Creating, Evaluating, and Utilizing the Council of State and Territorial Epidemiologists, Heat-related Illness Syndrome Query

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Monitoring heat-related illness is a public health priority in Arizona

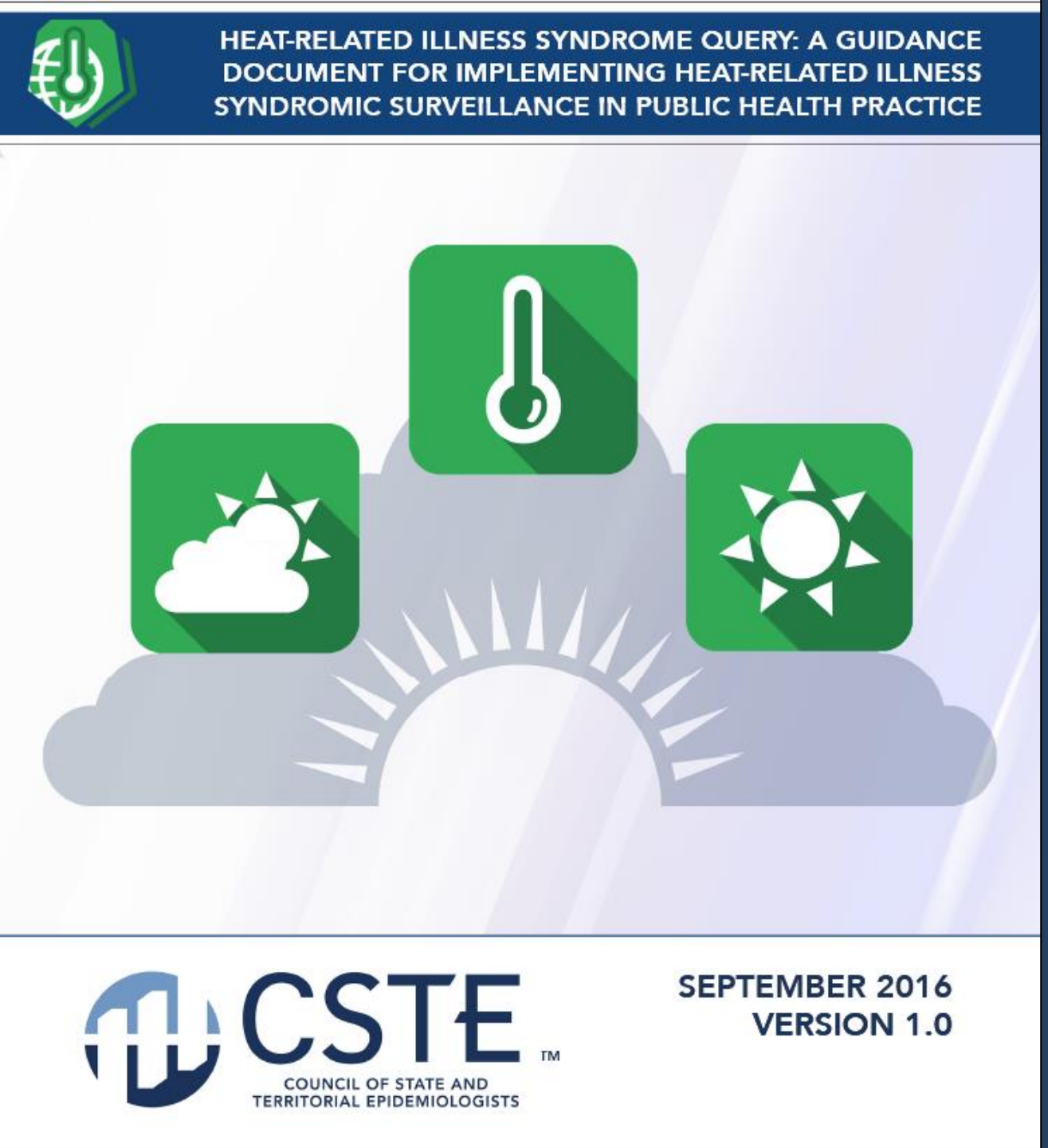
Ave # of days > 100°F:
110

Maricopa County deaths:
920

(between 2001- 2014)

BioSense for heat events?

