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Carbon monoxide poisoning surveillance during 2021 Winter Storm Uri:

Analysis of Texas Poison Center Network Data

Council of State and Territorial Epidemiologists
Disaster Epidemiology Workshop
May 18, 2021

Texas Poison Center Network (TPCN)



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Texas Poison Center Network (TPCN)

- Provides free medical care via Specialized Poison Investigators (SPIs)
 - Usually nurses, pharmacy students, medical students
 - Medical Doctors, Toxicologists, and other health care professionals
- Six regional poison centers based at hospitals or universities



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TPCN Operations

- Toll-free number – 800-222-1222
 - Universal phone number for all centers in the United States
 - Call first goes to the nearest local poison center where the call originated from
 - Telecommunications system allows calls to be answered by other poison centers
 - Ensures all calls are answered 24/7/365



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TPCN Data

- Types of Calls
 - Information and Exposure
 - Common exposures: medication, Illicit substances, plants, animal bites
- Data collected depends on the type of call
 - Exposure vs Information
- Substances / Exposures
 - Hierarchal categories
 - Poison Index → Generic Code → Minor Category → Major Category
- Exposures are not mutually exclusive
 - Calls can have multiple exposures



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Public Health Emergency and Event Surveillance Using TPCN Data



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Emergency Surveillance

- Public Health Emergencies and Events
 - Natural disasters
 - Disease outbreaks
 - Environmental events
 - Chemical plant fires
 - Spills
- Query TPCN and create daily reports
 - TPCN – public health emergency field
 - SAS codes
 - Access Database



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CO Surveillance

- Routine Surveillance
 - CO Exposure TPCN Dashboard
 - <https://healthdata.dshs.texas.gov/dashboard/environmental-health/carbon-monoxide-related-poison-center-calls>
- Winter Storm Uri Surveillance
 - Monitored calls for carbon monoxide exposure and contaminated water exposure calls
 - Created summary report of exposure calls



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Carbon Monoxide (CO) Poisoning



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Carbon Monoxide (CO)

- CO
 - Odorless, colorless, tasteless gas
- CO Poisoning
 - Inhaling combustion fumes
 - CO builds up in blood stream
 - Replaces oxygen in blood



CO Sources

- Fuel burning appliances and engines used in closed spaces
 - Charcoal grills
 - Generators
 - Space heaters
 - Water heaters
 - Cooking ranges
 - Fireplaces
 - Camp stoves



CO Poisoning & Disasters

- Snowstorms, heavy storms, hurricanes
 - Power outages
 - Bring alternative heat/electric sources into home
- Hurricane Ike (2008)
 - Carbon Monoxide Exposures After Hurricane Ike --- Texas, September 2008, CDC MMWR
 - 54 CO exposure calls to TPCN
 - 7 deaths



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North American Winter Storm Uri



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Winter Storm Uri

- Saturday February 13, 2021 – Wednesday February 17, 2021
- Ice
 - Hazardous road conditions
 - Freezing rain
- Record breaking
 - Low temperatures
 - -6° Tyler, TX
 - Snow
 - 14.8" Abilene, TX



Electric Reliability Council of Texas (ERCOT)

- ERCOT manages the state's main power grid
 - 90% of Texas' electric load
- 70% of ERCOT customers lost power during winter storm
 - Average 42 hours without power
 - Millions lost power for longer
- After temperatures warmed up millions still did not have power



