

# **TORNADO-RELATED DEATHS AND INJURIES DUE TO THE MAY 3, 1999 TORNADOES**

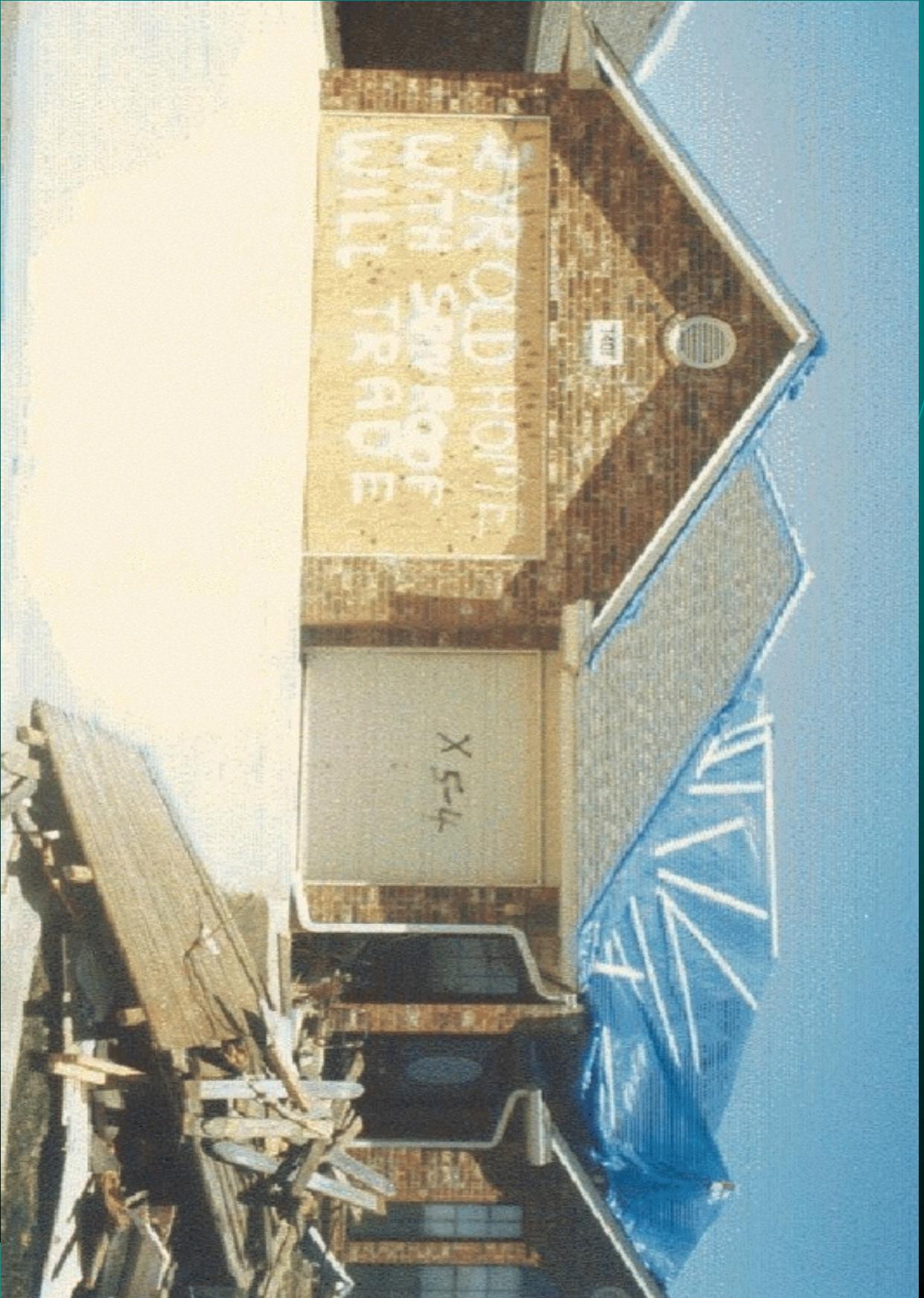
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**Photographs Courtesy of Jeff Piotrowski**