- MCDPH explored the utility of the BioSense Platform for extreme heat events
- May improve situational awareness & initiate more timely responses



Worked with CSTE and other jurisdictions to develop a novel query

Evaluation

Query Evaluation

All-Hazards Surveillance

PUBLIC HEALTH *Reports*

Evaluation of a Novel Syndromic Surveillance Query for Heat-Related Illness Using Hospital Data From Maricopa County, Arizona, 2015

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Table 1. Diagnosis search codes, terms, and chief complaint search terms used in an NSSP BioSense "heat, excessive" query and CSTE novel heat-related illness query to produce initial line lists of patients with heat-related illnesses, Maricopa County, Arizona, January 1 to December 31, 2015[a]

Syndrome Query		Search Codes and Terms[b]
Developer	**Name**	
NSSP, BioSense Platform	BioSense predefined "heat, excessive" query	Inclusion criteria: *ICD-9-CM* and *ICD-10-CM* diagnosis search codes[c] 992, E900, T67, and X30 Diagnosis text search terms: demasiado caliente, to hot, too hot, excessive + heat, heat apoplexy, heat collapse, heat cramps, heat edema, heat effects, heat exhaustion, heat fatigue, heat prostration, heat pyrexia, heat stroke, heat syncope, over + heated, sunstroke Chief complaint text search terms: demasiado caliente, to hot, too hot, enlosacion, heat, hypertermia, hyperthermia, insolacion, over + heated, overheated, sobre calentado, sobre caliente
CSTE Heat Syndrome Workgroup	Novel heat-related illness query	Inclusion criteria: *ICD-9-CM* and *ICD-10-CM* diagnosis search codes[c] 992, E900, T67, and X30 Chief complaint text search terms: heat_,[d] heatcramp, heatex, heatst, heat-exhaust, heat-related, heat-stroke, hypertherm, overheat, "over heat," "sun stroke," sunstr, sun-str, "to hot," "too hot," ([heet OR hot] AND [excessive OR exhaust OR expos OR fatigue OR cramp OR stress OR "in car" OR outside OR prostration]) Exclusion criteria: *ICD-9-CM* and *ICD-10-CM* diagnosis search codes[e] 1992, 6992, E900.1, E9001, and T50.992A Chief complaint text search terms: allerg, "feeling hot," "feels heat," "feels hot," "felt hot," (hot AND sensation), "heat sensation," inflam, (pain AND (limb OR arm OR shoulder OR elbow OR wrist OR hand OR leg OR hip OR groin OR thigh OR knee OR ankle OR foot OR feet), pain AND red, radiat, redness, swell, swollen, surg, "post op," ibuprofen, ibuprophen, alieve, motrin, tylenol, injur, trauma, heat AND ice, heat AND (applied OR tried OR used OR using), "heat pack," "heating pad," (pain AND [back OR neck OR flank]), lumbargo, relief, resolve, relieve, releive, dental, heat AND cold, hot AND cold, oral AND surg, pain AND (jaw OR mouth OR teeth OR tooth), sensitiv AND (heat OR hot), hot AND coff, "hot dog," "hot grease," "hot peppers," "hot tea," "heat ache," heatache, "heat attack," "heat beat," heatbeat, "heat burn" heatburn, "heat flutter," "heat racing," "heat rate," heatrate, heatlh, heath, heatth, "hitting heat," palpitation, cheat, heated, heater, Heather, heating, hotel, lithotr, methotr, photo, psychotic, sheath, sheet, shot, Sunday, theat, wheat, accident, alcohol, burn AND mouth, distress, fever, "gets hot," "heat flash," "hot flash," heat AND rash, hives, hot AND shower, "hot tub," "no heat," oven, suicid