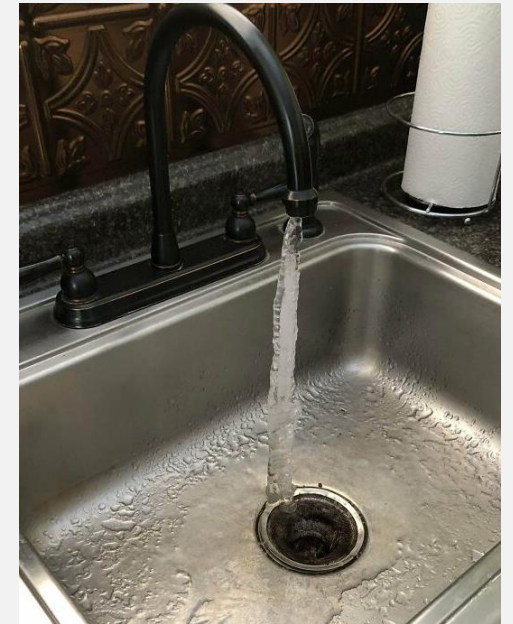
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After Effects

- Frozen and burst pipes left millions without water
 - 49% – lost access for an average of 2+ days
- Electricity shut-offs affected water treatment plants
 - Boil water notice – 14 million+ people
- Food shortage



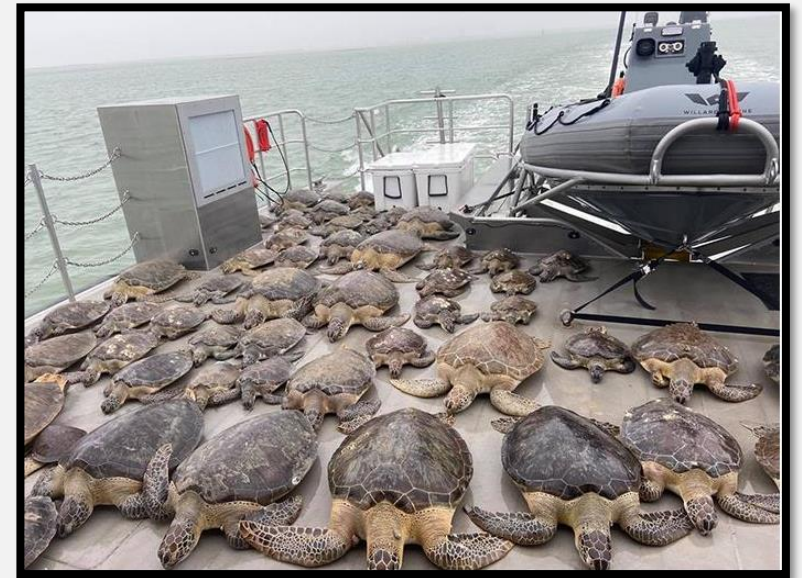
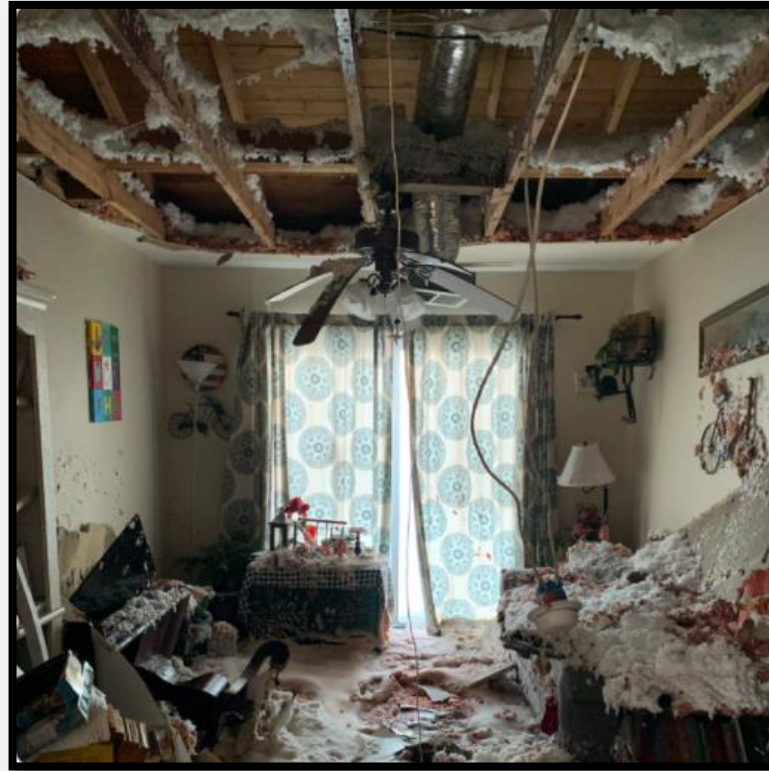
Reddit/icepics



@Thomas blackgg

Report by the Hobby School of Public Affairs at the [University of Houston](https://www.uh.edu/).







