



Current Fire Statistics Related to Electrical Fires

Aged Electrical Systems
Research Application Symposium
Chicago, Illinois
October 18, 2006



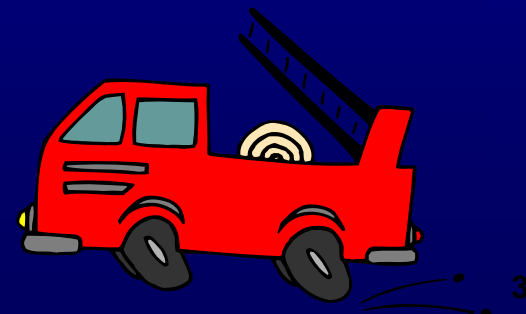
To Be Covered

- ◆ Overview of data sources
- ◆ What is an electrical fire?
- ◆ Home structures started by arcing, electrical failure or malfunction
 - ◆ By equipment involved
- ◆ Home structure fires involving electrical distribution and lighting equipment
 - ◆ Specific types of equipment
 - ◆ Equipment type trends, contributing factors and item first ignited



About the Data

- ◆ National estimates are derived from
 - ◆ NFPA's annual fire department survey
 - ◆ USFA's National Fire Incident Reporting System (NFIRS)
- ◆ Our statistics are projections
- ◆ All data comes from the fire service





NFIRS

- ◆ Provides the details
- ◆ Version 5.0 was introduced in 1999
 - ◆ Only 7% of fires in 1999 were originally collected in NFIRS 5.0
 - ◆ Data collected in older versions was converted to NFIRS 5.0 in national database
- ◆ NFIRS 5.0 has more details on equipment involved



Definition of Equipment Involved

- ◆ Earlier versions of NFIRS
 - ◆ “The equipment that provided the heat that started the fire”
- ◆ NFIRS 5.0
 - ◆ “The piece of equipment that provided the principal heat source to cause ignition if the equipment malfunctioned or was used improperly”



Statistics Are Based on NFIRS 5.0

- ◆ Statistics do not include
 - ◆ Converted data
 - ◆ Confined fires



NFIRS and Electrical Fires

- ◆ Could be captured in three fields
 - ◆ Heat source: arcing
 - ◆ Factor contributing: electrical failure or malfunction
 - ◆ Equipment involved: electrical distribution, lighting or power transfer

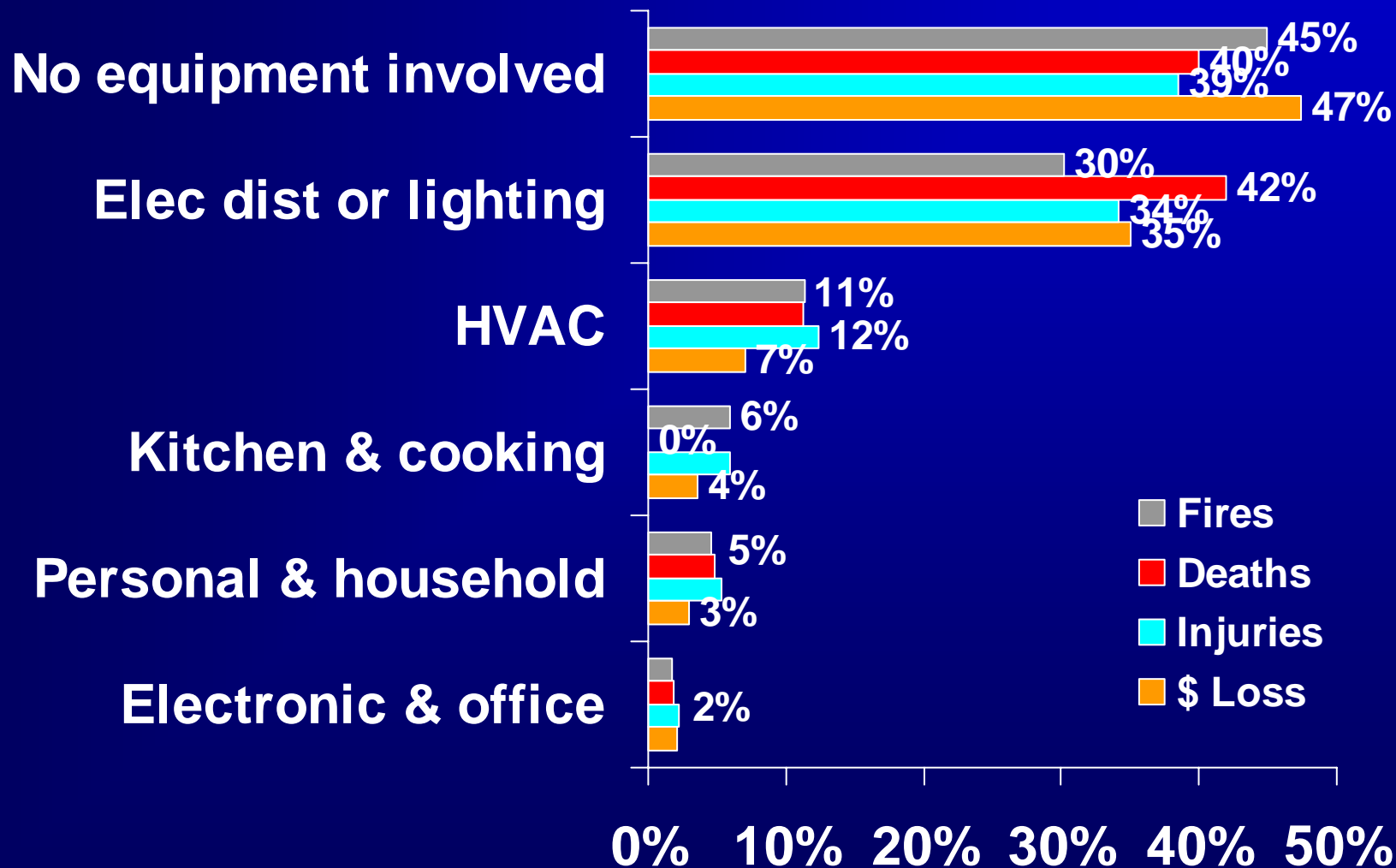


Heat Source: Arcing

- ◆ Code 13: Electrical arcing
 - ◆ No further definition provided
- ◆ In 1999-2003, arcing was the heat source in an annual average of
 - ◆ 37,700 home fires
 - (12% of non-confined, 10% of total home fires)
 - ◆ 240 home fire deaths (8%)
 - ◆ 890 home fire injuries (6%)
 - ◆ \$703 million in direct property damage (13%)



Leading Types of Equipment in Arcing Home Fires '99-'03





Factor Contributing to Ignition

- 31 Water-caused short circuit arc
- 32 Short circuit arc from mechanical damage
- 33 Short circuit arc from defective or worn insulation
- 34 Unspecified short circuit arc
- 35 Arc from faulty contact or broken conductor
- 36 Arc or spark from operating equipment, switch, or electric fence
- 37 Fluorescent light ballast
- 30 Other or unclassified electrical failure or malfunction