Query Evaluation

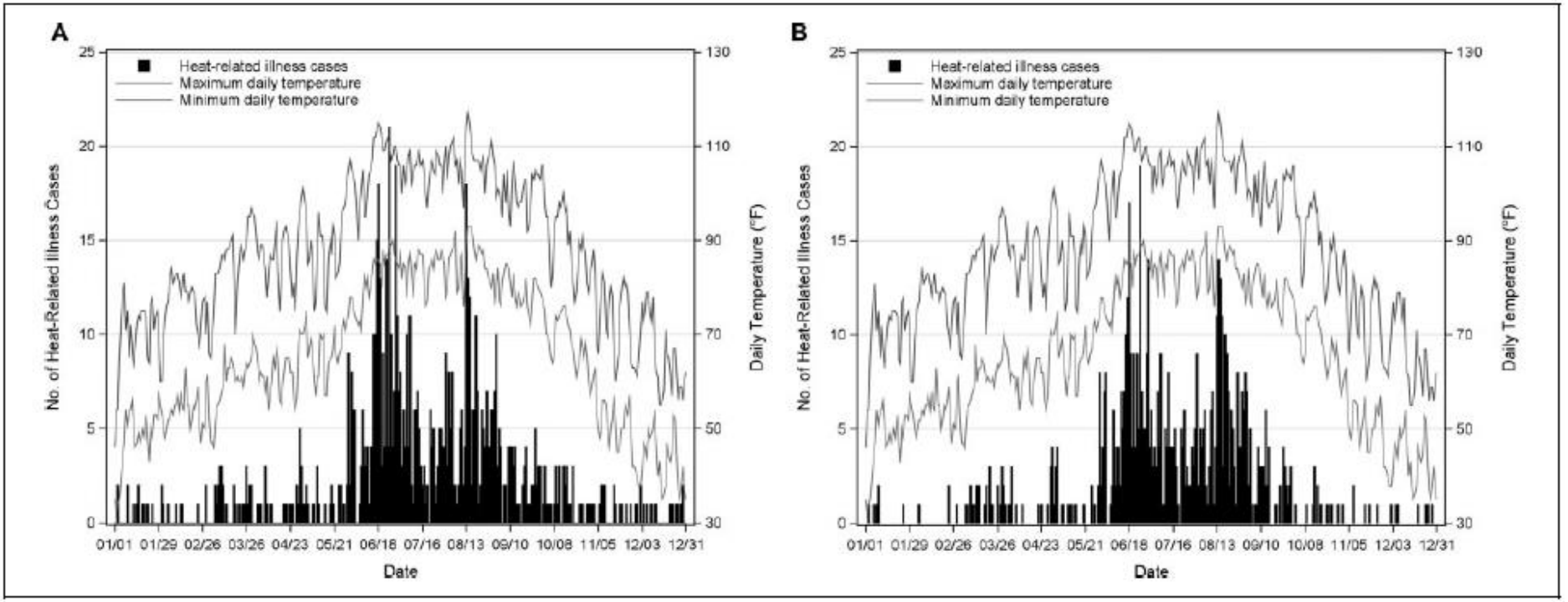


Figure. Trends in maximum and minimum daily temperatures and in frequency of heat-related illness cases identified by (A) the National Syndromic Surveillance Program BioSense "heat, excessive" query (n = 791) and (B) the Council of State and Territorial Epidemiologists novel heat-related illness query (n = 674), Maricopa County, Arizona, January 1 to December 31, 2015.

Query Evaluation

Table 3. Distribution of categories of heat-related illness cases, by query type (NSSP BioSense "heat, excessive" and CSTE novel heat-related illness) and period (full year, heat season, and cooler season), Maricopa County, Arizona, January 1 to December 31, 2015

Case Classification by Query Type	No. (%)		
	Full Year (Jan 1 to Dec 31)	Heat Season (May 1 to Sep 30)	Cooler Season (Jan 1 to Apr 30; Oct 1 to Dec 31)
BioSense "heat, excessive" query	791 (100.0)	647 (100.0)	144 (100.0)
Probable heat-related illness case	589 (74.4[a])	547 (84.5[a])	42 (29.2[a])
ICD-9-CM or *ICD-10-CM* diagnosis code (992, E900, T67, or X30)[b]	388 (49.1)	363 (56.1)	25 (17.4)
Chief complaint text (natural heat exposure)	201 (25.4)	184 (28.4)	17 (11.8)
Undetermined heat-related illness case	16 (2.0)	11 (1.7)	5 (3.5)
Ruled-out heat-related illness case	186 (23.5)	89 (13.8)	97 (67.4)
Novel heat-related illness query	674 (100.0)	594 (100.0)	80 (100.0)
Probable heat-related illness case	591 (87.7[a])	547 (92.1[a])	44 (55.0[a])
ICD-9-CM or *ICD-10-CM* diagnosis code (992, E900, T67, or X30)[b]	354 (52.2)	328 (55.2)	26 (32.5)
Chief complaint text (natural heat exposure)	237 (35.2)	219 (36.9)	18 (22.5)
Undetermined heat-related illness case	21 (3.1)	14 (2.4)	7 (8.8)
Ruled-out heat-related illness case	62 (9.2)	33 (5.6)	29 (36.3)

Query Wizard

Datasource:	Time Resolution:	Detector:	As Percent Query:	Start Date:
Patient Location (Full Details)	Daily	Regression/EWMA 1.2	No Percentage Query	24May18

