

Heat-Related Deaths Associated with a Severe Heat Wave — California, July 2006

**WREN
Ashland
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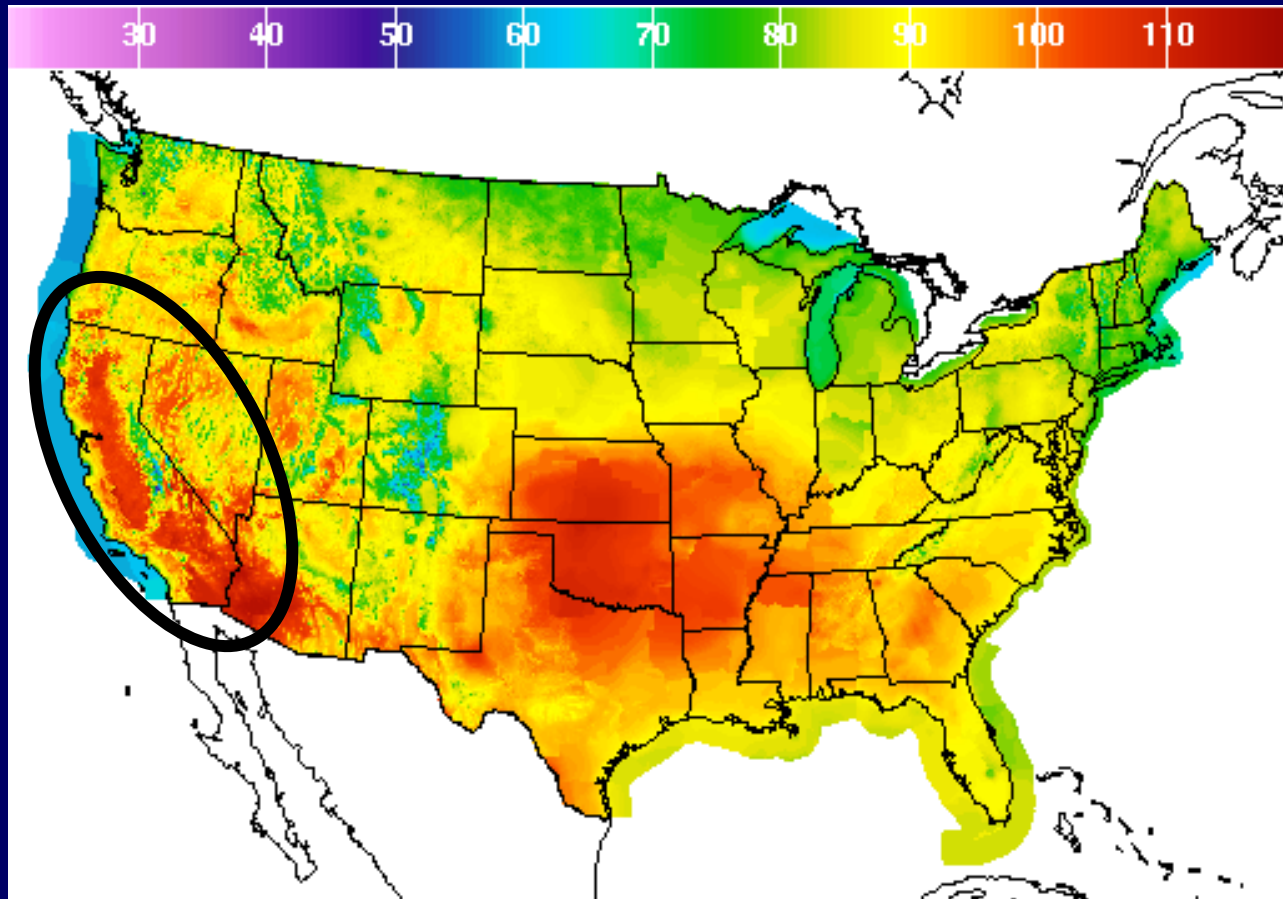
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(July 2007: Dept. of Public Health)**