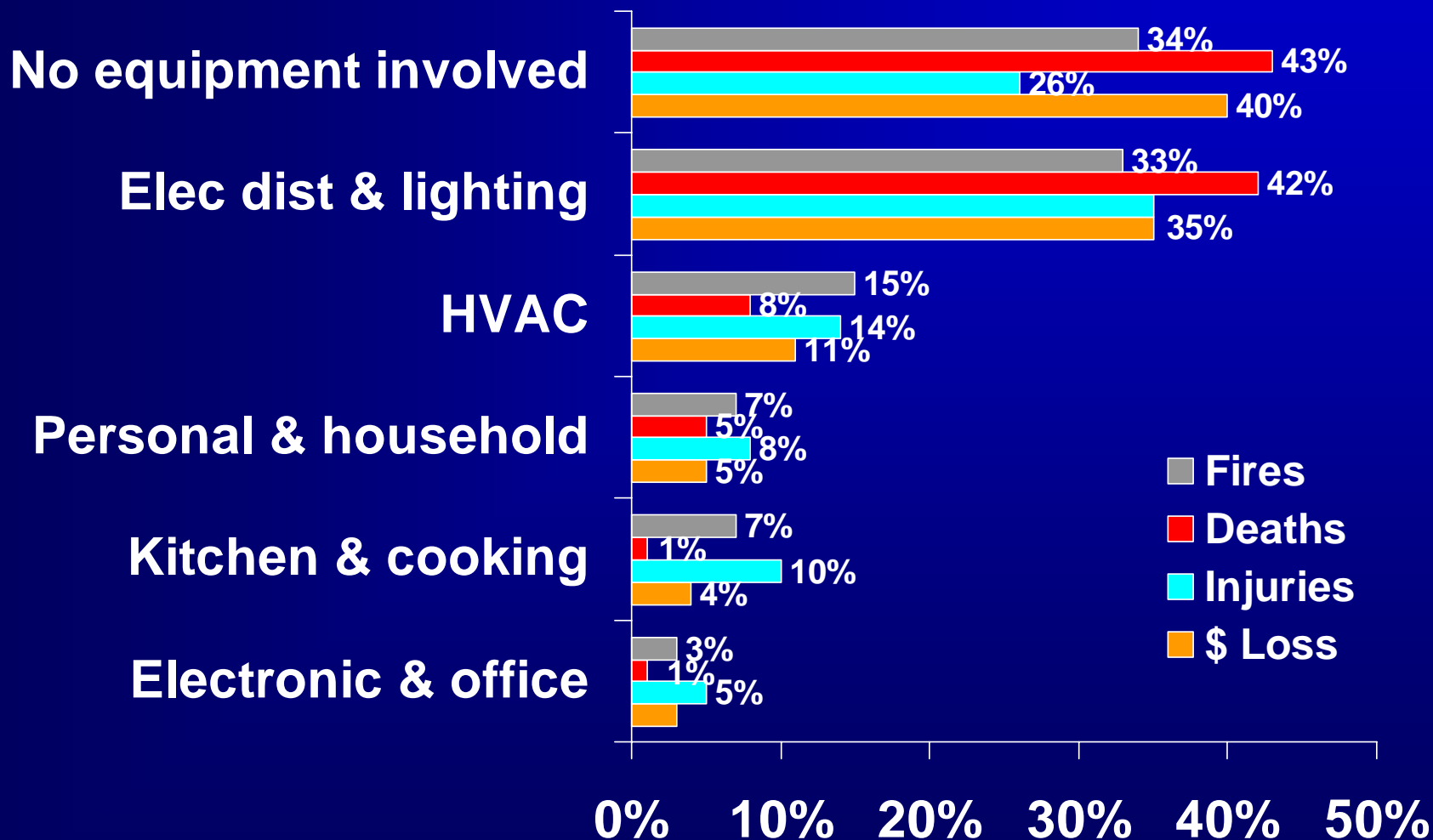


Electrical Failure or Malfunction

- ◆ In 1999-2003, electrical failures or malfunctions contributed to the ignition of an annual average of
 - ◆ 65,300 home fires
(21% of non-confined, 17% total)
 - ◆ 480 home fire deaths (16%)
 - ◆ 1,670 home fire injuries
(12% of non-confined, 11% of total)
 - ◆ \$1.2 billion in direct property damage (23%)



Leading Equipment Types in Electrical Failure Home Fires '99-'03





Electrical Distribution or Lighting

- ◆ NFIRS codes in the 200 series
- ◆ Version 5.0 provides more equipment choices
- ◆ NFPA groups a few codes (batteries, rectifiers and chargers, UPS, inverters, generators, and electric fences) elsewhere in this analysis

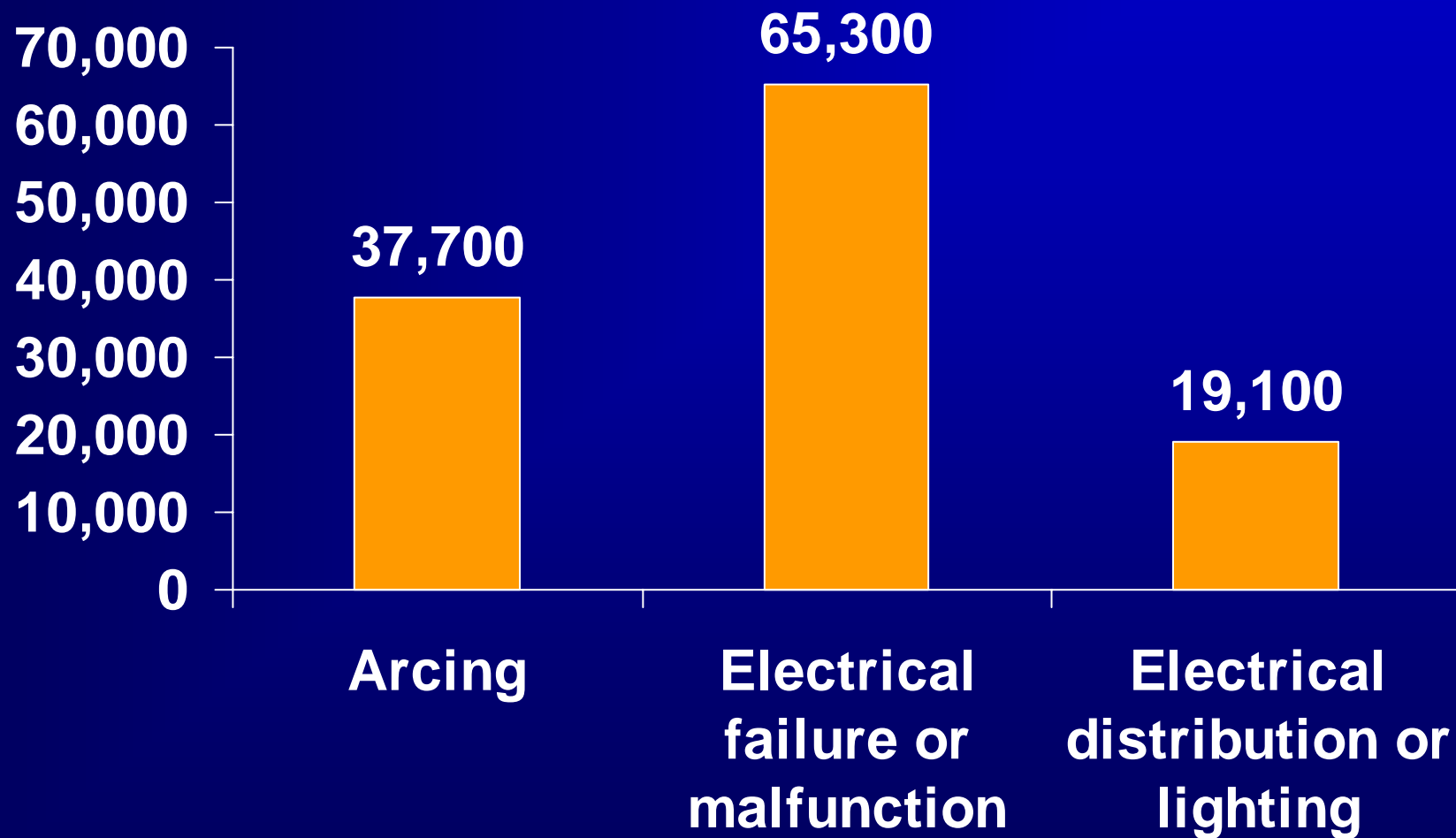


Home Electrical Distribution and Lighting Fires

- ◆ In 1999-2003, electrical distribution and lighting equipment was involved in the ignition of an annual average of
 - ◆ 19,100 home fires
(6% of non-confined, 5% total)
 - ◆ 140 home fire deaths (5%)
 - ◆ 610 home fire injuries
(4% of non-confined, 11% of total)
 - ◆ \$349 million in direct property damage (6%)