Ilana Panich-Linsman/The New York Times via Redux Pictures



CREDIT: JAY JANNER /AUSTIN AMERICAN-STATESMAN VIA AP



REDIT: GO NAKAMURA/GETTY

CO Exposure Calls and Winter Storm Uri

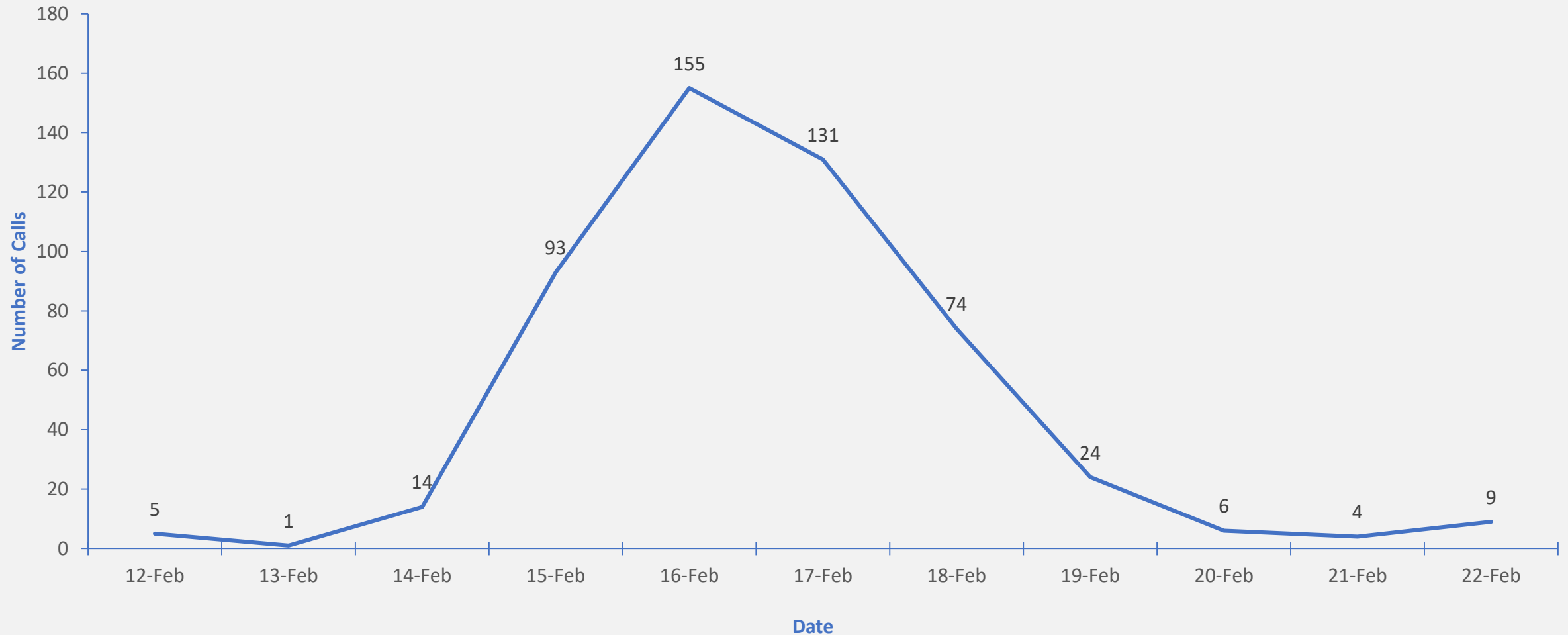