Heat Waves as Environmental Disasters



July 20, 2006

July 2006 California Heat Wave

- July 15 – August 1
- ≥ 3 days of $\geq 100^{\circ}$ F shade temperature, or
- ≥ 2 days of $\geq 105^{\circ}$ F heat index
- Record breaking maximum temperatures
- High minimum temperatures
- Long duration

Heat-Related Illness

- **Heat stress and exhaustion**
 - Cramping
 - Heavy perspiration
 - Weakness
- **Heat Stroke**
 - Core body temperature $>104^{\circ}\text{F}$
 - Multiorgan system dysfunction
 - Often fatal despite treatment

Risk Factors in Heat-Related Deaths

- **Infant or Age >60**
- **Lack of air conditioning**
- **Social isolation**
- **Presence of chronic disease condition**
- **Cognitive and mobility impairments**
- **Low socio-economic status**
- **Housing characteristics**

Objectives of Study

- **Perform a descriptive analysis of California heat-related deaths**
- **Identify potential modifications in the state plan for excessive heat emergencies**

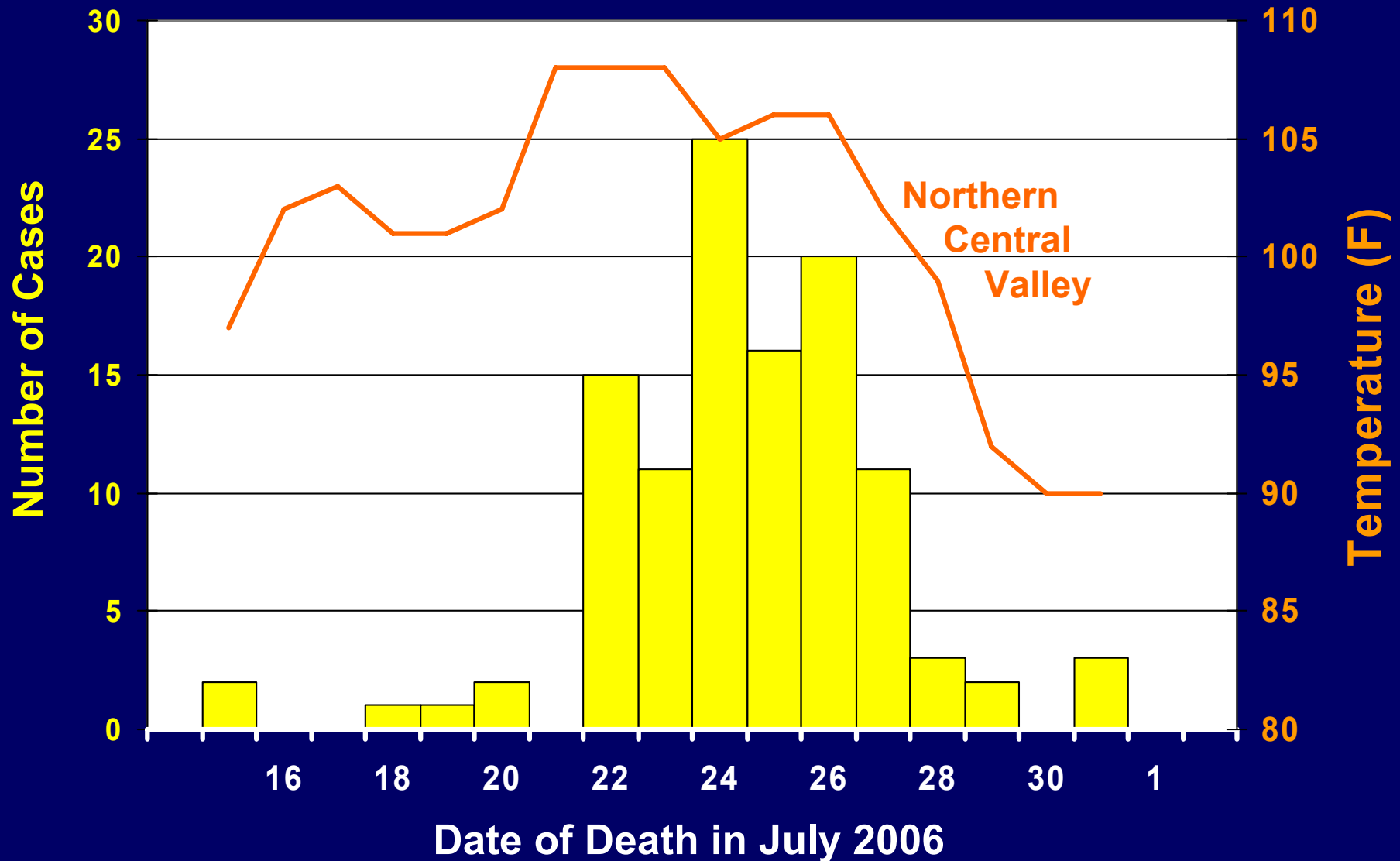
Methods

- **Case series**
- **Coroner reports**
 - Investigative narrative
 - Toxicology
- **Abstraction form**
- **Denominator data from 2005 US Census estimates**
