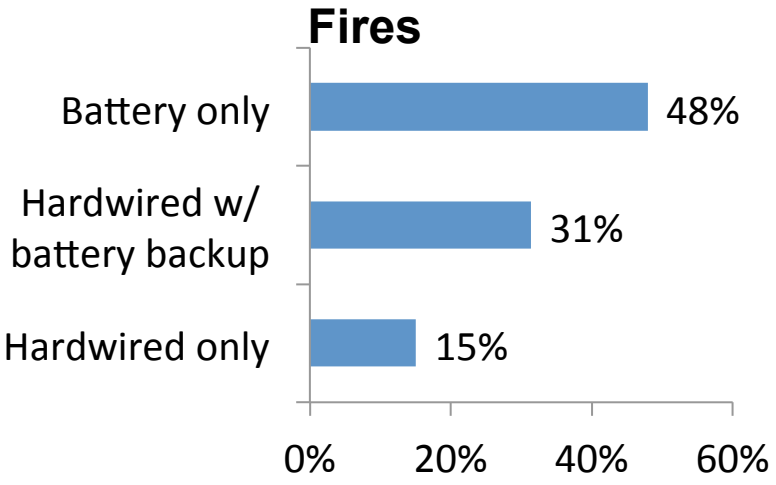


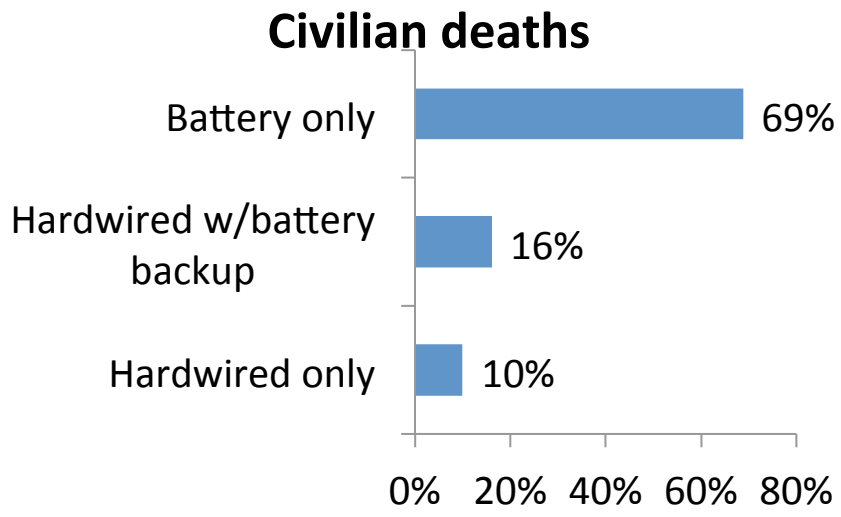
Confined fires in NFIRS

- Confined fire incident types
  - require little information
  - Account for
    - 37% of fires in one-or two-family homes
    - 68% in apartments or multi-family housing