February 12, 2021 – February 22, 2021



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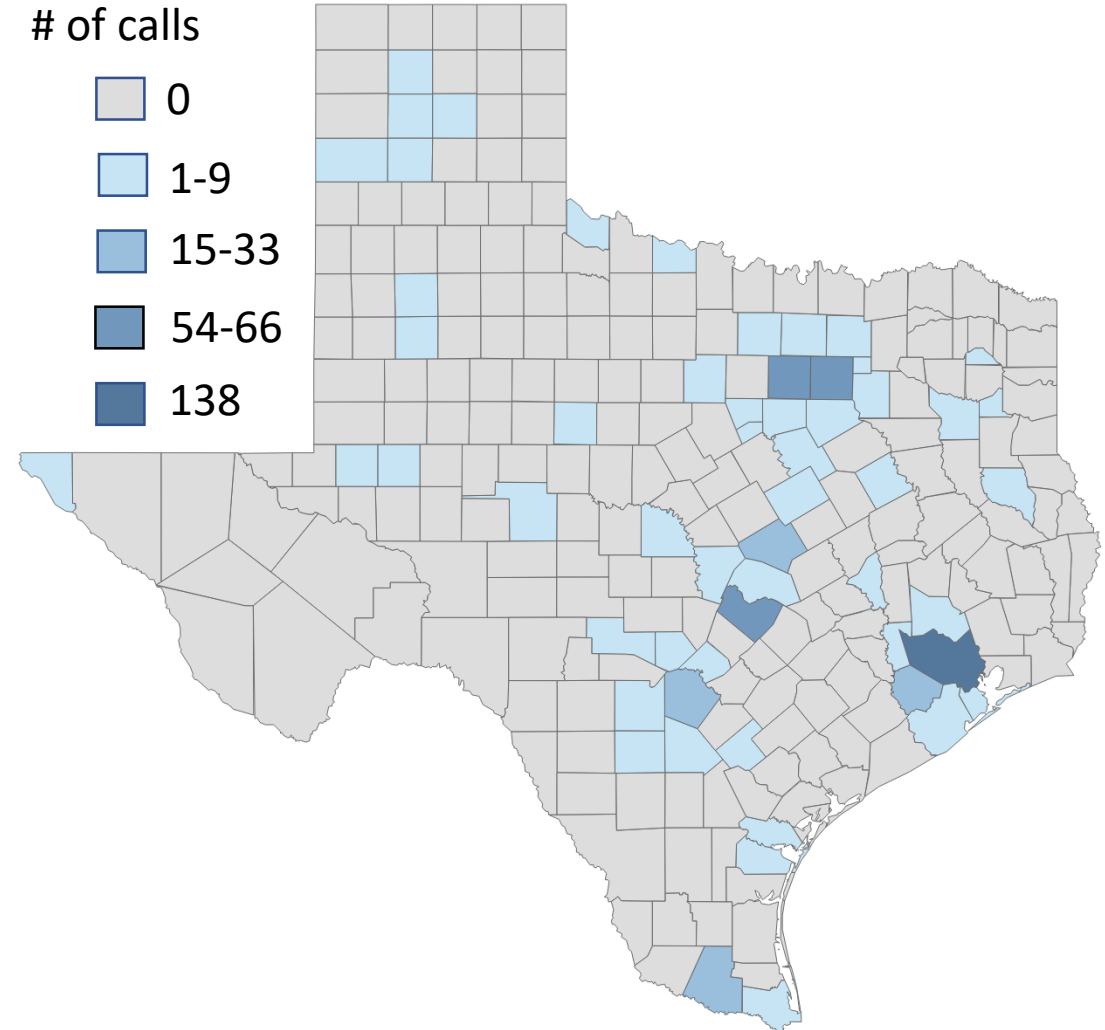
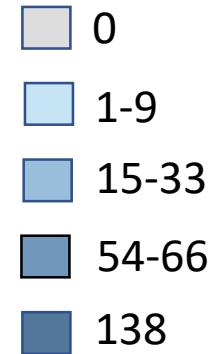
CO related calls to TPCN, February 2021