Available Query Fields

- Discharge Diagnosis
- Discharge Diagnosis Available
- ICD10 Discharge Diagnosis
- Time Interval
- Diagnosis Type
- CC and DD Category
- CC and DD
- CC and DD Category Free Text

CC and DD Category

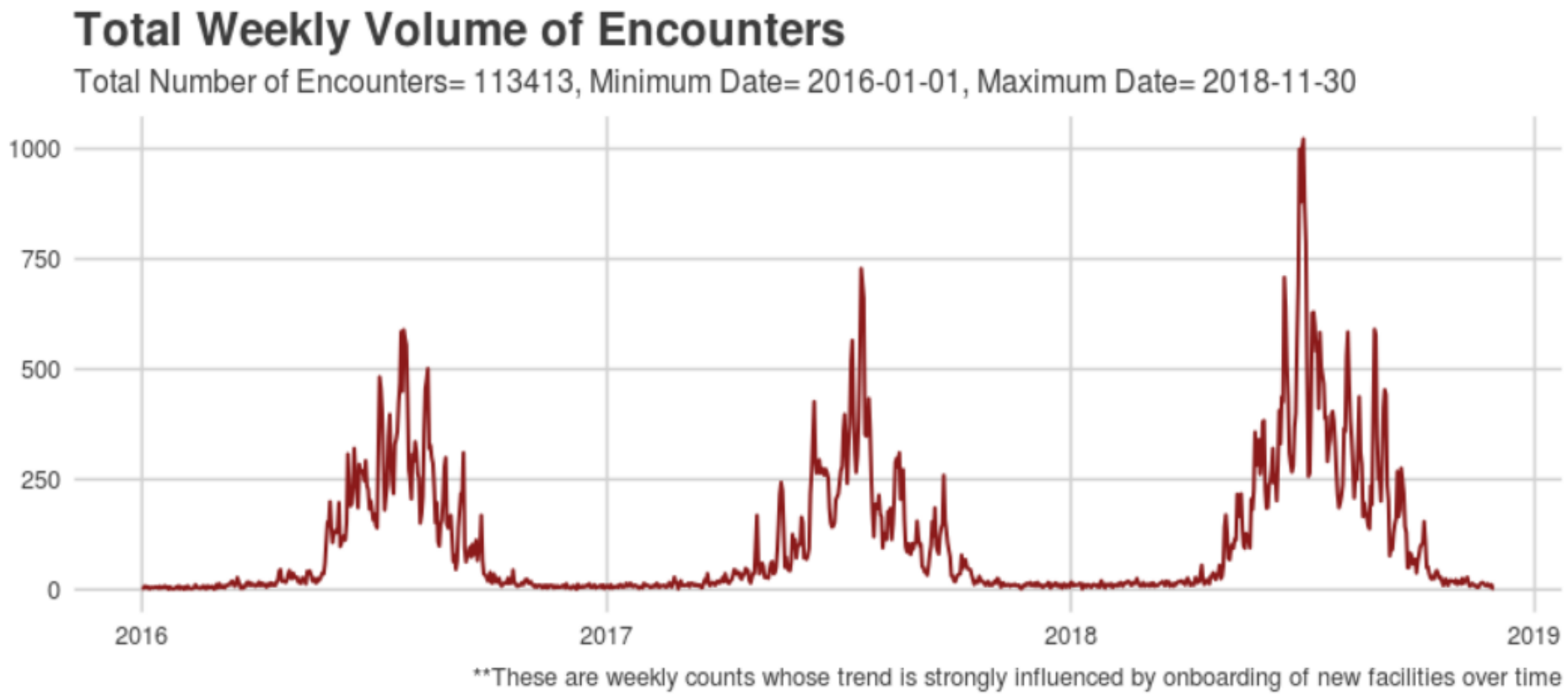
Select | Help

Select values for CC and DD Category:

- CDC Opioid Overdose v1
- CDC Stimulants v1
- Foreign Travel
- Heat Related Illness v1
- Heat Related Illness v2
- ILI CCDD v1