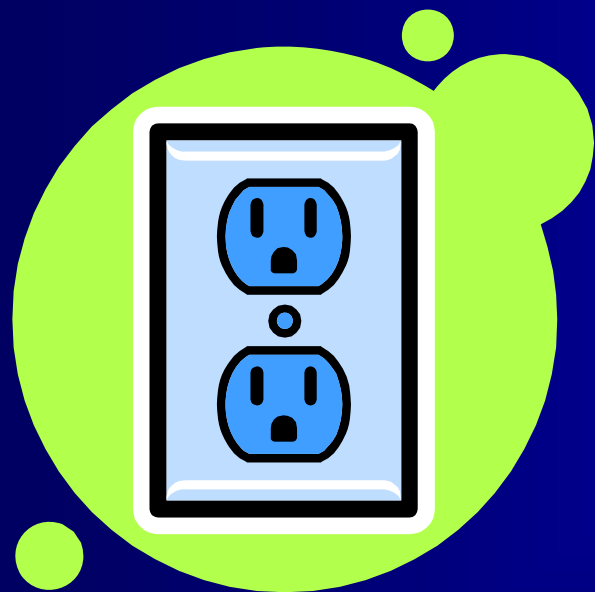


Counting Home Electrical Fires Three Ways: 99-03 Annual Averages



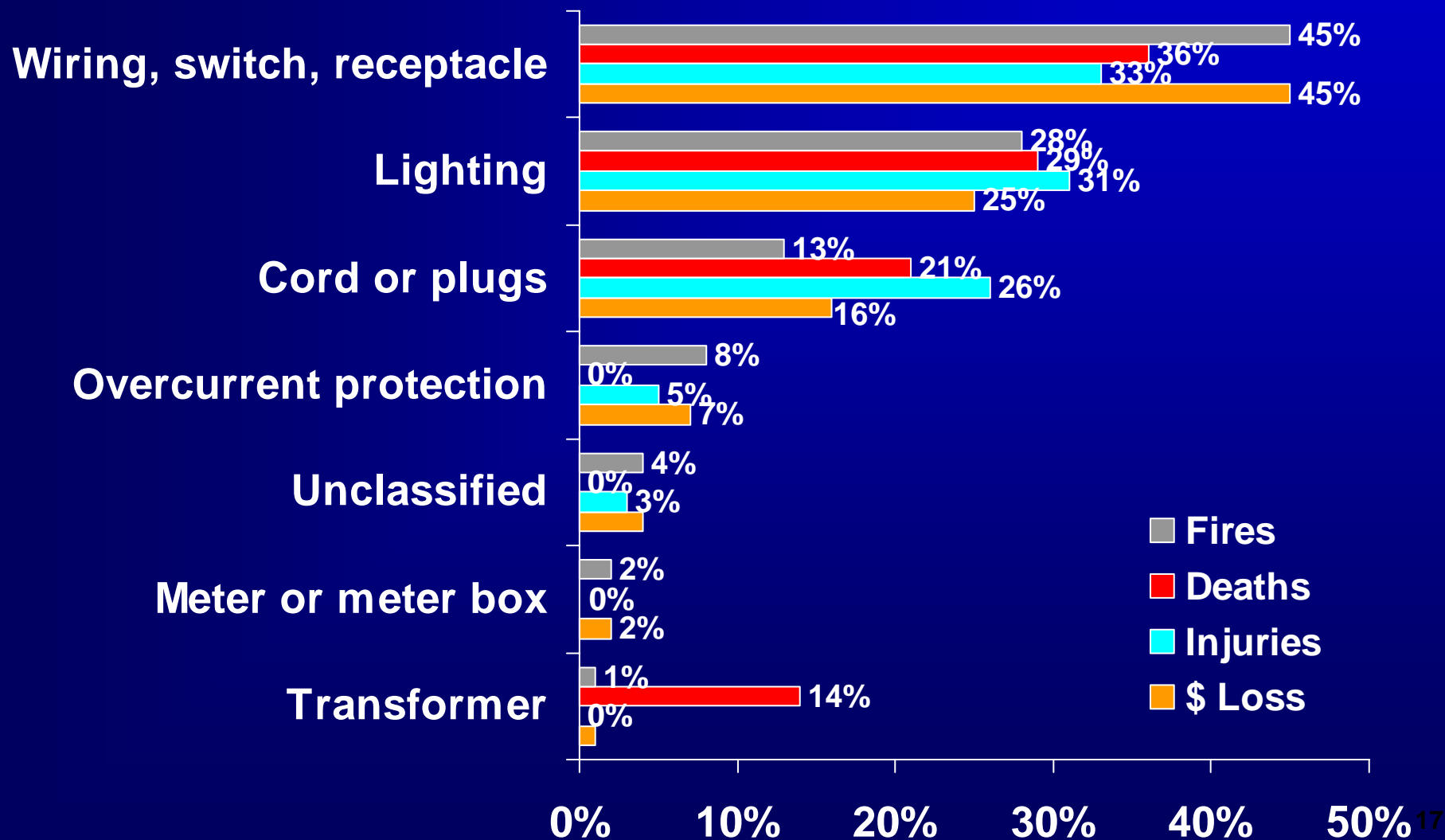


More on Electrical Equipment





Home Electrical Distribution Fires





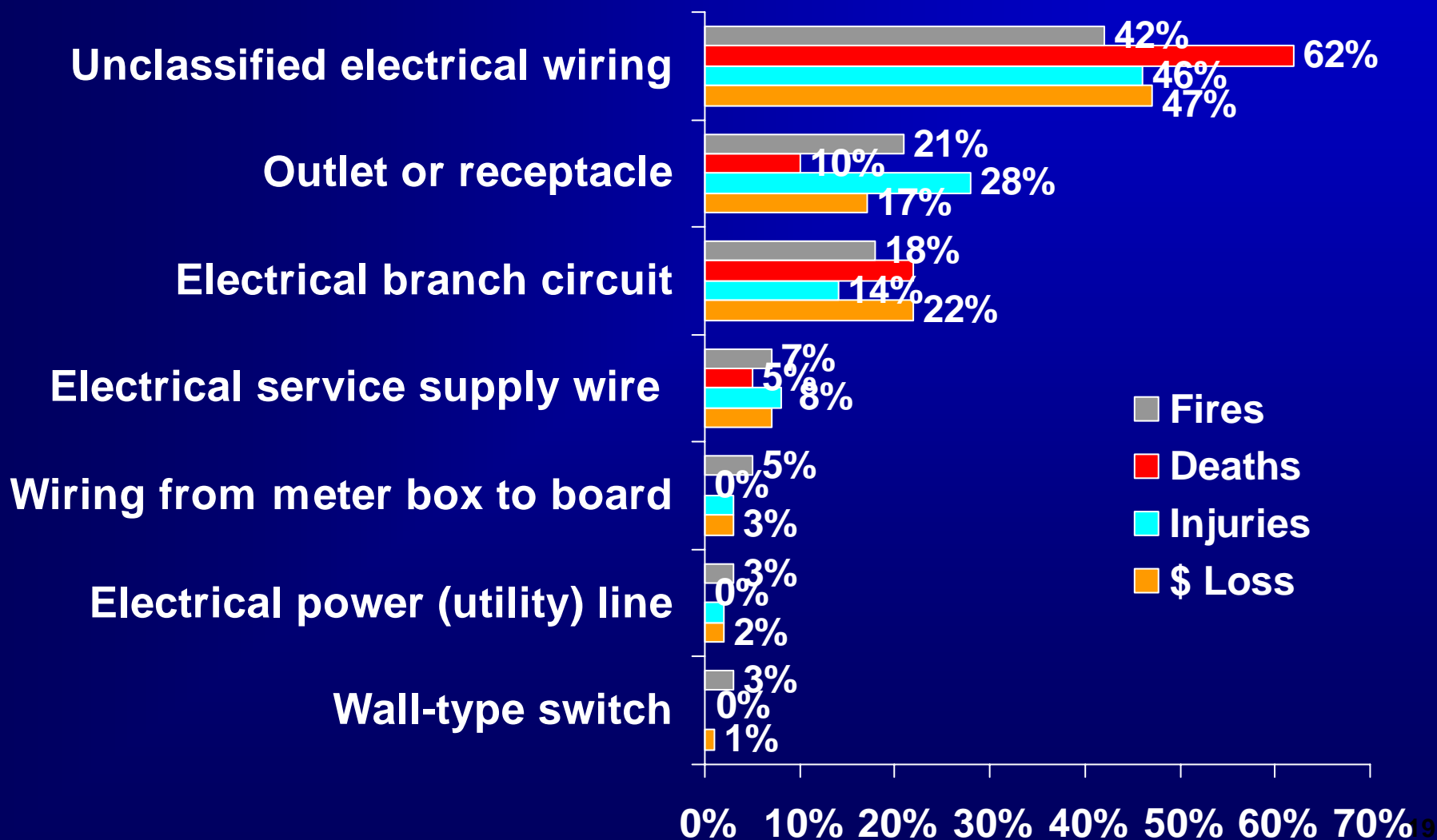
Wiring, Switches, Receptacles and Outlets in 99-03

- ◆ Annual average of
 - ◆ 8,520 home structure fires
 - ◆ 50 deaths
 - ◆ 200 injuries
 - ◆ \$158 million in direct property damage
- ◆ Accounted for 45% of electrical distribution fires and property damage
 - ◆ 36% of the deaths
 - ◆ 33% of injuries