# Path of F5 Tornado Through Moore









# OBJECTIVES

- Injury epidemiology
  - Magnitude of injuries
  - Causes of Injuries
  - Locations
- Warnings
- Protective actions

# METHODS

- Injury Assessment
- Community Survey
- Random telephone survey of OCMISA

# INJURY ASSESSMENT

- Reviewed hospital medical records
  - Emergency room and inpatient
- Reviewed Medical Examiner reports
- Surveyed survivors by mail
- Telephone interviews by Medical Examiner's office

# COMMUNITY SURVEY

- Face-to-face interviews in severely damaged areas 4 days following tornadoes
  - Bridge Creek
  - Moore and Southwest OKC
  - Del City

# RANDOM TELEPHONE SURVEY

- Telephone interview of 6 county Oklahoma City Metropolitan Statistical Area
- Computer generated random digit telephone sample

# DEATHS

- 45 persons died
  - 3 cardiac deaths
  - 1 preparing for the tornado
  - 1 after the tornado
  - 40 directly from tornado

# INJURIES

- 577 injured persons
  - 26 preparing for the tornado
  - 39 after the tornado
  - 512 directly from tornado

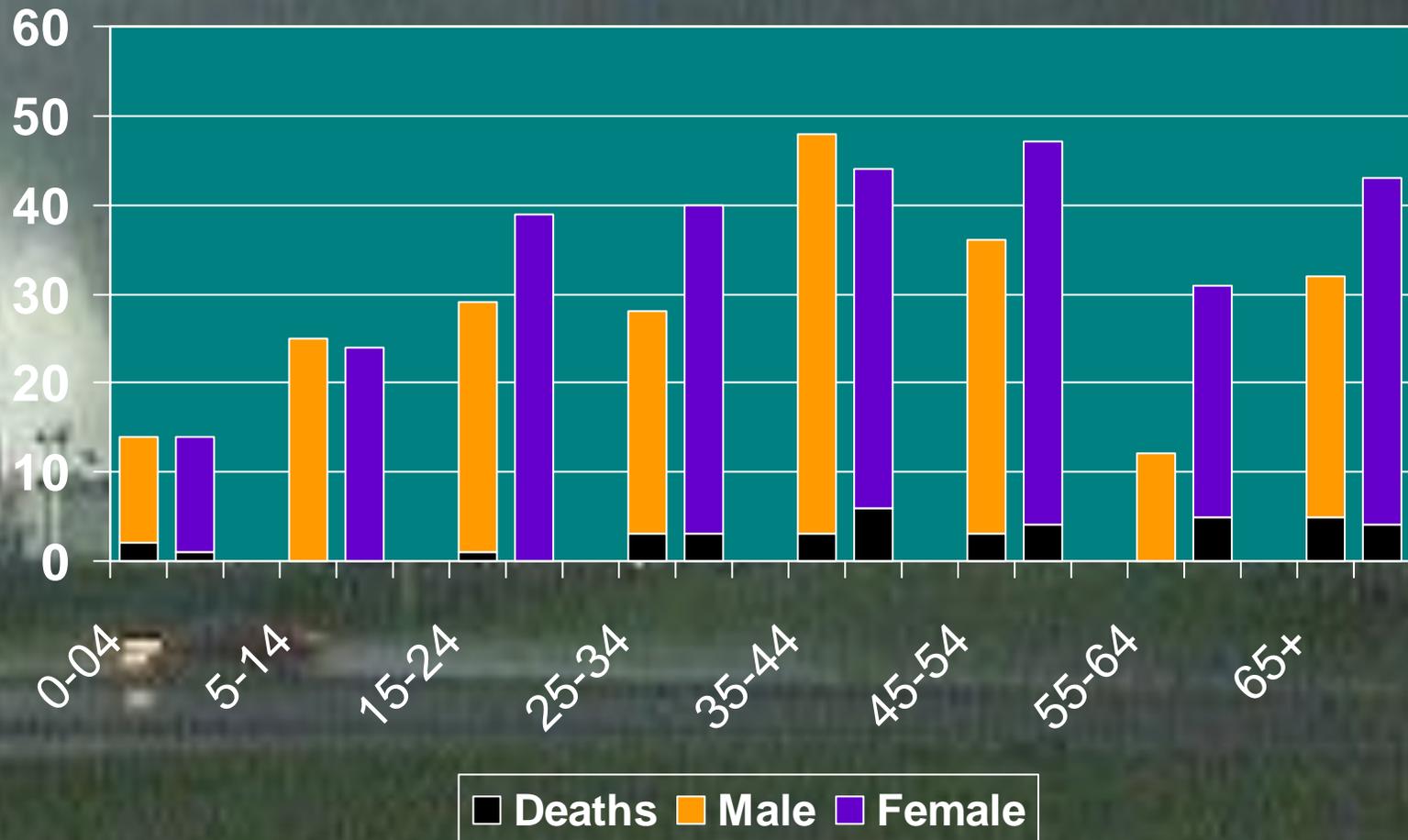
# DIRECT INJURIES\*

- 134 (26%) hospitalized
- 376 (73%) treated and released in emergency departments

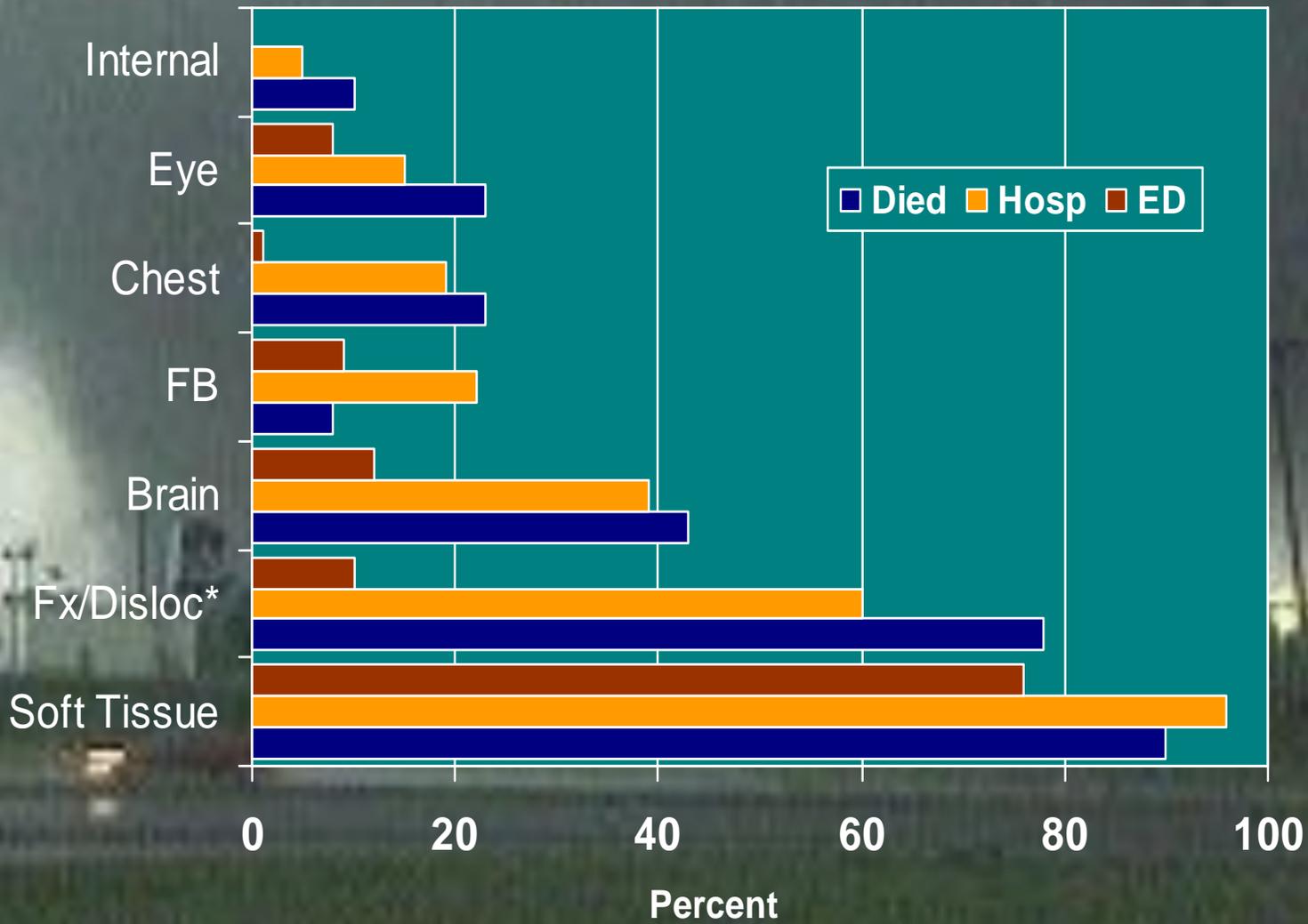
\*512 persons. Treatment status was unknown for 2 persons.