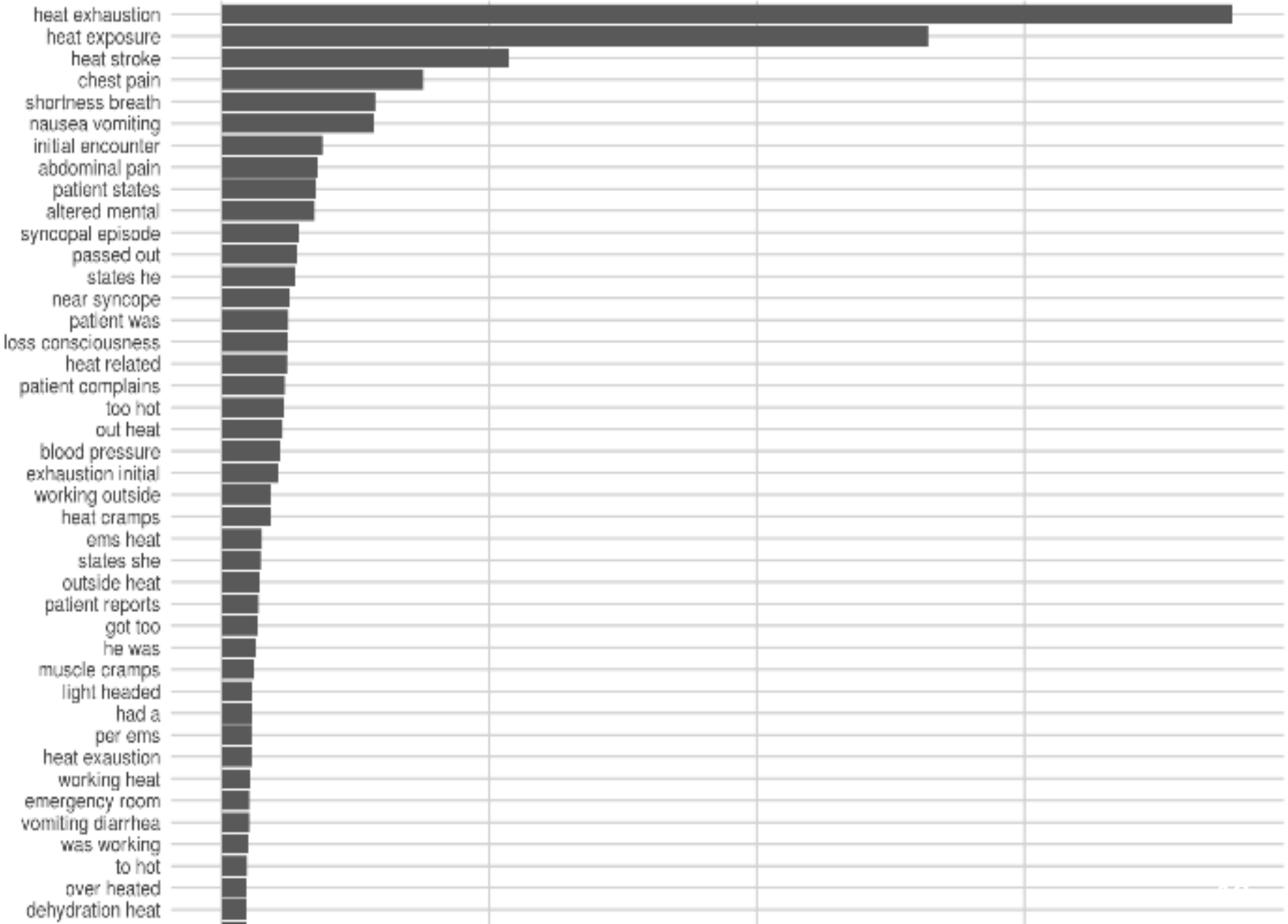
Table Builder | Time Series | Data Details | Graph Builder | Overview | Adv Qry | Explain