Home Wiring, Switch, Outlet, and Receptacle Fires by Equipment Type



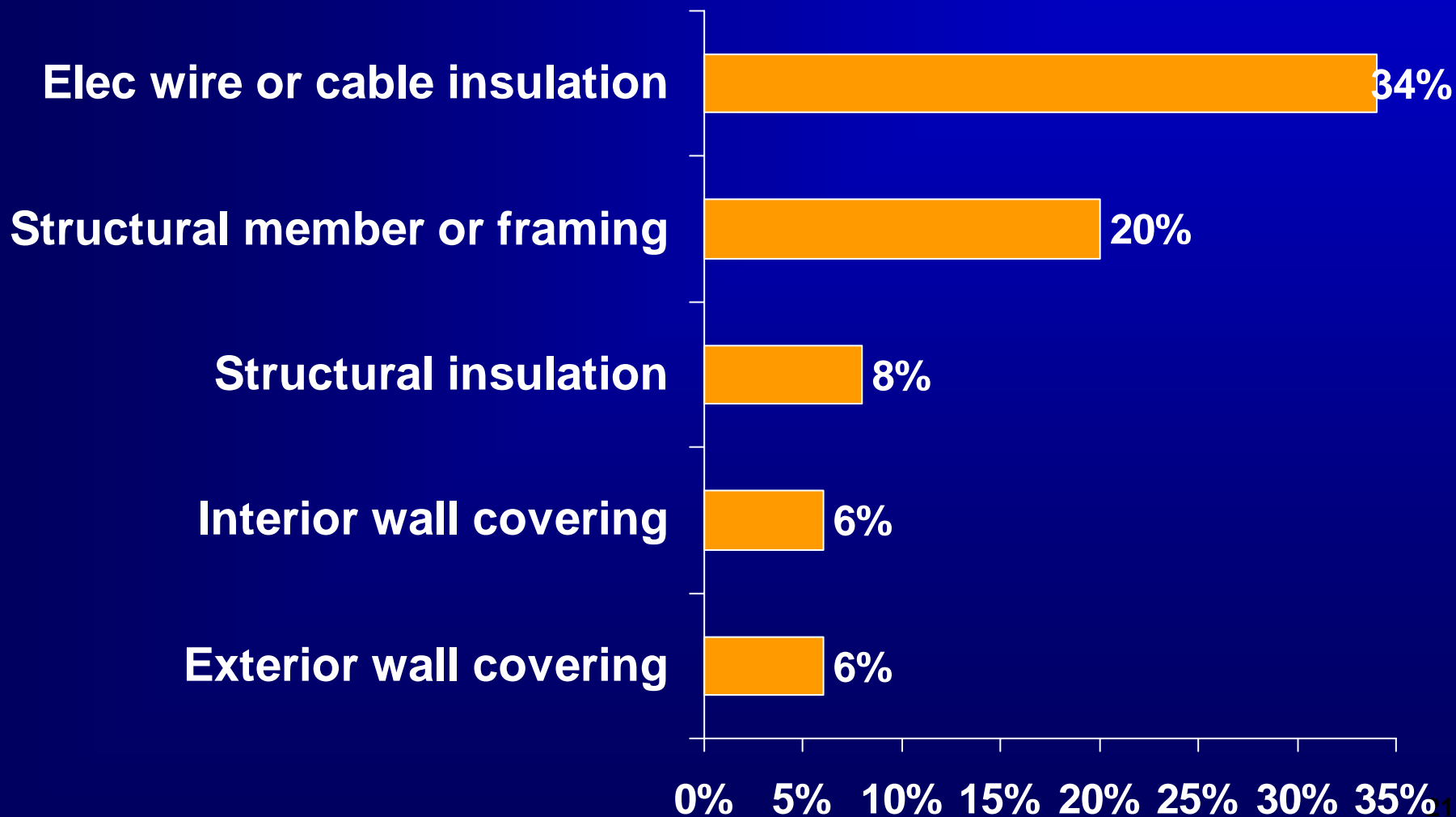


More on Home Wiring, Switch, Outlet and Receptacle Fires

- ◆ These fires fell a total of 40% from 1980 to 1998
- ◆ Leading factors contributing (99-03)
 - ◆ Unclassified electrical failure or malfunction – 30%
 - ◆ Unspecified short circuit arc – 23%
 - ◆ Short circuit arc from defective or worn insulation – 21%
 - ◆ Arc from faulty contact or broken conductor – 6%



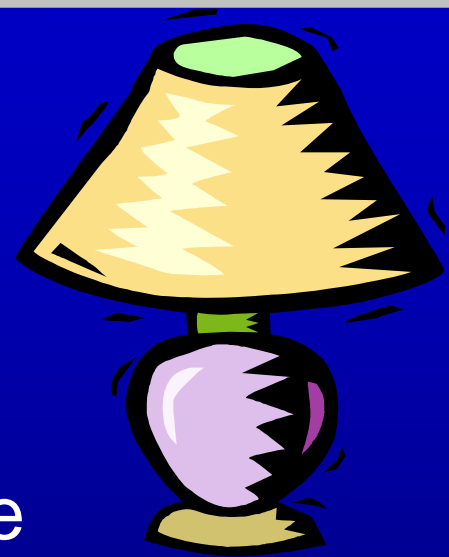
Leading Items First Ignited in Wiring, Switch, Receptacle & Outlet Fires





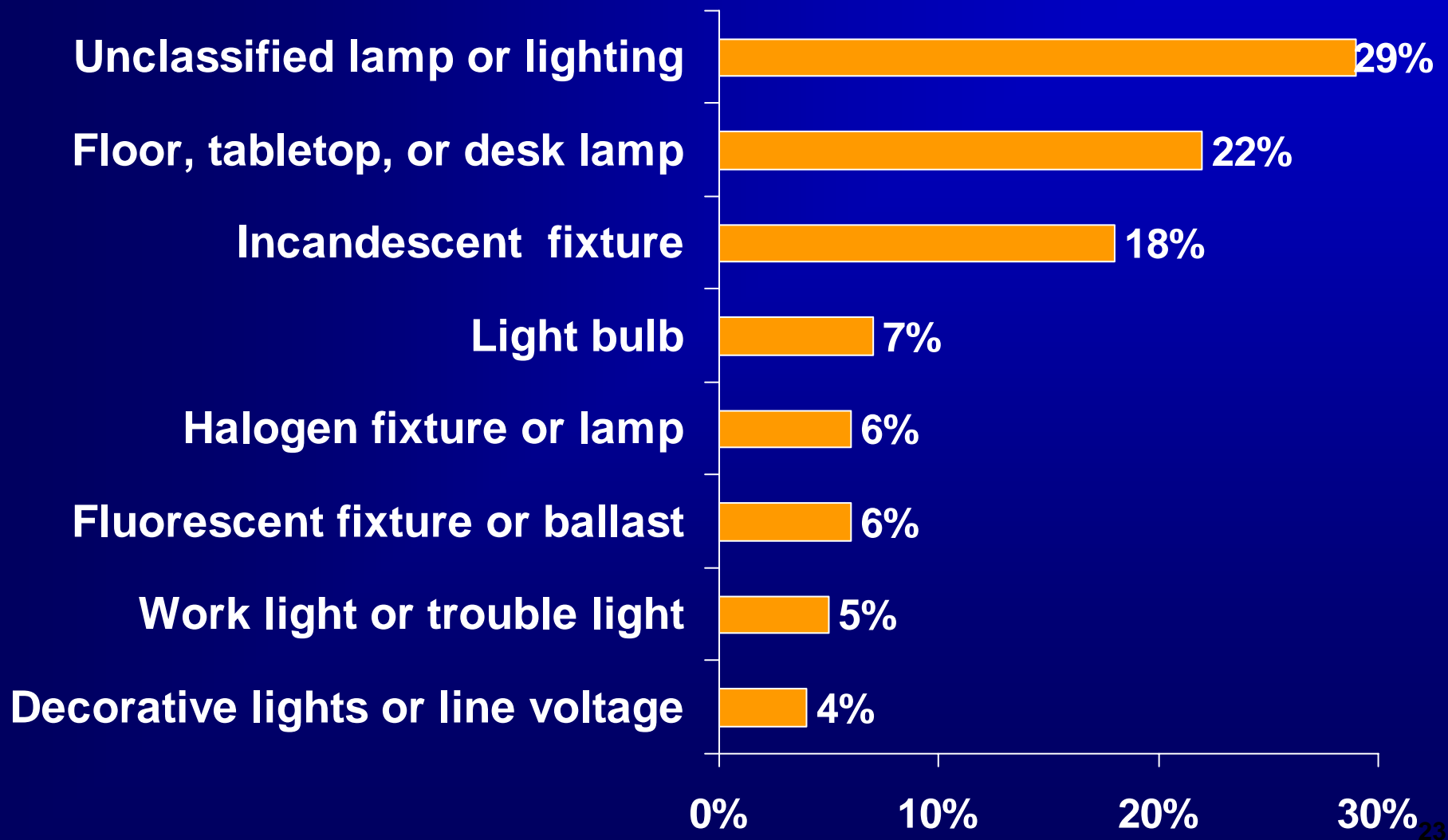
Home Fires Involving Light Fixtures, Lamps, Bulbs & Signs

- ◆ Annual average of
 - ◆ 5,290 home structure fires in 99-03
 - ◆ 40 deaths
 - ◆ 190 injuries
 - ◆ \$87 million in direct property damage
- ◆ Accounted for 28% of home electrical distribution and lighting fires
 - ◆ 29% of the deaths
 - ◆ 31% of injuries
 - ◆ 25% of the direct property damage