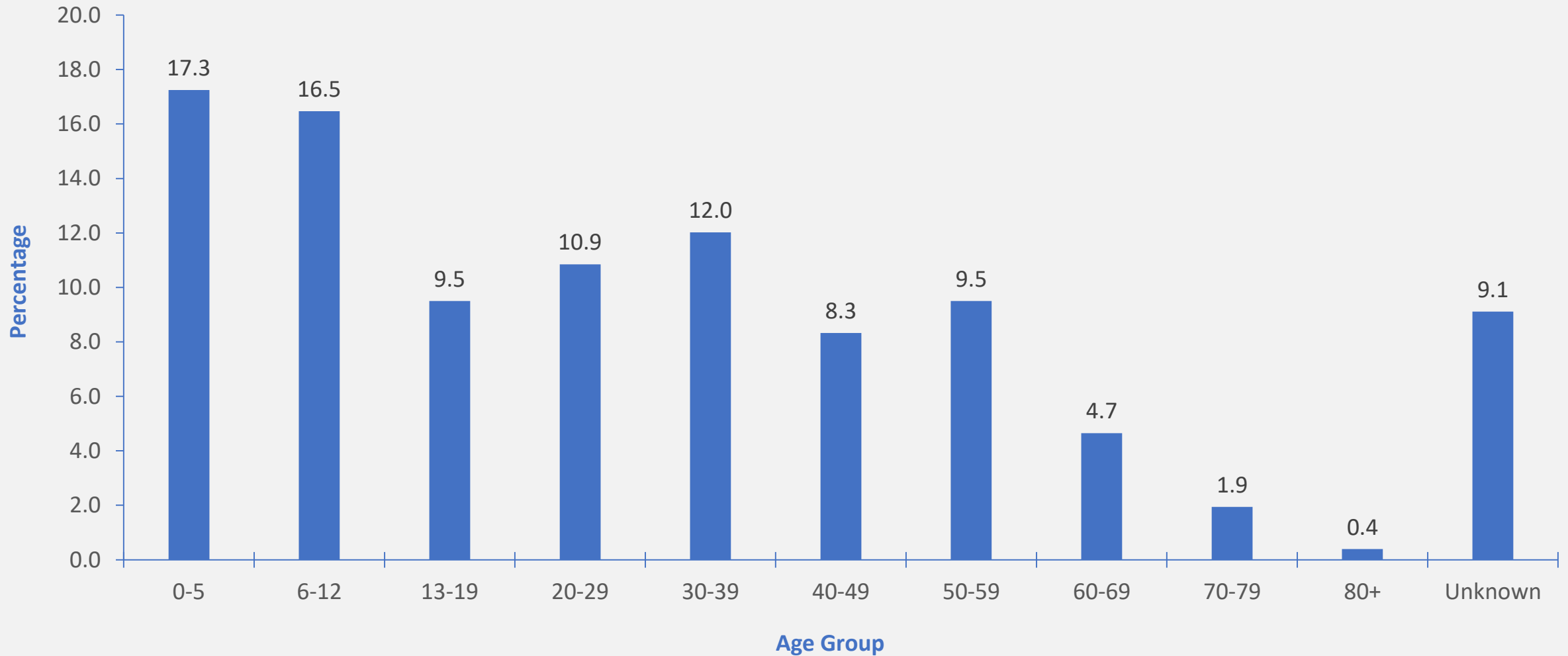
Calls by County

County	Calls
HARRIS	138
TRAVIS	66
DALLAS	55
TARRANT	54
HIDALGO	33
BEXAR	20
FORT BEND	19
BELL	15
MONTGOMERY	9
FREESTONE	8
GALVESTON	7
WILLIAMSON	6
BRAZOS	5