# AGE AND SEX

Number



# FREQUENCY OF INJURY BY TREATMENT AND OUTCOME STATUS



\*Significantly higher among persons who died.

# CAUSES OF INJURIES

- **Unspecified flying/falling debris (36%)**
- **Picked up/blown by tornado (16%)**
- **Collapse of walls, ceiling, roof (13%)**
- **Flying/falling wood or boards (11%)**
- **Hit by objects (11%)**
- **Glass (6%)**
- **MVC (5%)**
- **Other (10%)**
- **Unknown (29%)**

\*Percents add up to more than 100 because persons sustained more than one injury from more than one cause.

# PROBABLE CAUSE OF DEATH

- **Multiple injuries (50%)**
- **Head injuries (23%)**
- **Chest trauma (18%)**
- **Traumatic asphyxia (10%)**

# LOCATIONS\* OF DEATHS AND INJURIES

	Died	Injured
House	19	236
Mobile Home**	8	27
Outdoors**	7	31
Apartment**	4	10
Vehicle	1	24
Public Bldg	1	18
Storm Shelter	0	7

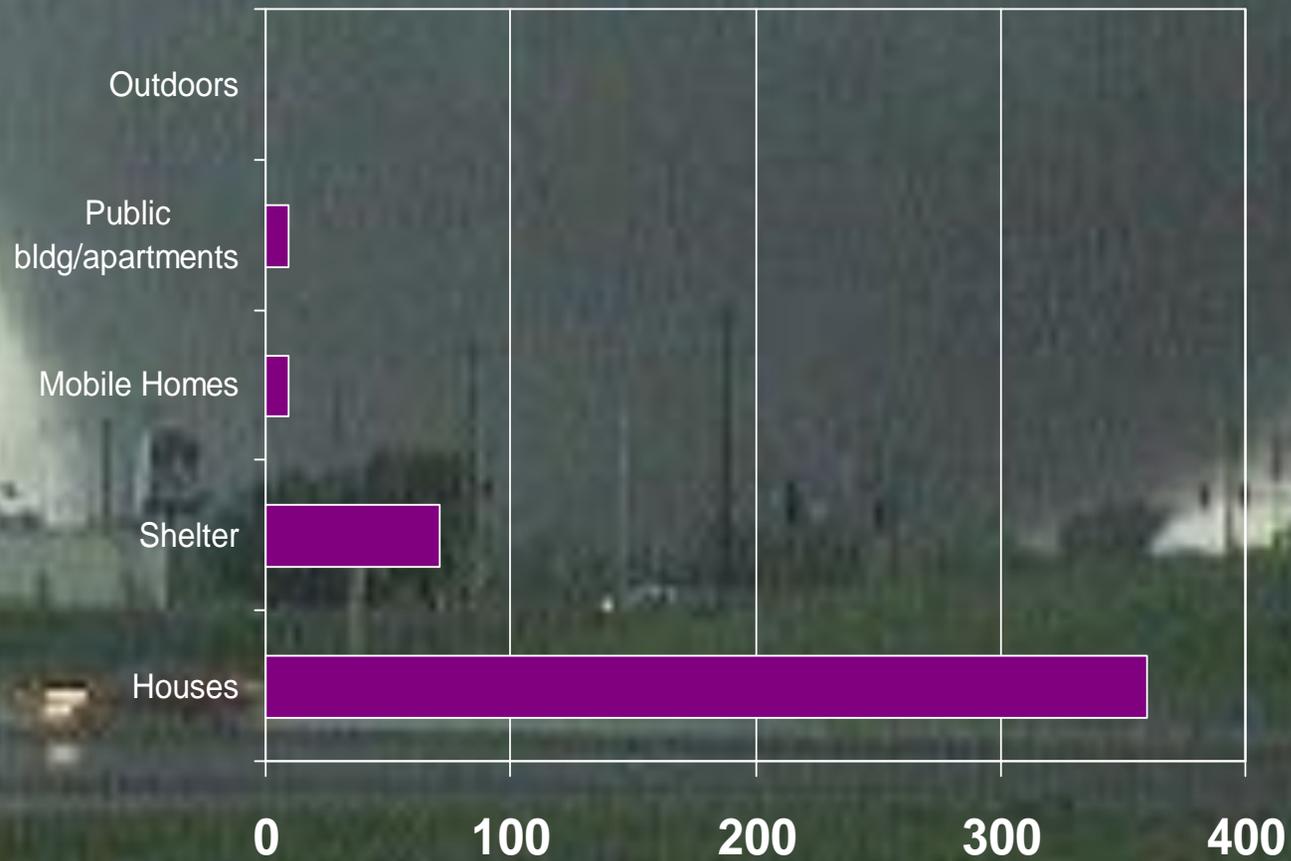
\*Includes locations of 353 injured survivors and 40 persons who died.

\*\*Proportion of deaths significantly higher than in houses.

