The US Home Fire Problem
Fire data sources

• National estimates derived from
  – USFA’s National Fire Incident Reporting System (NFIRS)
  – NFPA’s fire department survey
• Fire service is primary data source
• Results were pulled from NFPA’s reports
  – Home Structure Fires
  – Characteristics of Home Fire Victims
  – Intentional Fires
  – Playing with Fire
  – Smoke Alarms in US Home Fires
  – US Experience with Sprinklers
  – Fire Loss in the United States
Home fires 2009-2013: the big picture

- In 2009-2013, US fire departments responded to an annual average of
  - 357,000 home structure fires, resulting in
  - 2,570 civilian deaths per year
  - 13,210 civilian injuries

- Fire spread was confined to the object of origin in 56% of fires
  - These caused 3% of deaths and 16% of injuries

- One-quarter of fires spread beyond room of origin
  - Such fires caused 81% of deaths and 46% of injuries
Trends in home fires and fire deaths

From 1980-2014, home fires fell 50% and deaths fell 47%
Death rates from 1980 to 2014

- Home fires per million population fell 64%
  - Fire deaths per million population fell 62%
- Deaths per 1,000 reported home fires were slightly higher in 2014 than in 1980
US home fire victims in 2009-2013

- 780, or 30%, of fatalities were 65 or older
- Older adults have highest fire death rates
  - People over 85 had the very highest
  - Deaths rates are higher for the 50-64 age group than the under five
- Percentage of fatal fire victims who were
  - Under 5 has been falling
  - 65 or older has been rising
- 1,780, or 14%, of civilian fire injuries were 65 or older
Alcohol

- Autopsy reports found that alcohol was a factor in more than one-third of US adult fire deaths
Fear of crime

• Security measures can block exits
Civilian firefighting

- 35% of US civilian injuries in reported home fires in 2007-2011 occurred when the victim was fighting the fire
- CPSC: 97% of home fires are handled without the fire department*
  - Fire extinguishers were used in 5% of home fires

* CPSC’s 2004-2005 National Sample Survey of Unreported Residential Fires by Michael A. Greene and Craig Andres
Fire prevention and the poor

- Lack of resources, energy for fire prevention
- Tend to have older stuff
- Will take longer for benefits of safer products to reach them
- Very poor may have utilities shut off, makeshift housing
Causes of home fires
US home fires in 2009-2013: leading causes

### Fires
- **Cooking equipment**: 45%
- **Heating equipment**: 16%
- **Intentional**: 8%
- **Electrical dist or lighting**: 8%
- **Smoking materials**: 5%
- **Clothes dryer or washer**: 4%
- **Exposure**: 3%
- **Candles**: 3%
- **Playing with heat source**: 2%

### Civilian deaths
- **Smoking materials**: 23%
- **Heating equipment**: 19%
- **Cooking equipment**: 17%
- **Electrical dist or lighting**: 15%
- **Intentional**: 14%
- **Candles**: 3%
- **Oxygen admin eq**: 3%
- **Playing with heat source**: 3%
US home cooking fires

- Leading cause of home fires and home fire injuries
  - Third in home fire deaths
- Cause of 69% of apartment fires compared to 35% of fires in one- or two-family homes
- Three-quarters of cooking fires had incident types indicating a cooking fire confined to the vessel of origin
More on cooking

• Unattended cooking is leading factor in cooking fires
  – Frying is leading type of cooking associated with fire

• Most cooking-related burns resulted from contact with hot equipment, food or liquids
  – Children under five had disproportionate risk of non-fire cooking-related burns
US smoking-material fires ranked

• Fifth in number of home fires (5%)
• First in home deaths (23%) and
• Third in home injuries (10%)
US home fire deaths from smoking materials

- Smoking-material home fire deaths were down 68% from 1980 to 2013
- 35% of deaths in 1980-84, compared with 23% in 2009-2013
US heating equipment fires

- Second in number of
  - Home fires
  - Home fire deaths
  - Home fire injuries; and

- Bigger problem in one- or two-family homes than apartments
More on heating fires

• Failure to clean was leading factor in home heating equipment fires
  – Associated with chimney fires
• In heating fire deaths, leading factor was something that could catch fire too close to the equipment
• Space heaters (portable or fixed) were involved in five out of six home heating fire deaths
  – Space heaters need space!
US intentional home fires ranked

- Third in number of home fires
- Fifth in home deaths and injuries

- Not all intentional fires are arson
Arson arrests by age – (not just homes)

- According to 2011 national FBI statistics:
  - 2% were children under ten
  - 41% were under 18
- One of every five (19%) arson cases was solved

Source: FBI’s *Crime in the US* series
Electrical distribution or lighting equipment fires