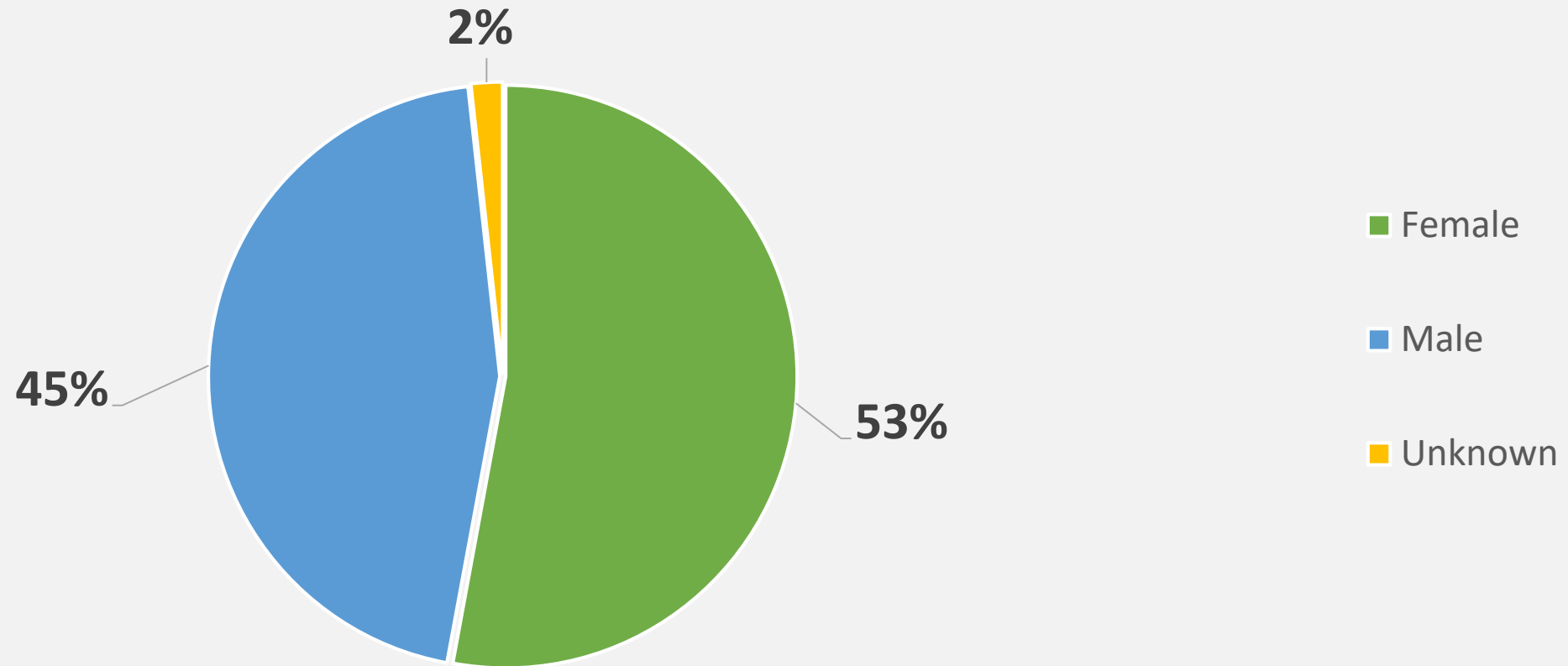
of calls