# **SPECIFIC LOCATIONS OF 27 PERSONS WHO DIED**

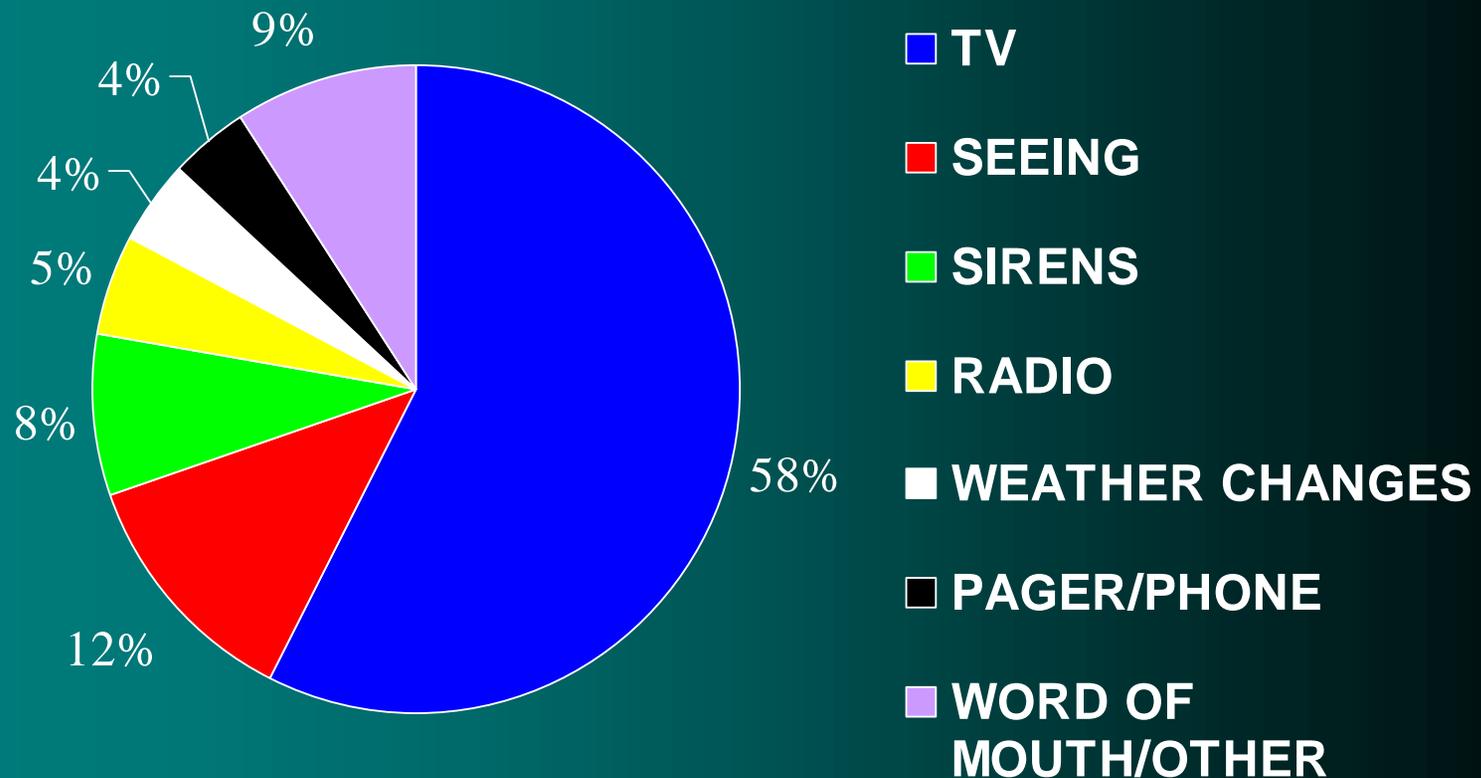
- **19 (70%) not in recommended place**
  - **8 mobile home**
  - **7 outdoors (2 under overpass)**
  - **1 upstairs apartment**
  - **2 rooms with exterior walls**
  - **1 motor vehicle**
- **8 (30%) in recommended place**
  - **5 closet**
  - **3 bathroom**