- **Compared to CA mortality data**

Case Definition

- Death of a CA resident of any age
- Death between July 15 – August 1
- Underlying or contributory cause of death
- No evidence of trauma and at least one of the following:
 - Core body temperature $\geq 105^{\circ}\text{F}$ ($\geq 40^{\circ}\text{C}$)
 - Decomposed body, person last seen alive at onset of heat wave
 - High environmental temperature at death scene

Heat-Related Death in California, July 15 – August 1, 2006 (n=140)



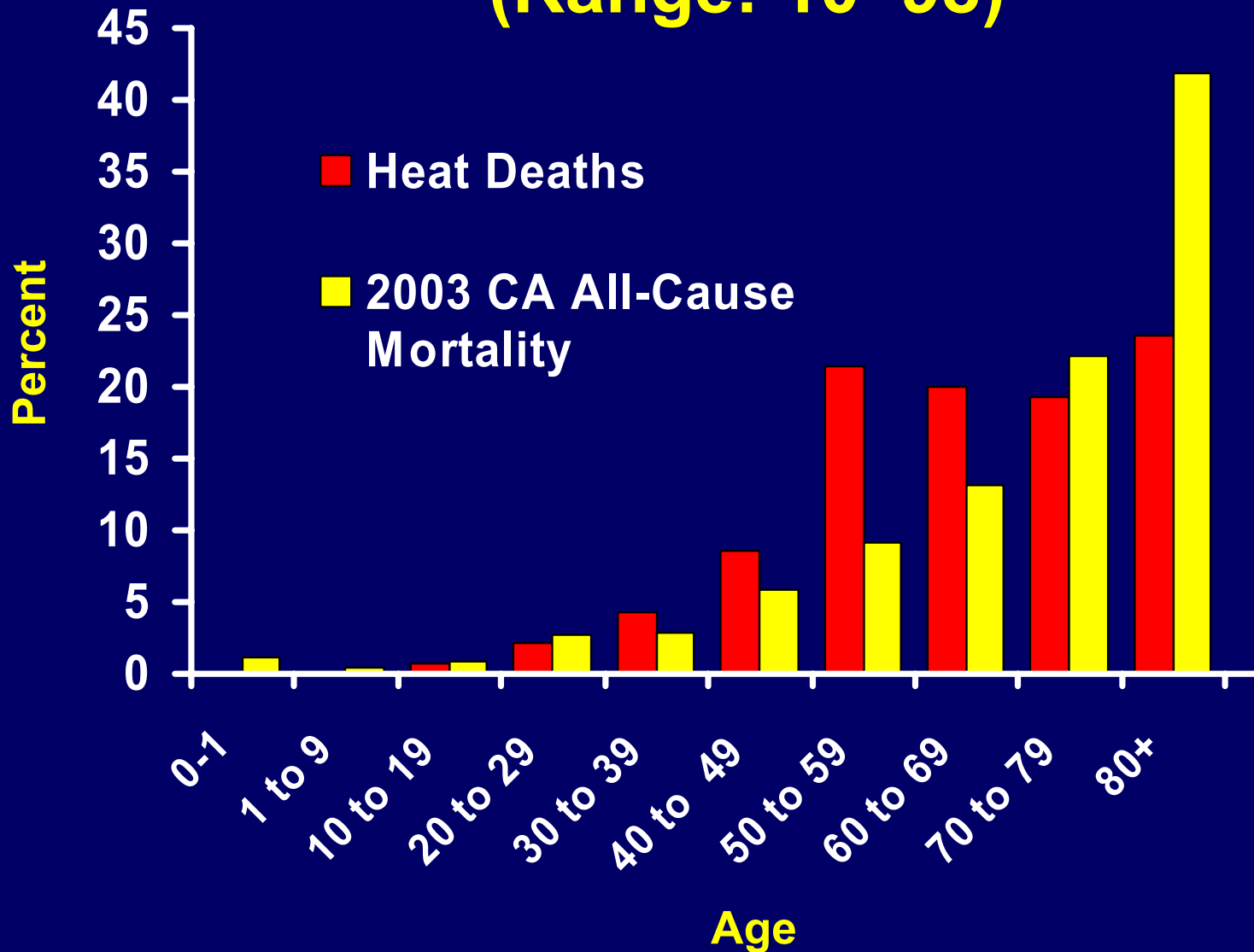
Heat-Related Deaths in Counties with ≥10 Deaths, July 15 – August 1