Heat-related Illness Encounters



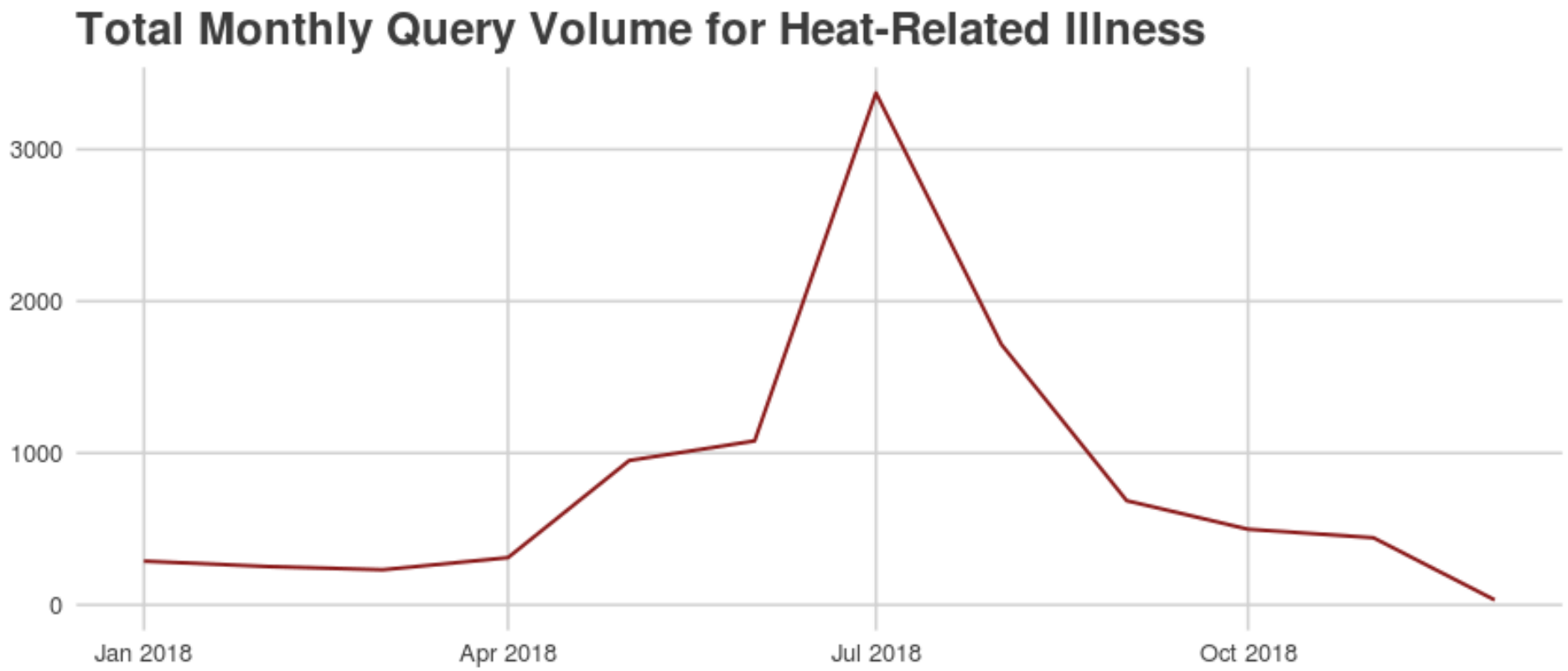

heat
t675xxa
x30xxxa
exhaustion
e860
exposure
patient
vomiting
shortness
weakness
syncope
abdominal
cramping
t671xxa
chest
breath
z79899
pain
complains
nausea
hot
stroke
r42
t672xxa
m6282
f17210
cramps
i10
r531
e876
r55
r112
r51
ems
n179
t670xxa
dizzy
x58xxxa
headache
t679xxa
dizziness
dehydration
feeling
altered
f17200
k219
f419
body
initial
r079
weak
r110
syncopal
encounter
episode
e119
denies
mental
y9389
blood
y990
reports
dehydrated