# LOCATIONS OF PERSONS IN DAMAGED AREAS



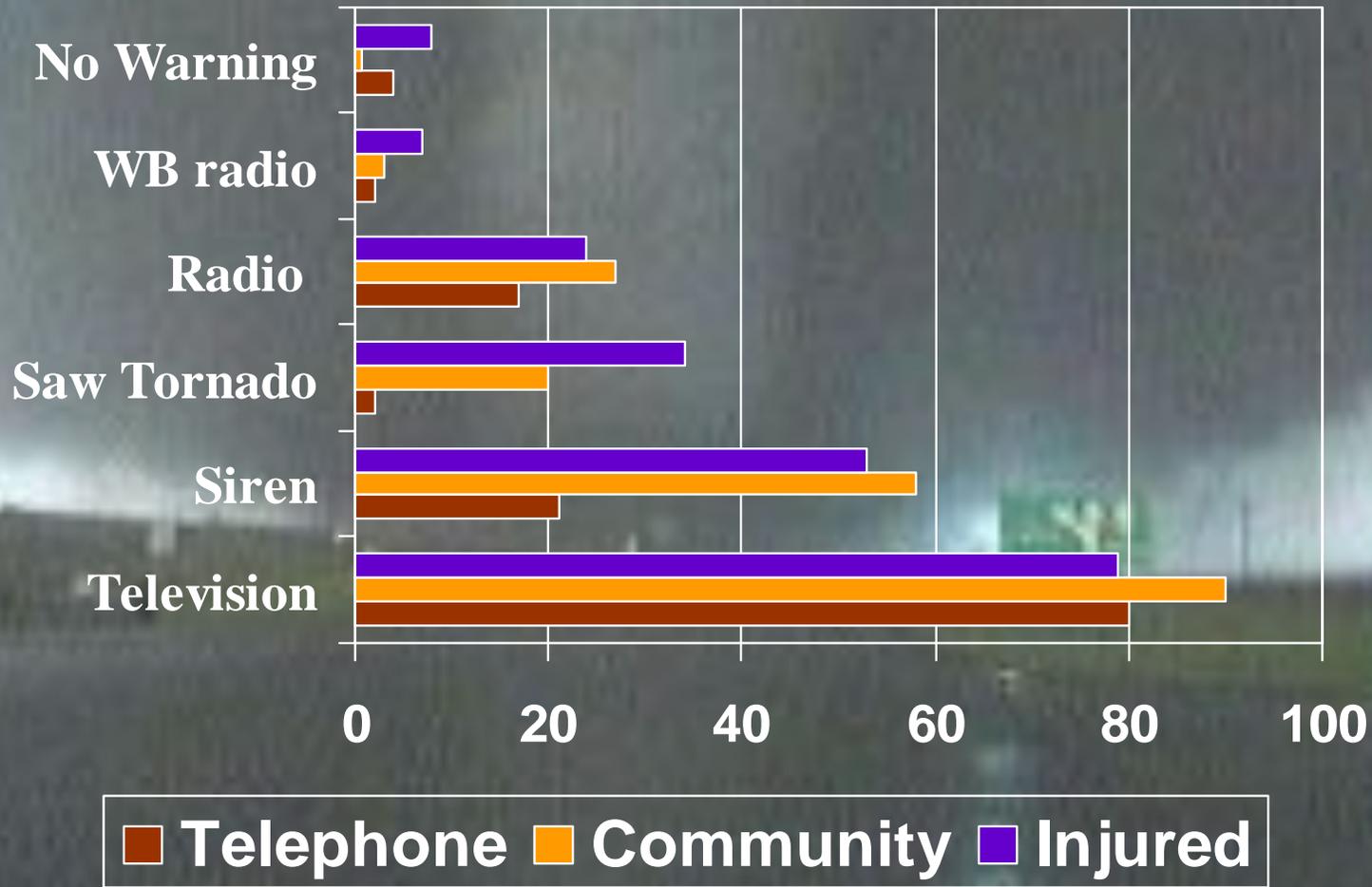
\*450 people in damaged areas.

# WARNINGS THAT CAUSED ACTION (COMMUNITY SURVEY\*)



\*Interviews with 450 people in areas damaged by the tornado.

# PREVALENCE OF WARNINGS



# KNOWLEDGE OF SHELTERS

- Community survey
  - 66% “didn’t know or weren’t sure” of shelter location
- Random telephone survey
  - 37% “didn’t know or weren’t sure” at time of tornado
  - 32% “didn’t know or weren’t sure” 14-17 months later
  - 14% shelter on home premises at time of tornado
  - 17% shelter on home premises 14-17 months later

# PROTECTION

- Go to lowest level of dwelling, away from exterior walls, in an interior closet or bathroom
  - Need to examine how public perceives “recommended safe place”
- Cover the body with thick blankets or clothing (protect from flying debris)
- Protect the head from brain injury by wearing a motorcycle or bicycle helmet

# RECOMMENDATIONS

- Have a preparedness plan in advance
  - If in a mobile home, **LEAVE** immediately. Have a predetermine shelter
- Heed the warnings
- Increase availability of shelters
- Increase knowledge of location of shelters

# RECOMMENDATIONS

- Don't seek protection under overpasses
- If caught outdoors or in motor vehicle, seek substantial shelter