	No. (%)	Rate/100,000 population (95% CI)
Imperial	10 (7)	6.4 (2.4 – 10.4)
Stanislaus	23 (16)	4.6 (3.0 – 6.4)
San Joaquin	21 (15)	3.2 (1.8 – 4.5)
Fresno	20 (14)	2.3 (1.2 – 3.2)
Kern	15 (11)	2.0 (1.0– 2.9)
Sacramento	13 (9)	0.9 (0.4 – 1.5)
California: June – Aug (1999-2004)		0.12 / 100,000 population

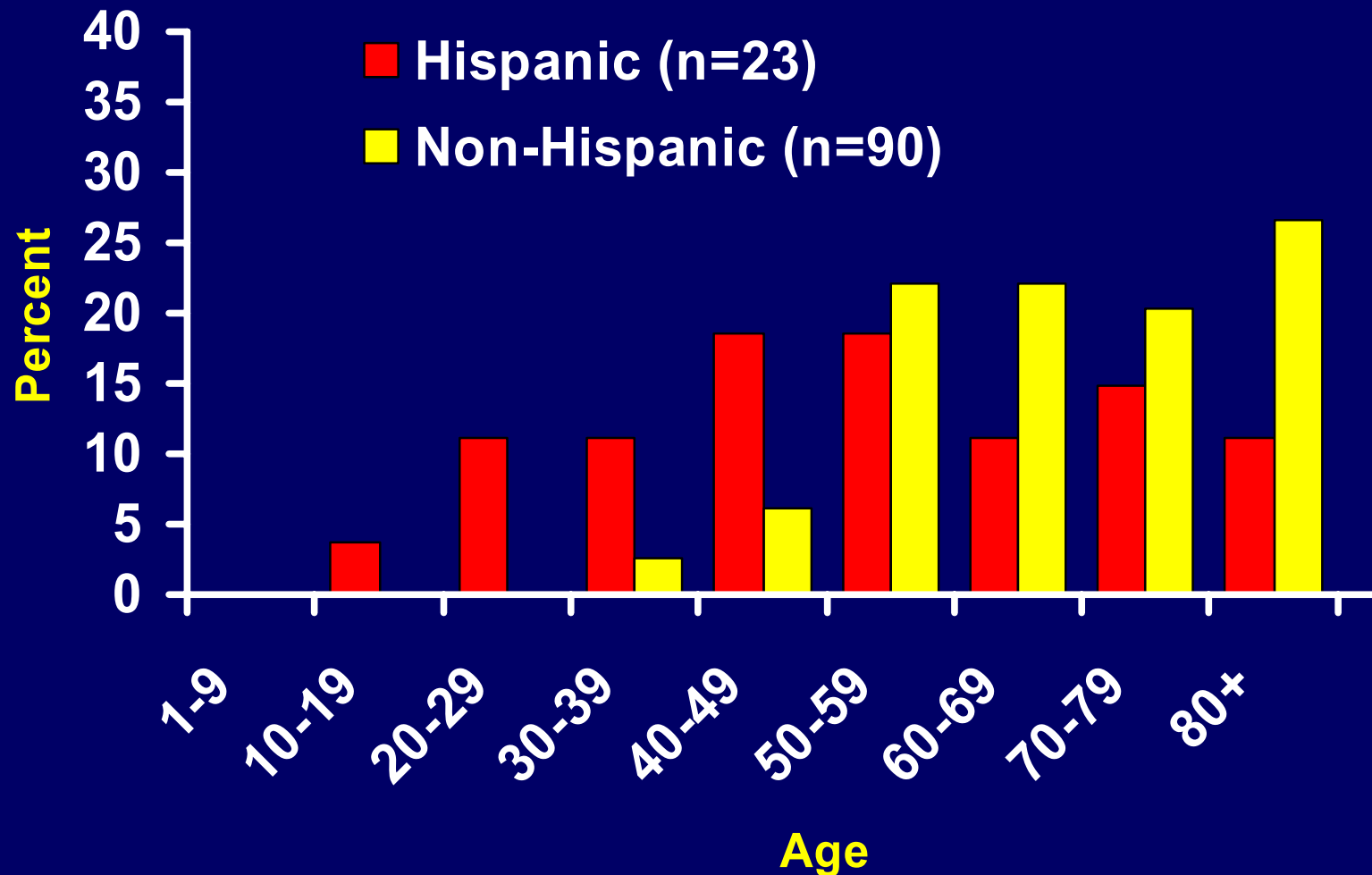
Demographics of Heat-Related Deaths (n=140)

Characteristic	Case (%)	% CA Mortality	OR (95% CI)
Male	66	50	2.0 (1.3–2.8)
White, Non-Hispanic	63	71	referent
Hispanic	24	14	1.9 (1.2–2.9)
Black, Non-Hispanic	12	8	1.8 (1.0–23.2)
Asian / Pacific Islander	1	7	0.1 (0.01–0.8)
Unknown race	19		

Distribution of Heat-Related Deaths by Age (Range: 10–98)