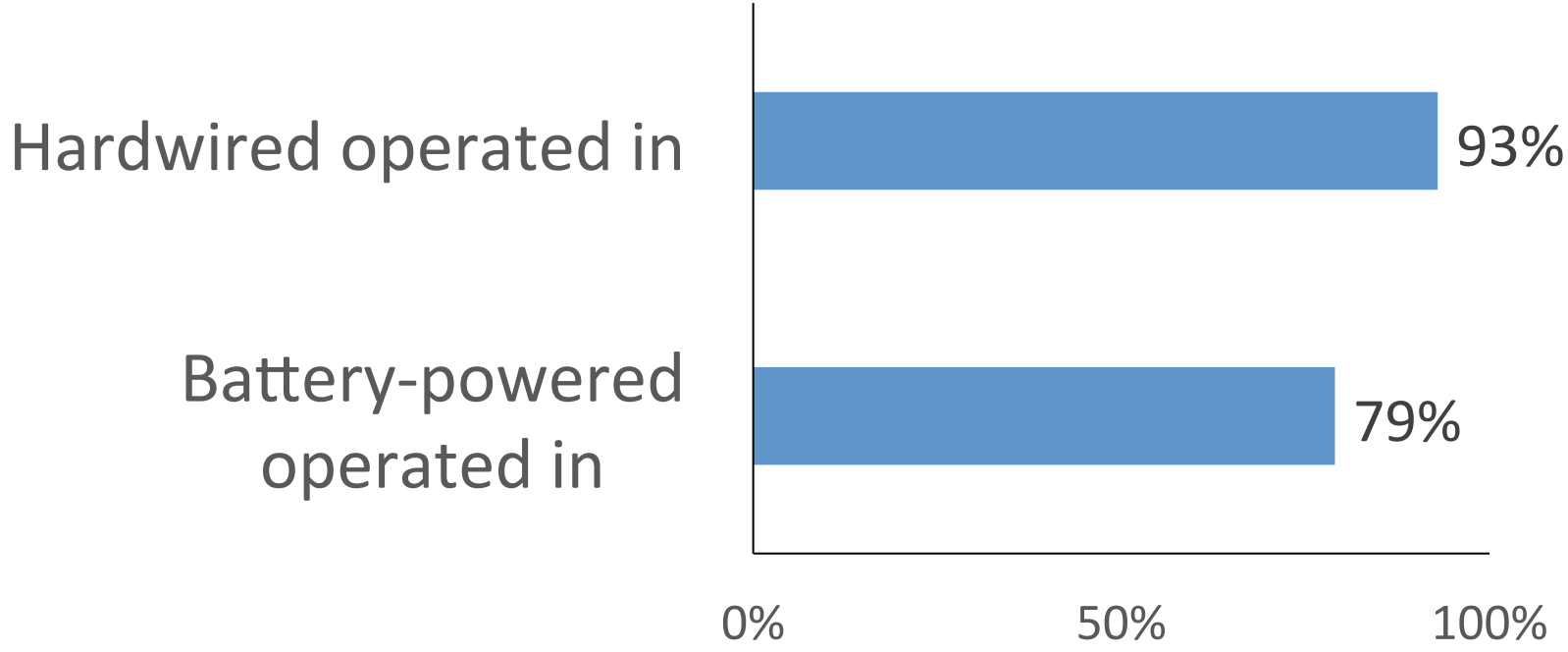


Power sources in reported home fires

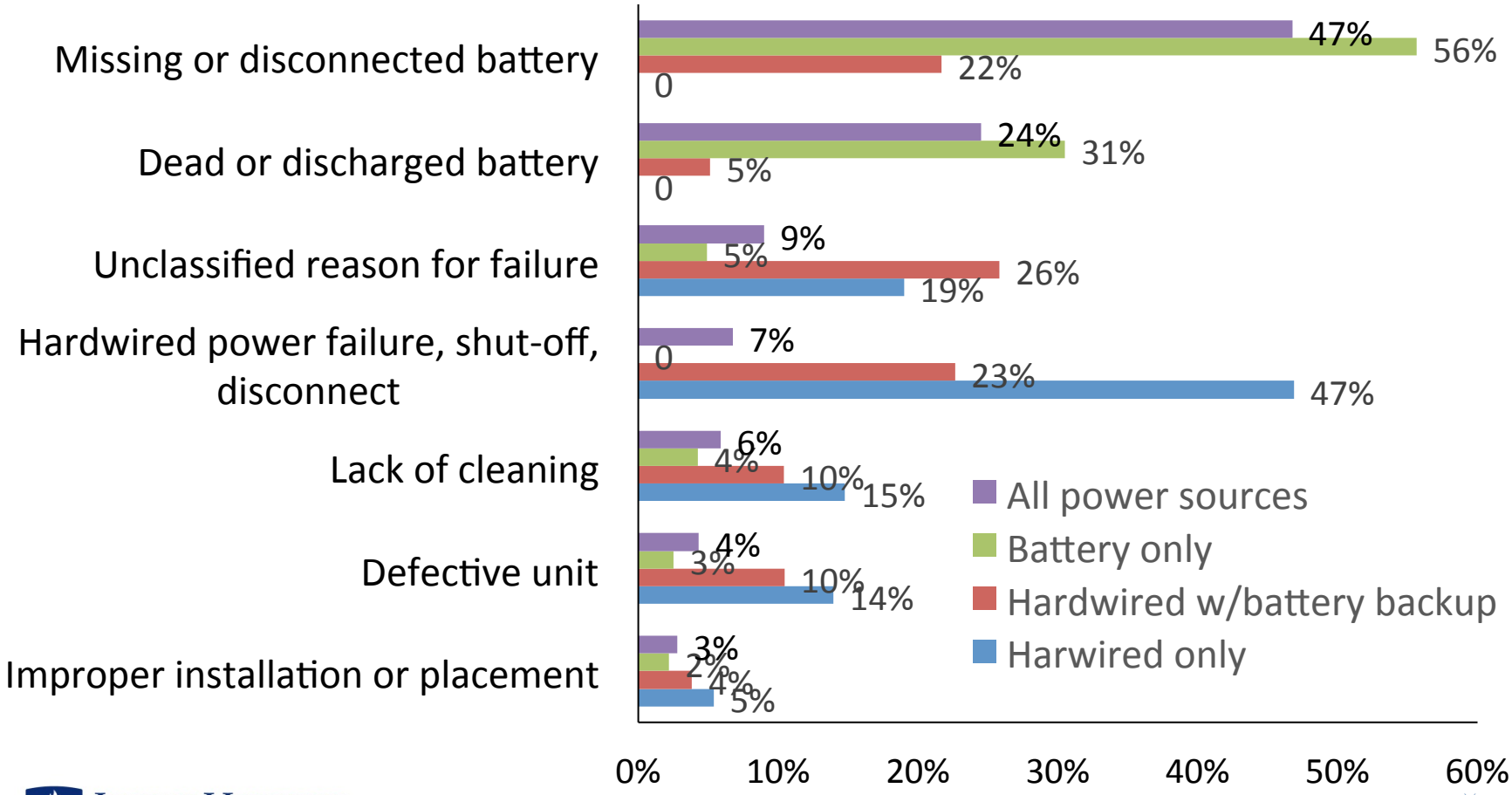




In reported home fires large enough to activate alarm,



Reasons for non-operation



Data issue for alarm failures

- More difficult to tell why hardwired alarms did not operate
  - Originally undetermined for
    - Half of all hardwired
    - One-quarter of battery operated
  - 4-5 times the percent of unclassified reasons for hardwired (19-26%) as battery (5%)

% of Fatal home fire victims with and without working smoke alarms

Who Were…..	Operating alarms	No or no working alarms
In room or area when fatally injured	**62%**	50-52%
In area and involved in ignition	**46%**	32-37%
Sleeping when fatally injured	30%	**37-42%**
Physical disability contributed	**20%**	8-12%
Trying to fight fire themselves	**6%**	2%
Unable to act	**15%**	9-11%
At least 65 years old	**35%**	23%-29%

More on home fire victims

- When physical disability was a factor, more than half (55%) of fatalities had working alarms
- 37% of civilians who were non-fatally injured while fighting the fire had working smoke alarms
  - Compared to 30-31% with no or no working alarms