Home Lighting Fires by Leading Equipment Type



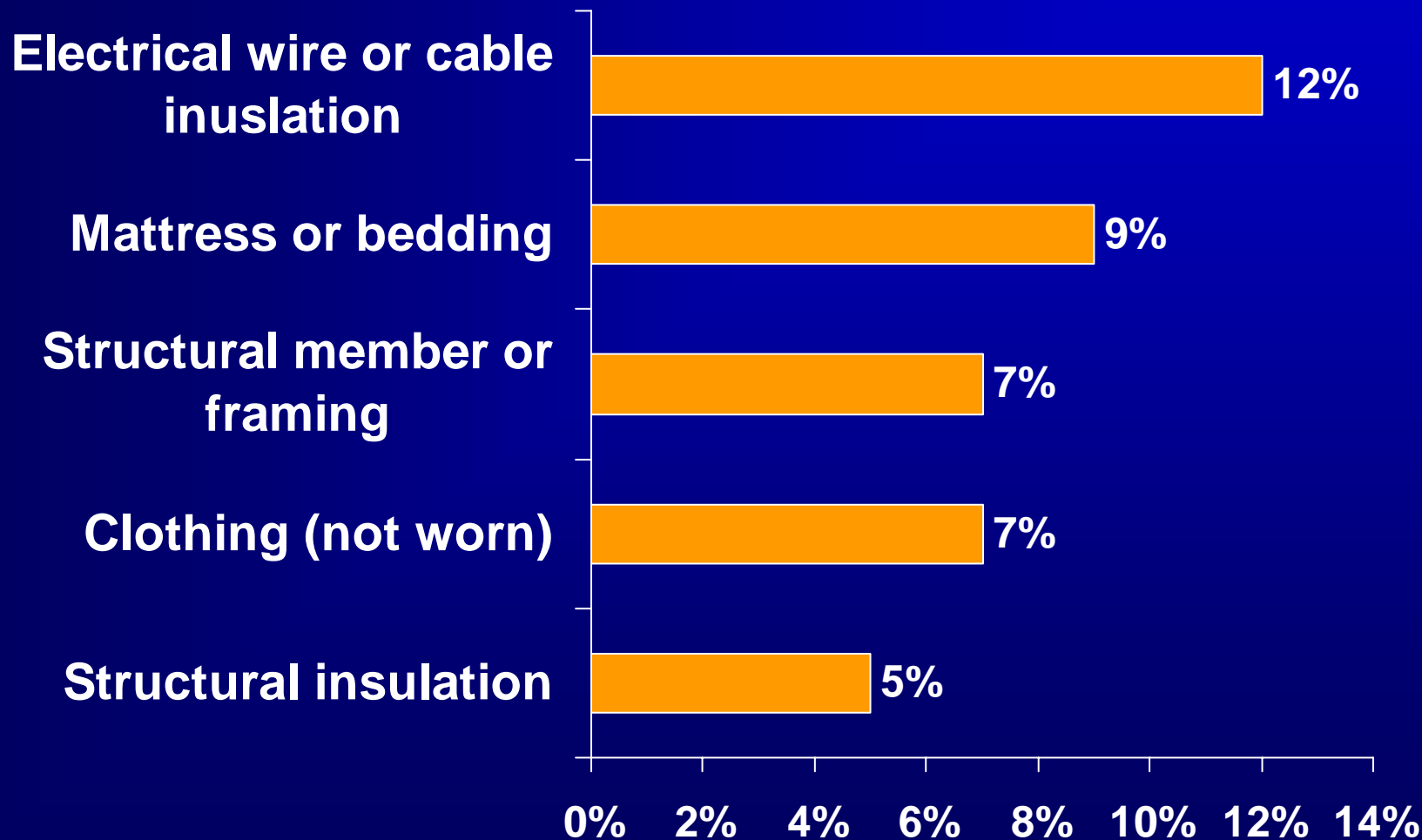


More on Home Lighting Fires

- ◆ These fires fell a total of 34% from 1980 to 1998
- ◆ Leading factors contributing (99-03)
 - ◆ Heat source too close to combustibles – 33%
 - ◆ Unclassified electrical failure or malfunction – 13%
 - ◆ Unspecified short circuit arc – 10%
 - ◆ Short circuit arc from defective or worn insulation – 7%
 - ◆ Collision, knock down or turn over – 5%



Leading Items First Ignited in Home Lighting Fires





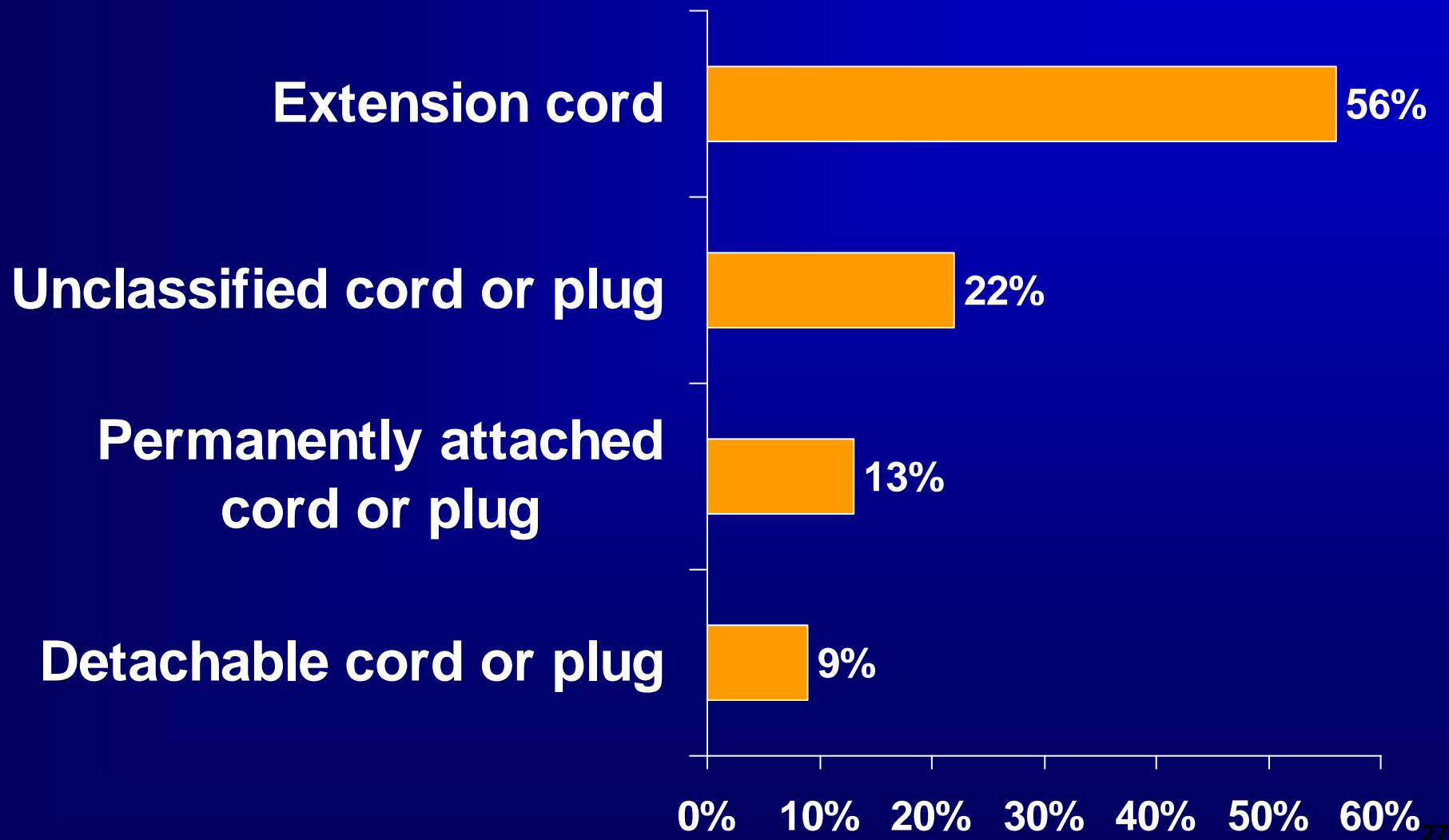
Home Fires Involving Cords and Plugs in 99-03

- ◆ Annual average of
 - ◆ 2,400 home structure fires
 - ◆ 30 deaths
 - ◆ 160 injuries
 - ◆ \$56 million in direct property damage
- ◆ Accounted for 13% of home electrical distribution and lighting fires
 - ◆ 21% of the deaths
 - ◆ 26% of injuries
 - ◆ 16% of the direct property damage