- Fourth in home fires, deaths and injuries
- National Electrical Code (NEC) standards make wiring safer
- Homes with older wiring face highest risk of electrical fires*

- “What Causes Wiring Fires in Residences?” by CPSC’s Linda Smith and Dennis McCoskrie
Electrical failures or malfunctions

• Can happen with anything powered by electricity
• Factor in
  – 13% of US home fires
  – 17% of home fire deaths
  – 11% of home fire injuries
Fire play in the US

• Playing with heat source caused
  — 2% of US home fires
  — 3% of home fire deaths
  — 5% of home fire injuries
• Injury rate per 1,000 fires was higher than for other major causes
• 61% of fatalities in play fires were under five*
  — 15% were between five and nine
CPSC lighter standard

• In 1994, new CPSC standard required that 85% of all children under 4-1/2 be unable to operate disposable and novelty lighters
  – Fires and casualties associated with playing with both lighters and matches fell
US home fire play deaths & injuries (all heat sources)

First full year of lighter standard
Fire death trends by heat source and area of origin

Deaths from selected heat sources
- Operating equipment
- Smoking materials
- Lighters, candles or matches

Deaths by area of origin
- Living room, family room or den
- Bedroom
- Kitchen
Fire protection
Smoke alarms

- 96% of US homes in phone survey had at least one smoke alarm
  - Not verified by home visits
  - CPSC ‘s Green and Andres found that homes with unreported fires were slightly less likely to have smoke alarms at all.
    - Pattern continued through increasing levels of protection
- Because property ownership is not a coded field in NFIRS, rental property cannot be identified in national fire data
- Unwanted alarms are an issue
  - Recent study of NFIRS Incident Types found that false alarm incident types were particularly challenging
Detection activation continuum

- CPSC’s Greene and Andres: Fire departments went to only 3.4% of home fires in 2004-2005
Smoke alarms

- Risk of dying in a reported home fire is cut in half in homes with working alarms.

Smoke alarm status in reported home fires: 2009-2013

<table>
<thead>
<tr>
<th>Status</th>
<th>Fires</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire too small to operate</td>
<td>12%</td>
<td>1%</td>
</tr>
<tr>
<td>Operating smoke alarm</td>
<td>53%</td>
<td>40%</td>
</tr>
<tr>
<td>Present but did not operate</td>
<td>8%</td>
<td>21%</td>
</tr>
<tr>
<td>No smoke alarm present</td>
<td>27%</td>
<td>38%</td>
</tr>
</tbody>
</table>
Percent of home fire victims with and without working smoke alarms

<table>
<thead>
<tr>
<th>Who Were.....</th>
<th>Working alarms</th>
<th>No or no working alarms</th>
</tr>
</thead>
<tbody>
<tr>
<td>In room or area when fatally injured</td>
<td>62%</td>
<td>50-52%</td>
</tr>
<tr>
<td>In area and involved in ignition</td>
<td>46%</td>
<td>32-37%</td>
</tr>
<tr>
<td>Sleeping when fatally injured</td>
<td>30%</td>
<td>37-42%</td>
</tr>
<tr>
<td>Physical disability contributed</td>
<td>20%</td>
<td>8-12%</td>
</tr>
<tr>
<td>Trying to fight fire themselves</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Unable to act</td>
<td>15%</td>
<td>9-11%</td>
</tr>
<tr>
<td>At least 65 years old</td>
<td>35%</td>
<td>23%-29%</td>
</tr>
</tbody>
</table>
Sprinklers in US home fires in 2007-2011

• Present in 6% of reported home fires
  – When present in large enough fire, operated 95% of the time

• Compared to home fires with no automatic extinguishing equipment, in homes with wet pipe sprinklers, the
  – Death rate per 1,000 reported fires was 82% lower
  – Average dollar loss per fire was 68% lower
Changing fire service

- Compared to 1980, US fire departments in 2014 responded to
  - 4.0 times as many medical aid calls
  - 5.3 times as many mutual aid calls
  - 2.8 times as many false alarms
  - 2.9 times as many calls
  - Less than half (43%) as many fires

- In 2014
  - 4% of fire department responses were to fires
  - Almost two-thirds (64%) were medical aid calls

Source: NFPA survey
Summary

• Risk factors do not by themselves cause fires or fire deaths
• We know what causes fires and fire deaths
• We know how to prevent them
• Let’s make it happen!
Summary

• We have made progress, but still have more to do
• Older adults have highest risk of dying in a fire
• Fires have many causes
• Smoke alarms provide critical warning but can’t save everyone
• Sprinklers reduce deaths even more
• Hard to get safer products to those who need it the most