Data issue re victims

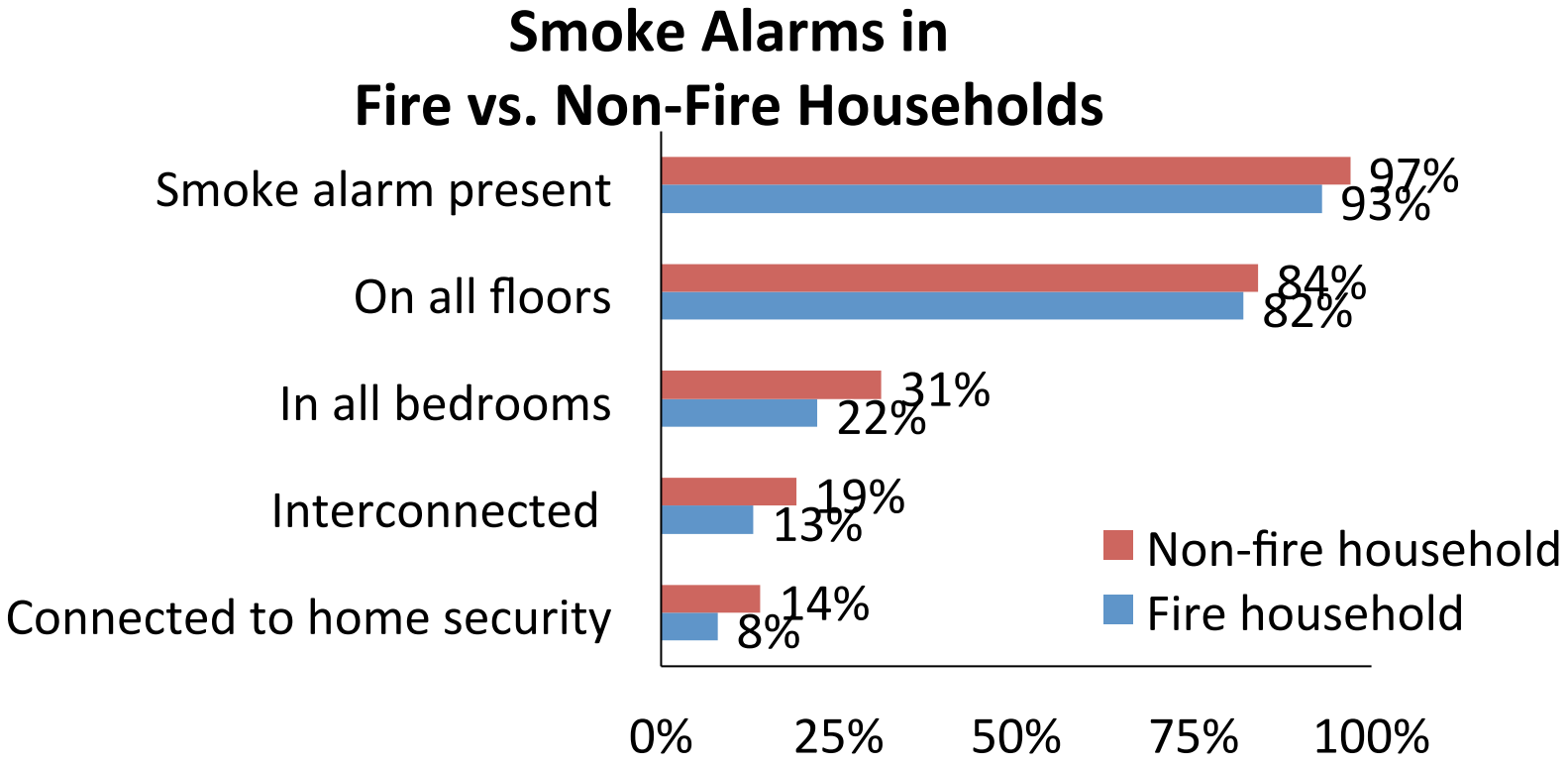
- Do firefighters consider hearing loss a physical disability?
- We can't tell how many victims did not hear an operating smoke alarm

General population and unreported fires

- 97% of home fires were handled without fire department

Data from CPSC's
2004-2005 National Sample Survey of Unreported Residential Fires