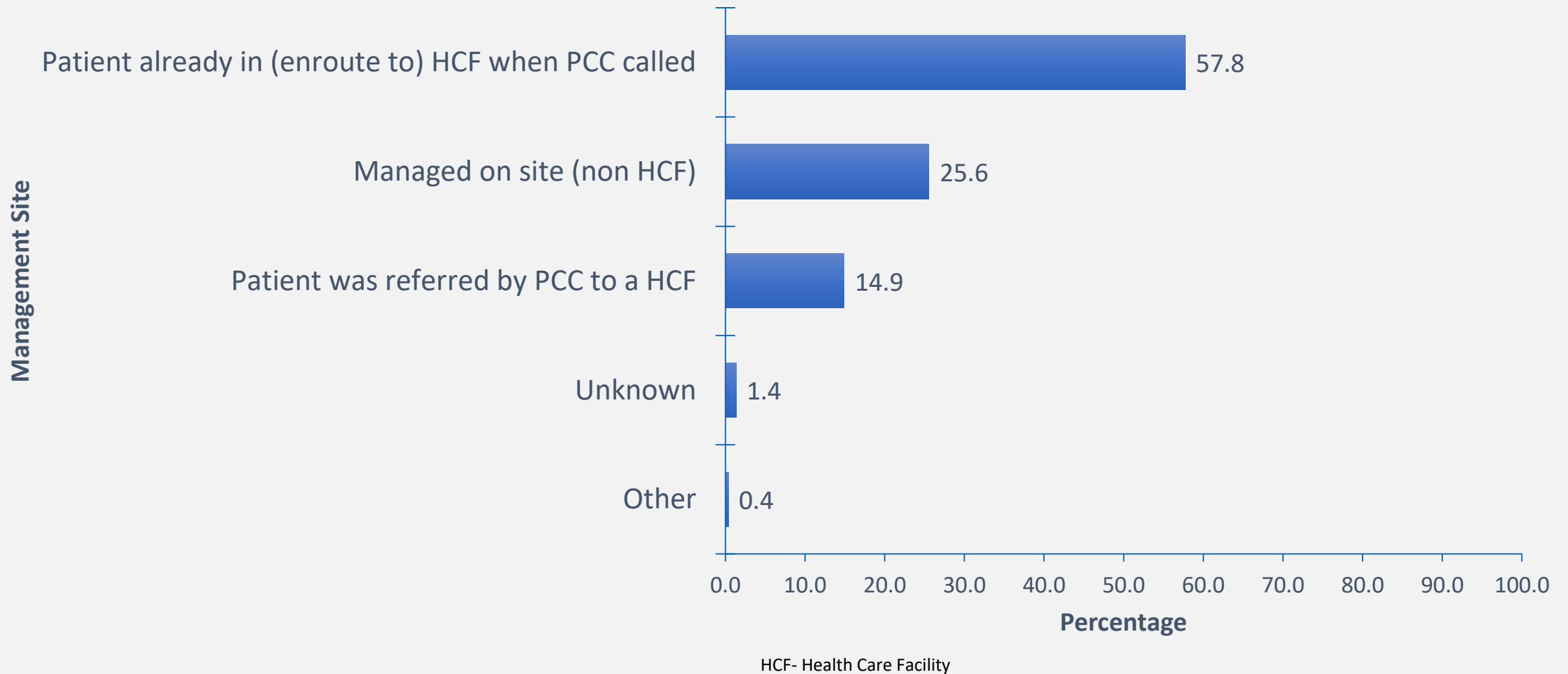
Calls by Patient Age Group (n=516)