Home Cord and Plug Fires by Equipment Type



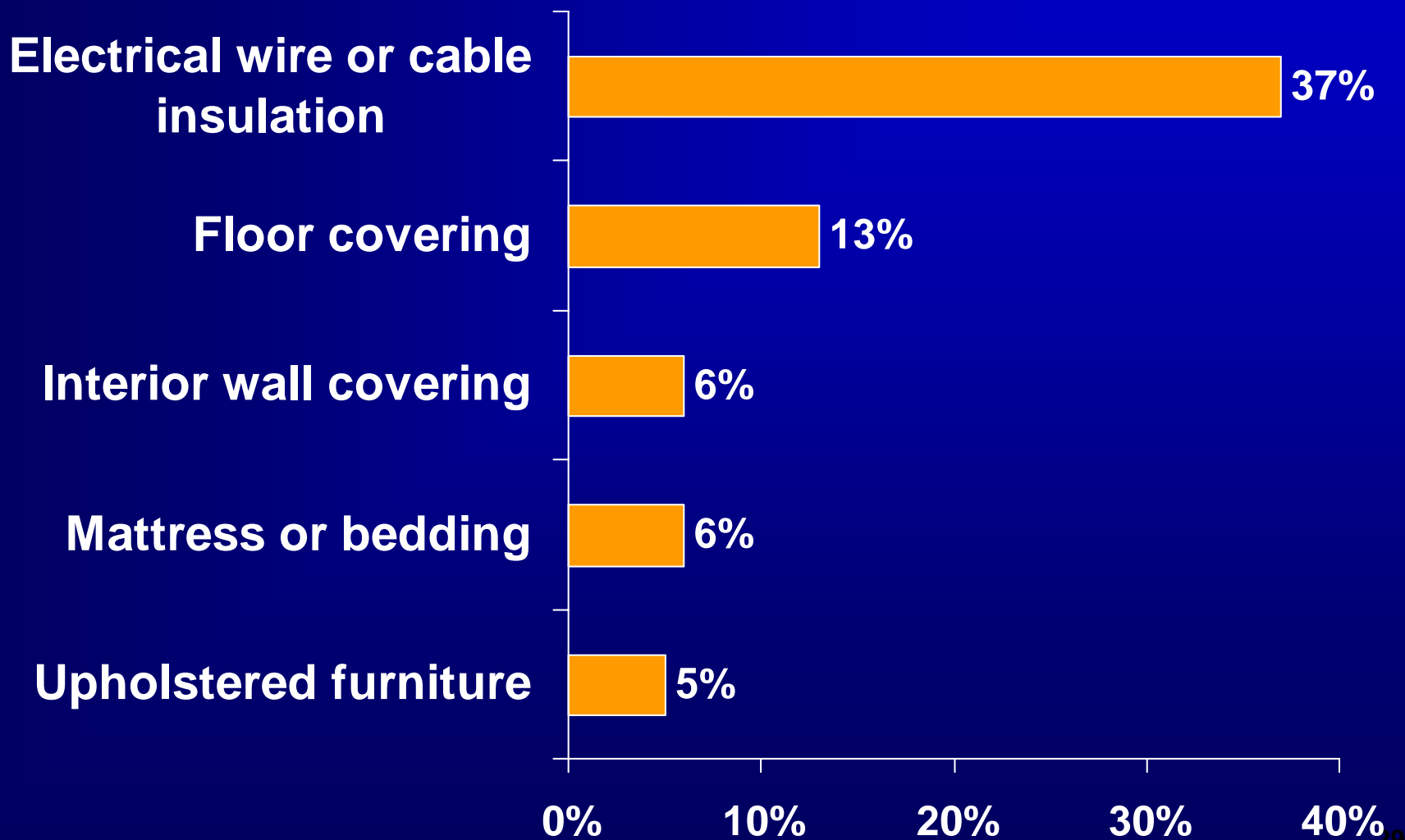


More on Home Cord & Plug Fires

- ◆ These fires fell a total of 44% from 1980 to 1998
- ◆ Leading factors contributing (99-03)
 - ◆ Unclassified electrical failure or malfunction – 32%
 - ◆ Short circuit arc from defective or worn insulation – 19%
 - ◆ Unspecified short circuit arc – 17%
 - ◆ Equipment overloaded – 12%



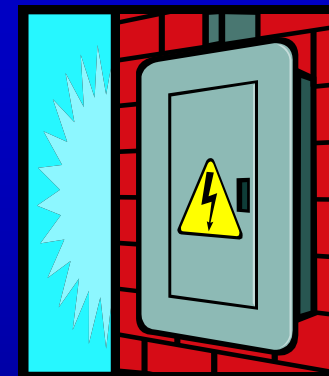
Leading Items First Ignited in Home Cord and Plug Fires





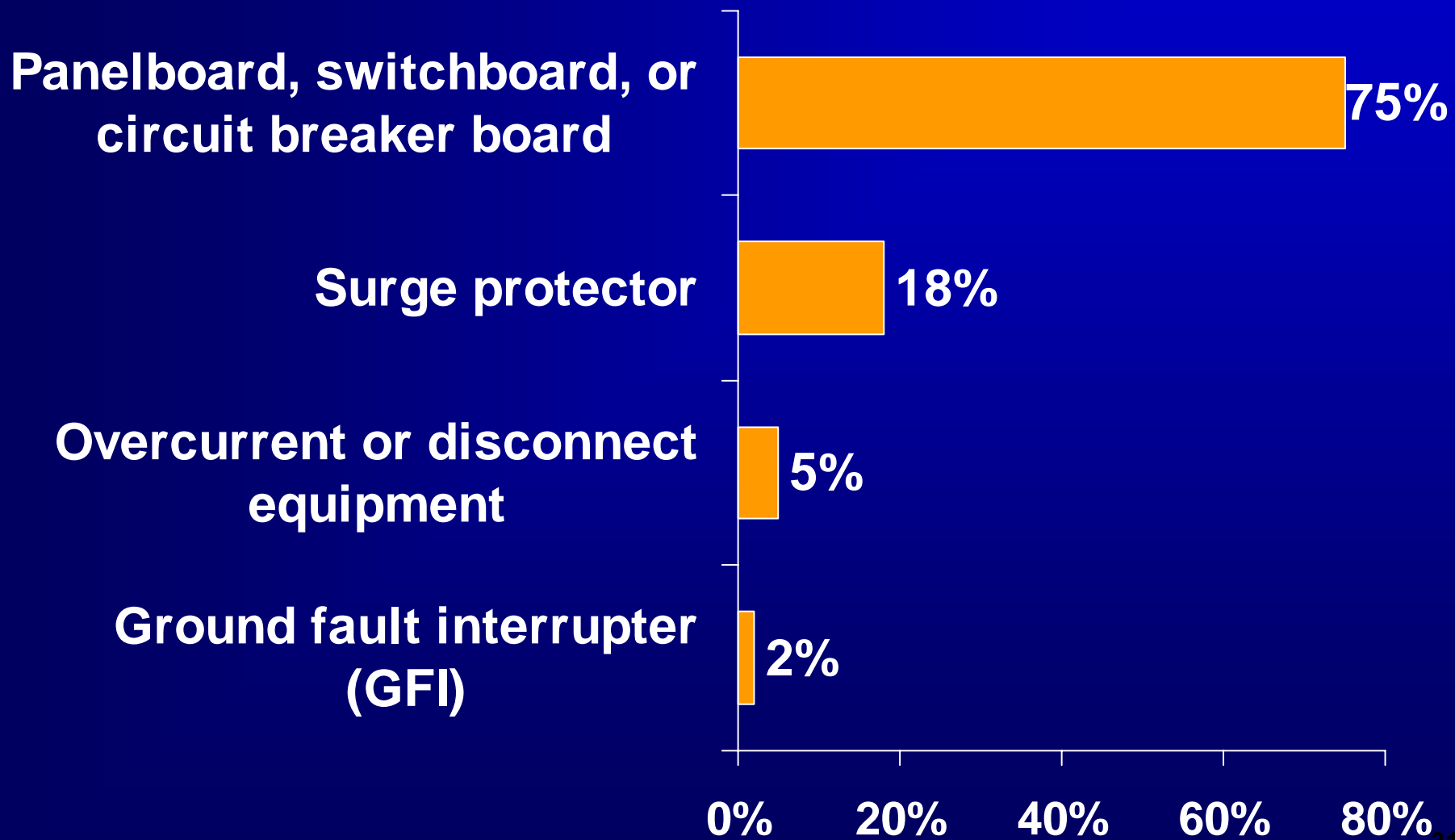
Home Fires Involving Overcurrent Protection Devices in 99-03

- ◆ Average of
 - ◆ 1,200 home structure fires
 - ◆ No deaths reported to NFIRS
 - ◆ 30 injuries
 - ◆ \$23 million in direct property damage
- ◆ Accounted for 8% of home electrical distribution fires
 - ◆ 5% of injuries
 - ◆ 7% of the direct property damage