From CPSC's Survey of Unreported Residential Fires



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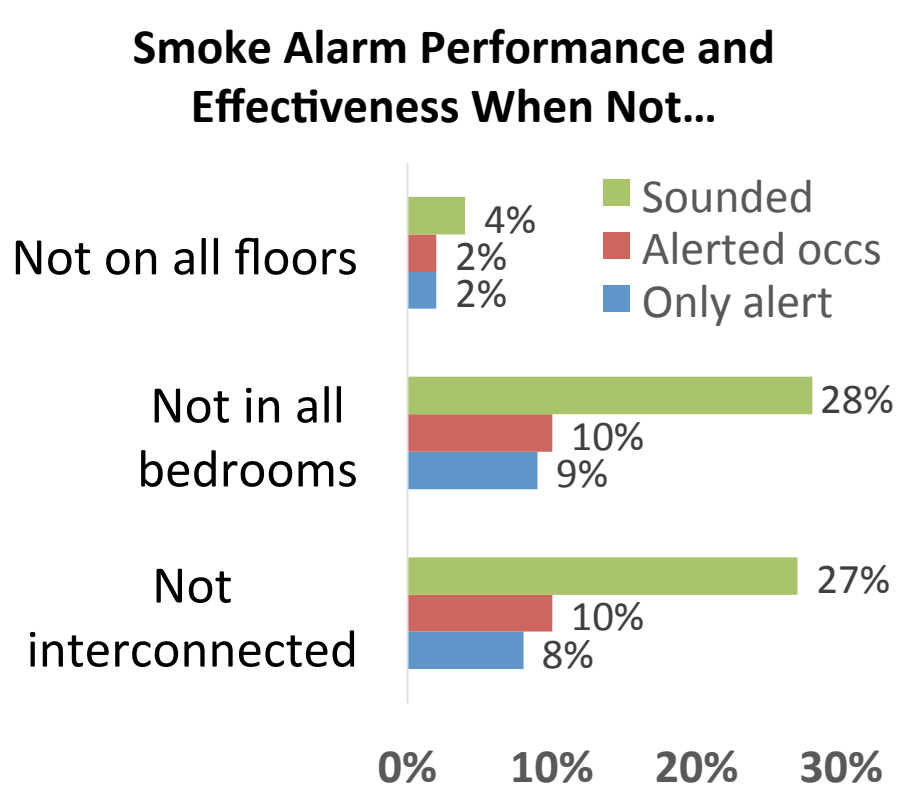
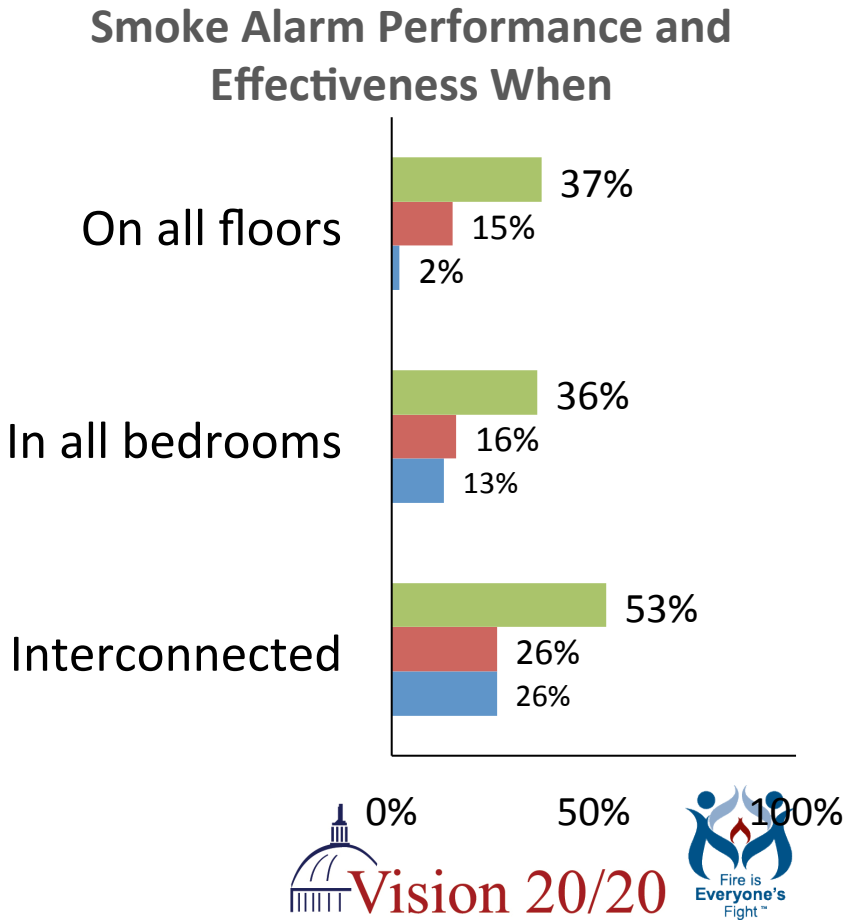