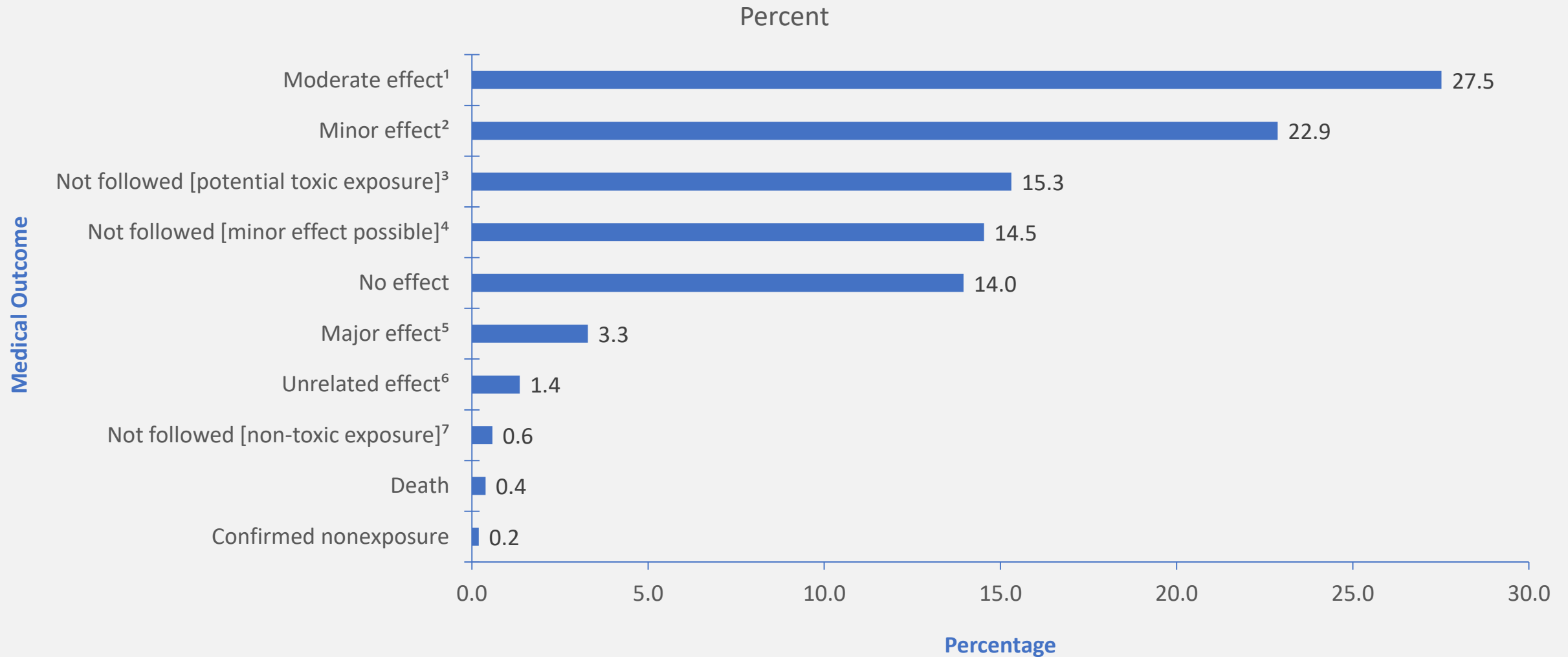
Calls by Patient Sex (n=516)



Calls by Management Site (n=516)



Calls by Medical Outcome (n=516)



Medical Outcome Effect Definitions

¹Moderate Effect: patient exhibited pronounced and prolonged symptoms and exposure may require treatment.

²Minor Effect: patient exhibited some symptoms, but they were minimally bothersome and resolved quickly.

³Unable to follow, judged as a potentially toxic exposure.

⁴Not followed, minimal clinical effects possible (no more than minor effect possible).

⁵Major Effect: patient exhibited life threatening symptoms or significant residual disability.

⁶Unrelated effect, the exposure was most likely not responsible for the effect(s).

⁷Not followed, judged as nontoxic exposure (clinical effects not expected).



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Conclusion



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Summary

- Harris county (Houston) had the most CO calls, 138
 - Followed by Travis (66) ,Dallas (55), and Tarrant (54)
- 33.8% of calls were for children 0-12
- 57.8% of calls were en route to a HCF when TPCN was called
- Majority of calls had a moderate (27.5%) or minor (22.9%) medical outcome



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Conclusion

- Winter storm Uri had devastating impacts on Texans
- Calls centered around the largest cities in Texas
- This is only a snapshot of carbon monoxide exposures
- Poison centers are an important lifeline for residents during emergencies



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Next Steps

- Analyze sources of carbon monoxide exposures during public health emergencies
- Look into not followed up calls



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Thank you!

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