Home Overcurrent Protection Device Fires by Equipment Type



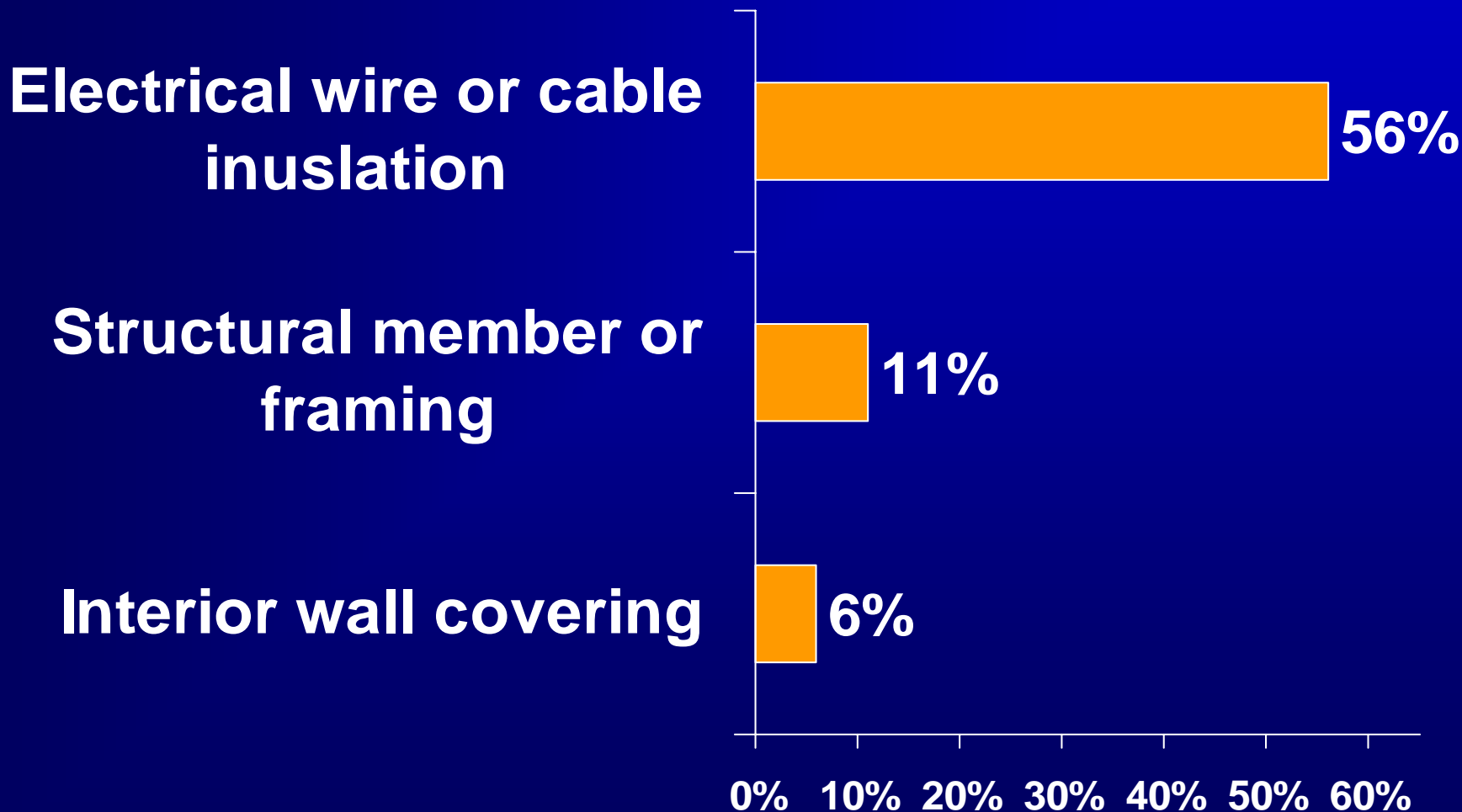


More on Overcurrent Protection Device Fires

- ◆ These fires fell a total of 47% from 1980 to 1998
- ◆ Leading factors contributing (99-03)
 - ◆ Unclassified electrical failure or malfunction – 34%
 - ◆ Unspecified short circuit arc – 24%
 - ◆ Short circuit arc from defective or worn insulation – 14%
 - ◆ Arc from faulty contact or broken conductor – 6%
 - ◆ Water caused short circuit arc – 6%



Leading Items First Ignited in Home Overcurrent Protection Device Fires





Home Meter and Meter Box Fires

- ◆ Average of
 - ◆ 420 home structure fires in 99-03
 - ◆ No deaths reported in NFIRS
 - ◆ 3 injuries
 - ◆ \$8 million in direct property damage
- ◆ Accounted for 2% of home electrical distribution fires
 - ◆ < 1% of injuries
 - ◆ 2% of the direct property damage





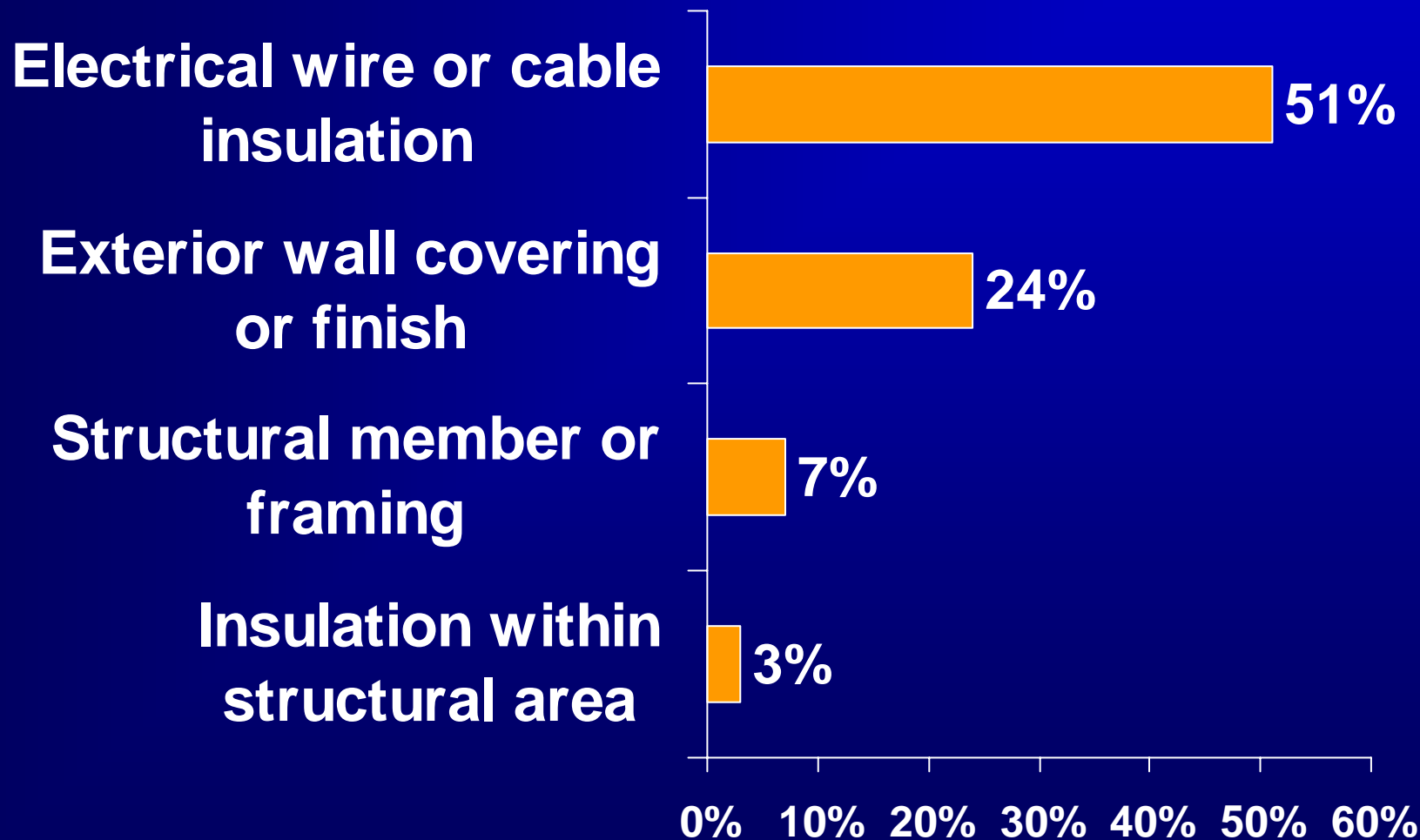
More on

Home Meter and Meter Box Fires

- ◆ No consistent trend for these fires
- ◆ Leading factors contributing (99-03)
 - ◆ Unspecified short circuit arc – 30%
 - ◆ Unclassified electrical failure or malfunction – 18%
 - ◆ Short circuit arc from defective or worn insulation – 13%
 - ◆ Short circuit arc from mechanical damage – 8%
 - ◆ Water caused short circuit arc – 8%