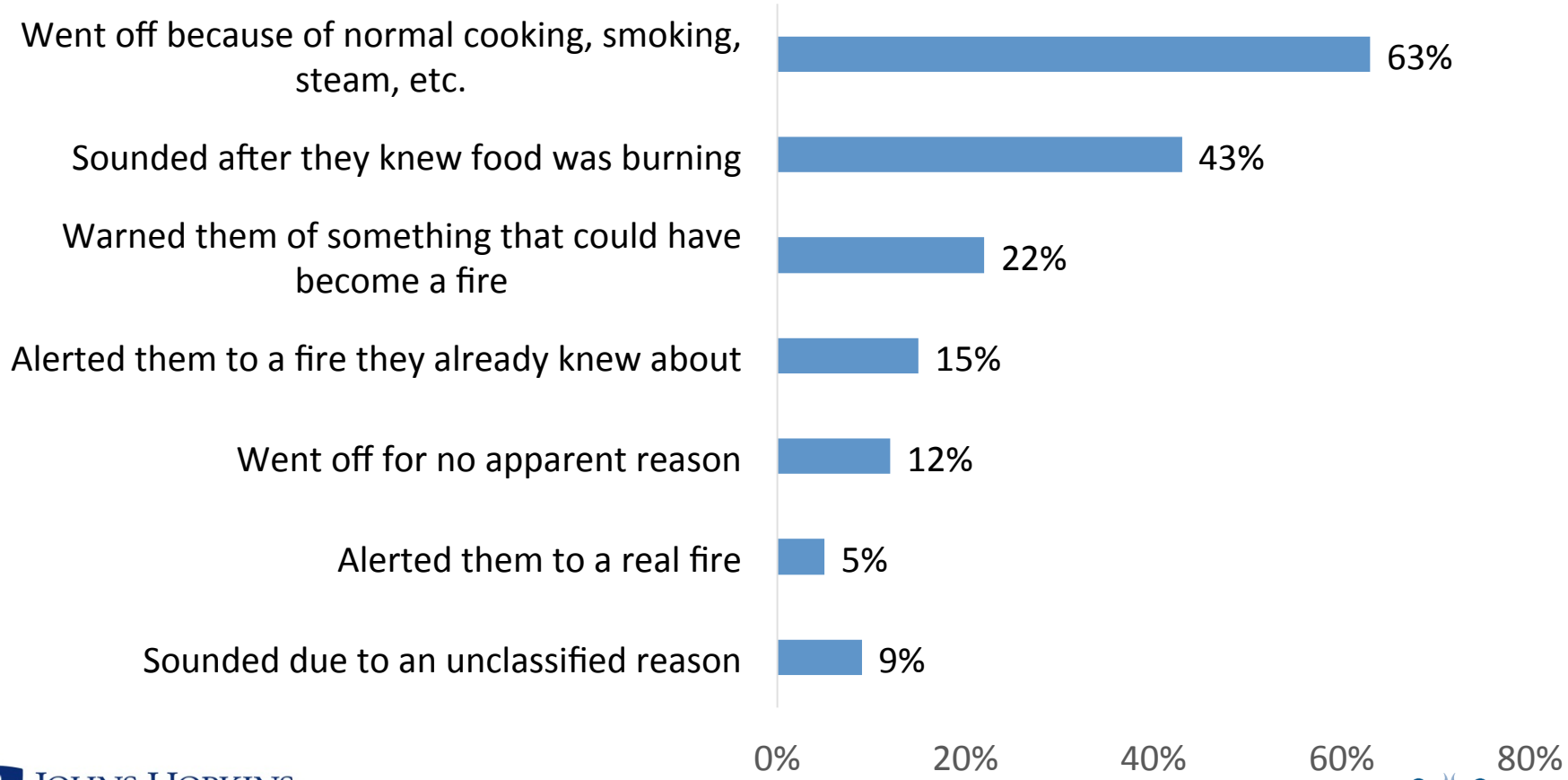
Audibility and sound effectiveness (from CPSC's reports)