Age Distribution of Heat-Related Deaths by Hispanic Ethnicity



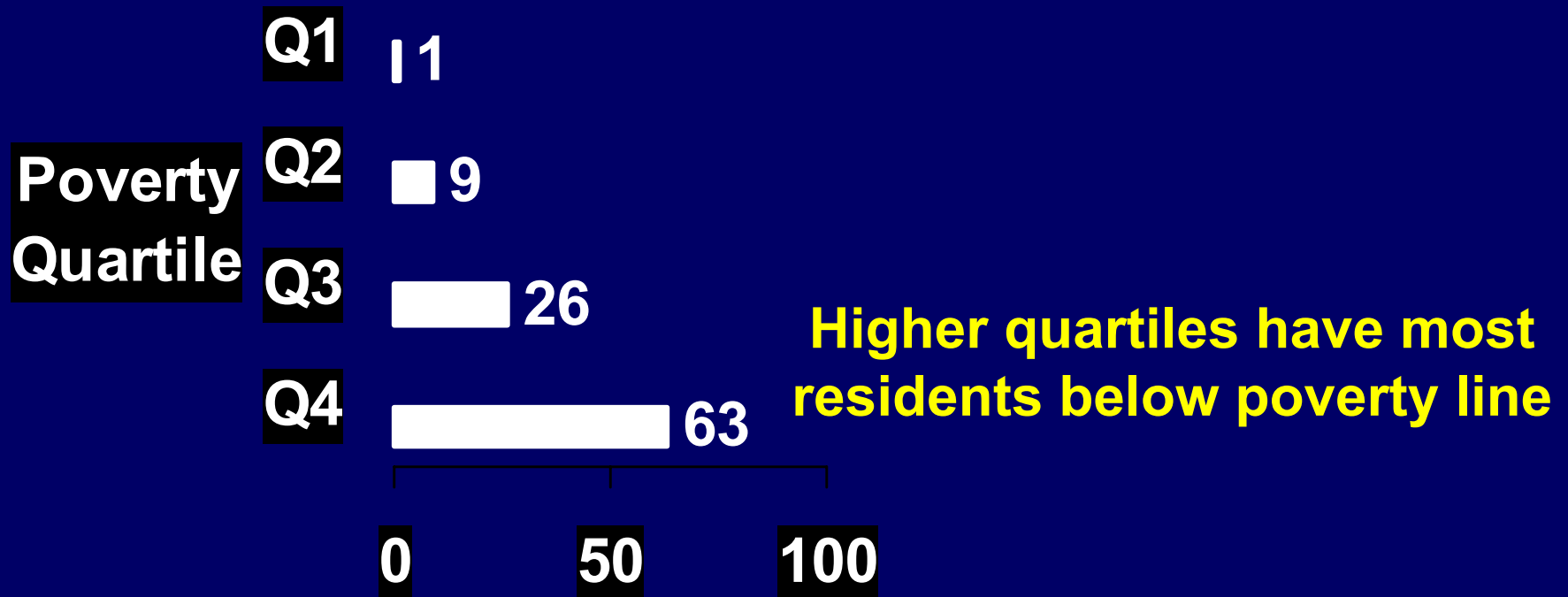
Air Conditioning (AC) Use Among Indoor Decedents (n=96)

Status	No. (%)
AC not present	42 (45)
AC Unknown	19 (20)
AC present	35 (35)
Not functional	16 (46)
Functional	19 (54)
Used	1 (5)
Not used	18 (95)