Leading Items First Ignited in Home Meter and Meter Box Fires



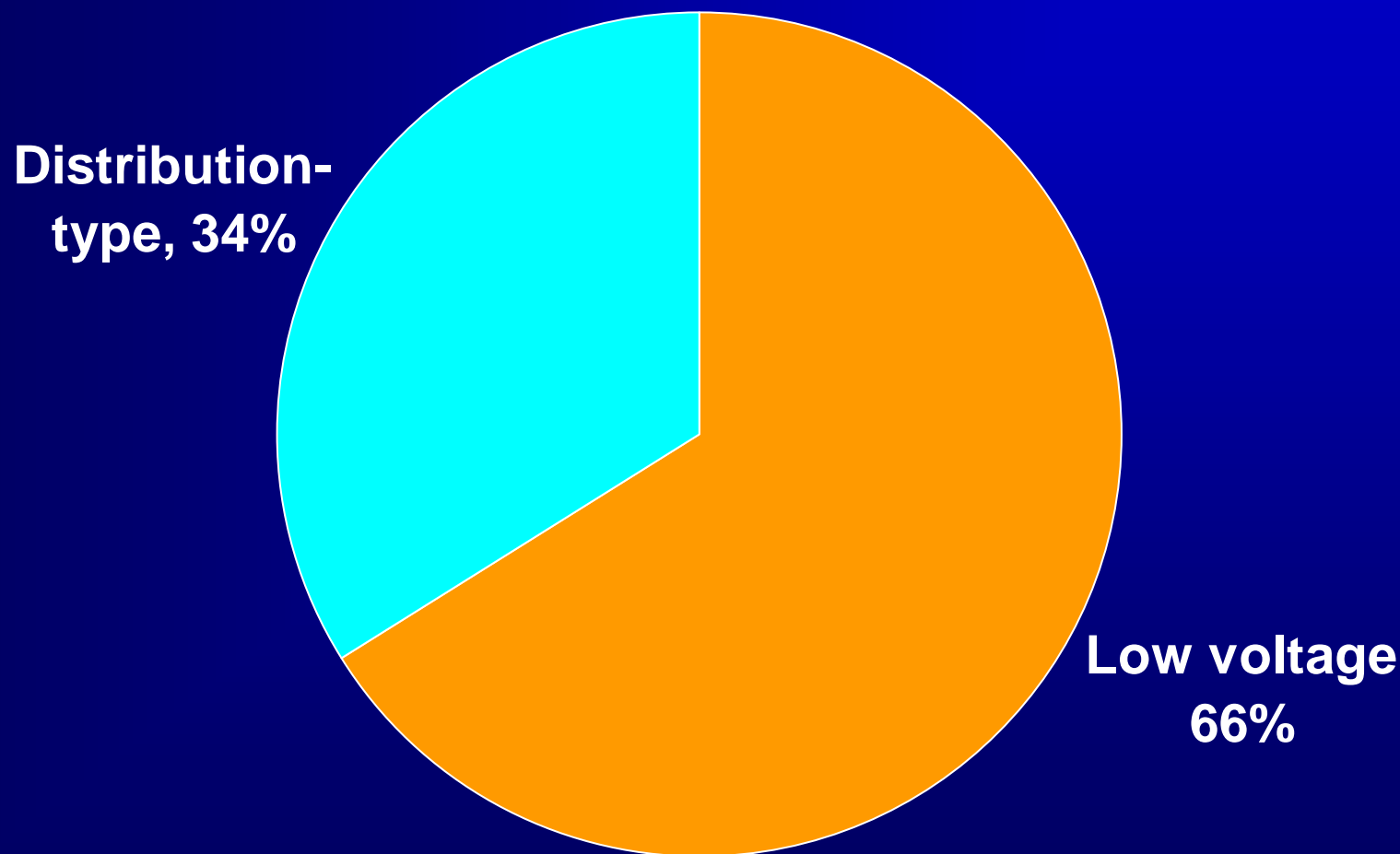


Home Fires Involving Transformers in 99-03

- ◆ Annual average of
 - ◆ 170 home structure fires
 - ◆ 19 deaths (inflated by multiple death fire)
 - ◆ 3 injuries
 - ◆ \$2.4 million in direct property damage
- ◆ Accounted for 1% of home electrical distribution and lighting fires
 - ◆ 14% of the deaths
 - ◆ < 1% of injuries
 - ◆ 1% of the direct property damage



Home Transformer Fires by Equipment Type



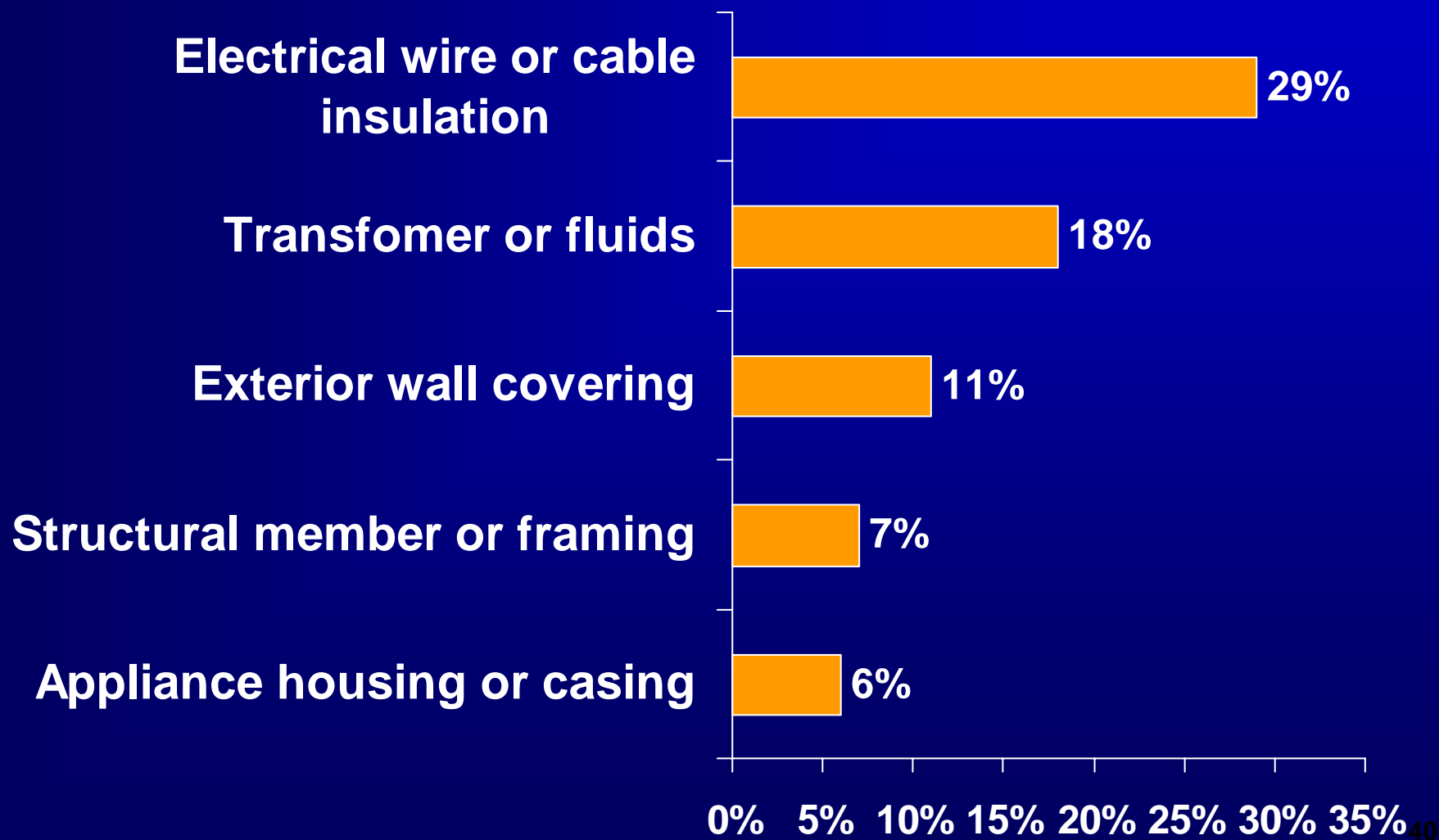


More on Home Transformer Fires

- ◆ These fires fell 50% from 1980 to 1998
- ◆ Leading factors contributing (99-03)
 - ◆ Unclassified electrical failure or malfunction – 35%
 - ◆ Unspecified short circuit arc – 18%
 - ◆ Short circuit arc from defective or worn insulation – 8%
 - ◆ Installation deficiency -- 6%
 - ◆ Storm – 6%
 - ◆ Exposure fire – 6%
 - ◆ Equipment overloaded – 12%



Leading Items First Ignited in Home Transformer Fires





In Summary

- ◆ The term “electrical fires” can have different definitions
- ◆ Electrical distribution and lighting fires have been falling
- ◆ Electrical factors dominate all categories of electrical distribution and lighting except lighting
- ◆ Leading specific factor was short circuit arc from defective or worn insulation



Closing Thoughts

- ◆ Some things don't fall neatly into categories
 - ◆ Will appliance power cord be coded as appliance or cord?
- ◆ Statistics suggest avenues for further research and help measure progress



Contact Information

Marty Ahrens

NFPA

1 Batterymarch Park

Quincy, MA 02169-7471

(617) 984-7463

mahrens@nfpa.org