- Closed door reduced volume 10-20 dB
  - Volume fell about 20dB each floor traveled
- Today's smoke alarms effectively wake adults who are
  - NOT under the influence of alcohol or drugs
  - NOT sleep deprived
- May not wake those with hearing loss

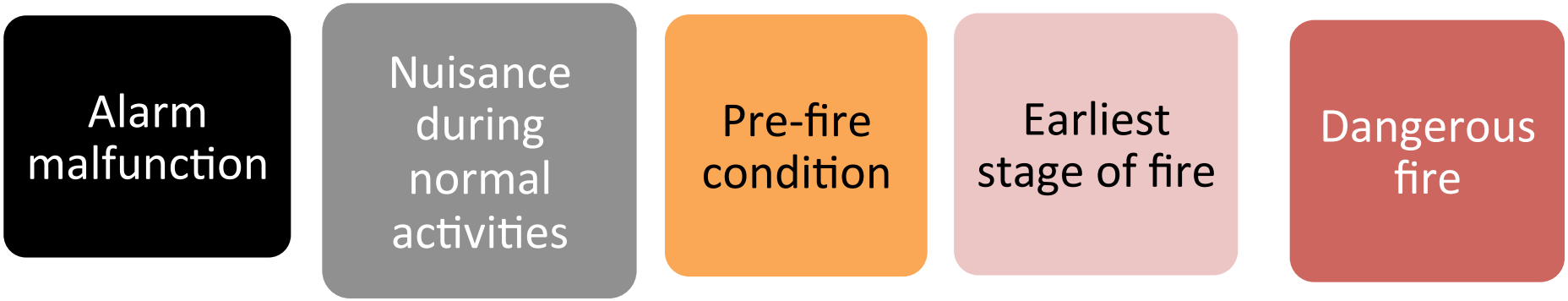
Unwanted smoke alarms

- 2010 NFPA Harris Poll asked why smoke alarms had gone off
  - Almost three-quarters said cooking
  - 8% said low battery chirp
  - None mentioned fire
- Then they were asked to agree or disagree with a series of questions…

The Last Time a Smoke Alarm Sounded, It...



Smoke alarm performance is not binary



Sources

- Marty Ahrens. *Smoke Alarms in U.S. Home Fires*, NFPA, 2014
- Michael A. Greene and Craig Andres. *2004-2005 National Sample Survey of Unreported Residential Fires*. CPSC, July 2009.
- Arthur Lee. *The Audibility of Smoke Alarms in Residential Homes*, CPSC 2005.
- Arthur Lee, Jonathan Midgett, and Sharon White. *A Review of the Sound Effectiveness of Residential Smoke Alarms*, CPSC 2004.
- Marty Ahrens *Physical Disability as a Factor in Home Fire Deaths*, NFPA, 2014