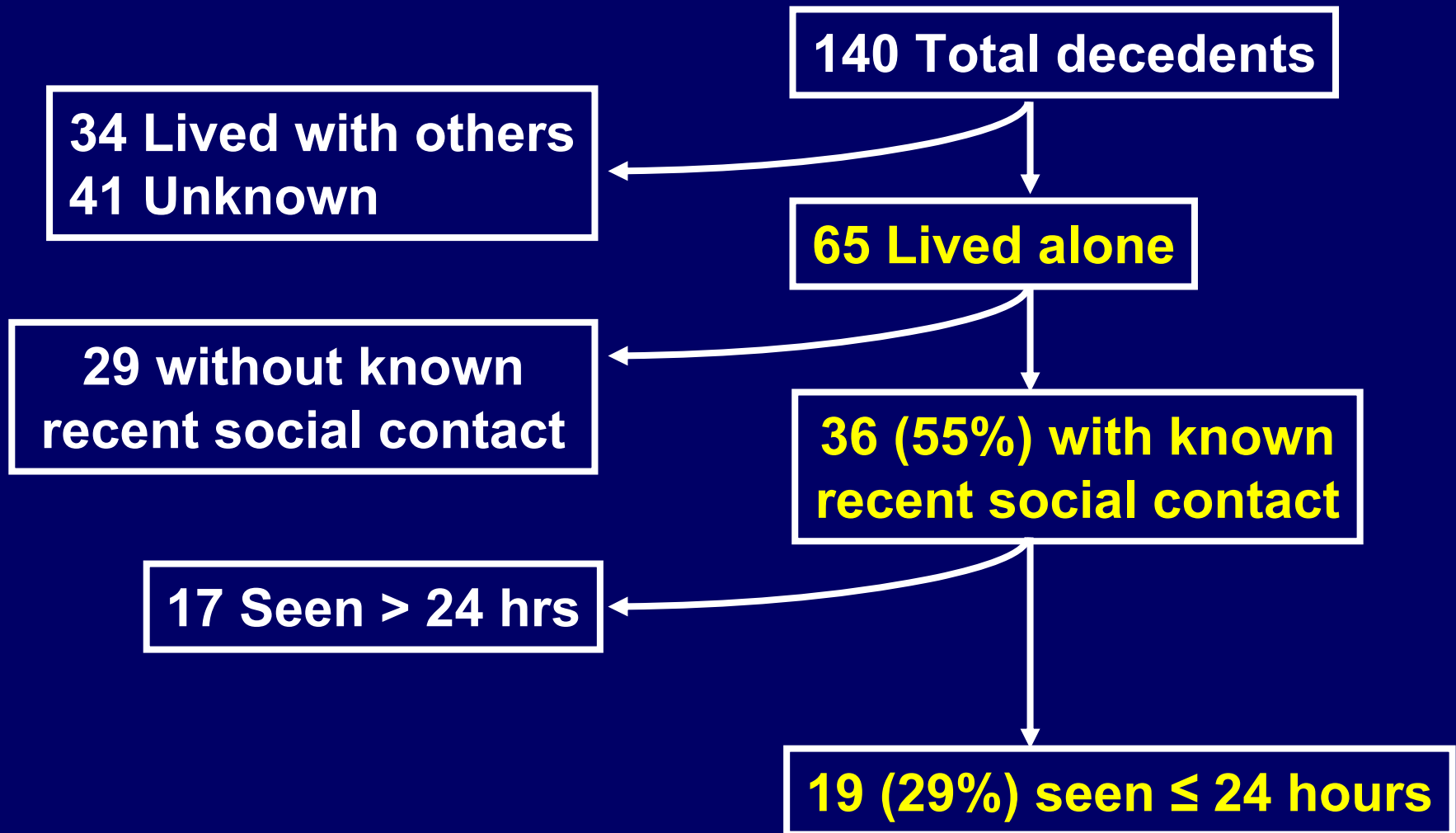
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Residence of Decedents in Zip Code Areas by Level of Poverty



Recent Social Contact Before Death of Decedents Who Lived Alone



Chronic Disease Conditions Among Heat-Related Deaths

Disease	%
Cardiovascular	47
Psychiatric	23
Alcohol abuse / dependence	17
Pulmonary	7
Confined to bed	2

Limitations

- **Lack of information on decedents**
 - Knowledge of alerts and risk reduction steps
 - Presenting symptoms
- **Coroner reports**
 - Incomplete data for public health use
 - Definition of heat-related death applied consistently?

Discussion

- **71% had one or more commonly known risk factors**
- **Non-use of functioning air conditioners in 13%**
- **Possible ineffective assessment and intervention by social contact prior to death**
- **Younger age in Hispanic decedents**

Recommendations

- **Clearly define threshold for intervention by social contacts**
 - Not to wait for symptoms
 - Based on forecast and risk factors
- **Broadcast heat advisories on the Emergency Alert System**
- **Conduct active surveillance or case control study in heat illness**
 - AC use
 - Tailor prevention messages for high risk groups

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The findings and conclusions in this presentation have not been formally disseminated by the CDC and should not be construed to represent any agency determination or policy