Top 200 Bigram Term Frequencies of Chief Complaint Parsed

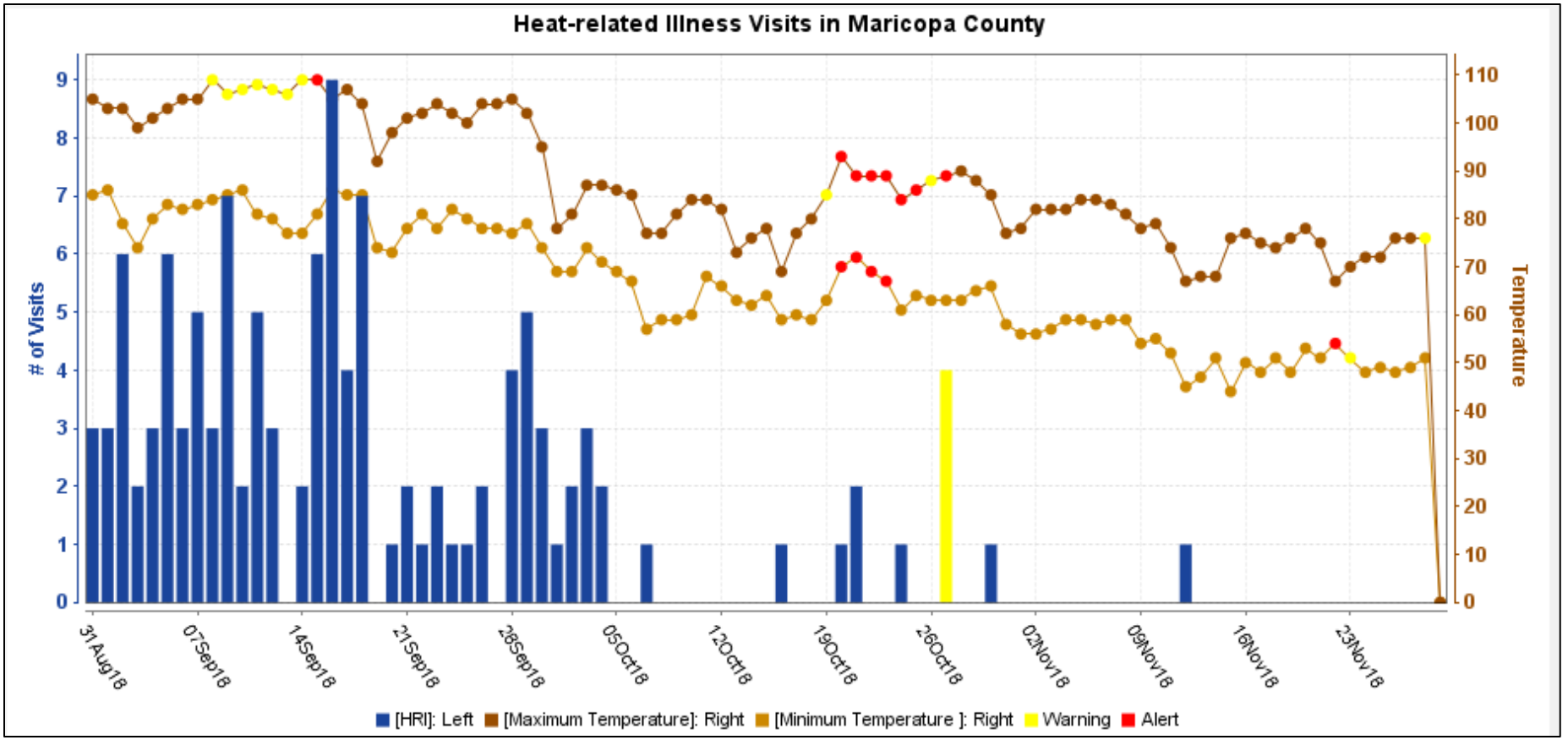


Utilization

National Use

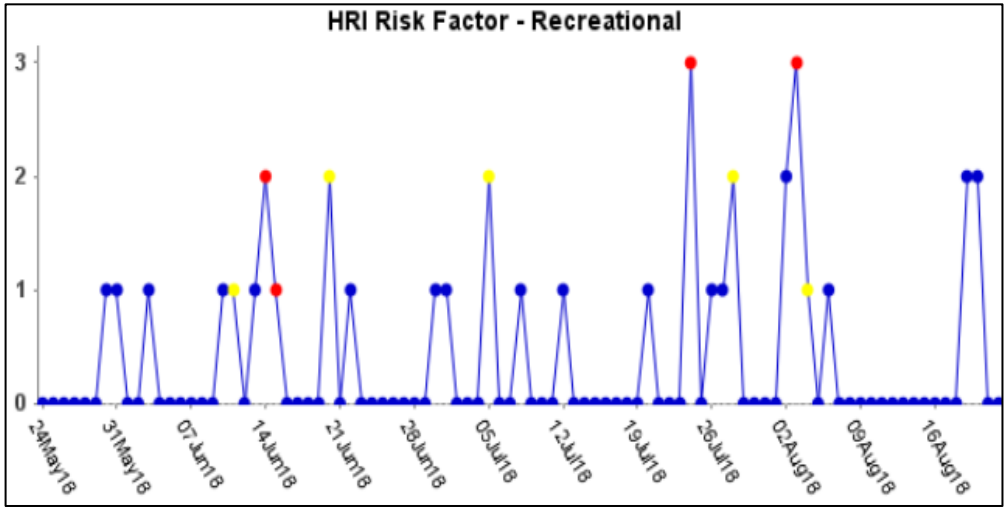


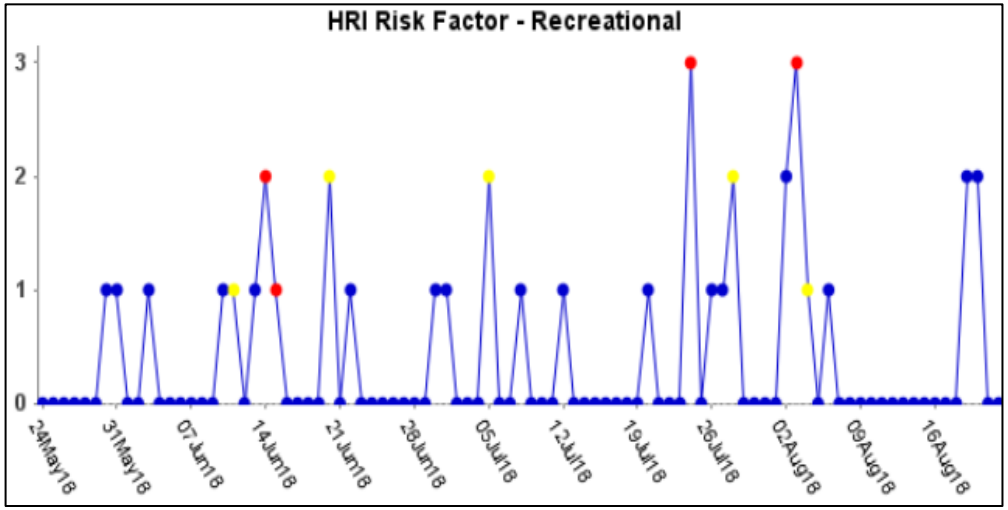
MCDPH HRI Dashboard



Risk Factor Surveillance

- Recreational
- Yard Work
- Cooling System Issue
- Vehicle-related
- Homelessness
- Occupational
- Substance Use





Additional Tables

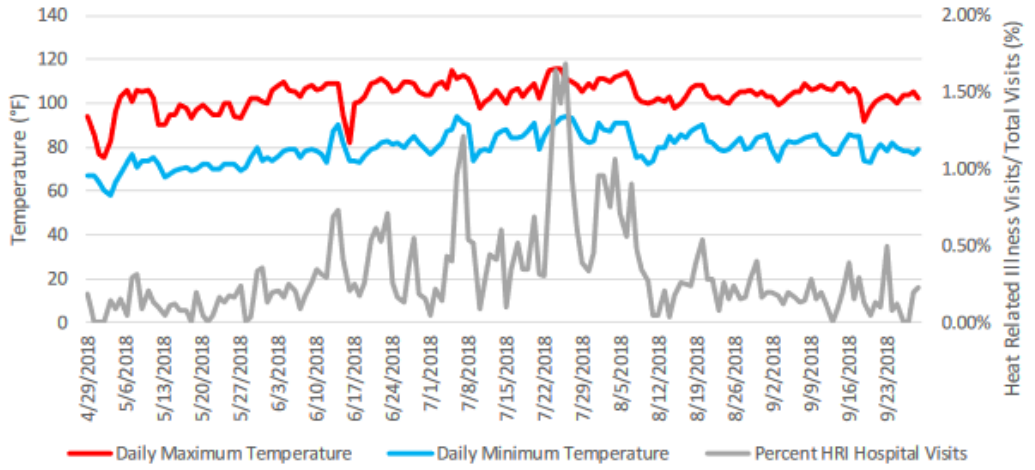
- Race & Ethnicity
- Gender
- Age
- Disposition
- Reporting Facility

Heat Associated Deaths & Hospital Visits Weekly Report

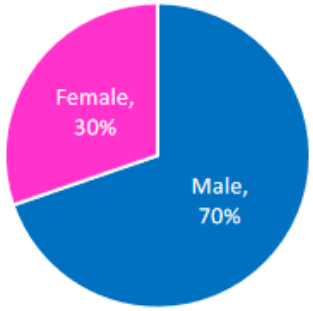
HEAT ASSOCIATED DEATHS & HOSPITAL VISITS
2018 WEEKLY REPORT
Week 40 (09/30-10/06)

Every year, hundreds of individuals visit Maricopa County hospitals due to environmental heat exposure and heat-related illness. Maricopa County Department of Public Health conducts weekly syndromic surveillance to identify these visits. Patient visit data from 13 Maricopa County emergency department and inpatient hospitals are available in near real-time and monitored to identify patients who may have experienced heat exhaustion or heat stroke. The National Syndromic Surveillance Program's BioSense Platform ESSENCE tool locates heat-related illness visits by identifying key terms and codes within the chief complaint field (i.e., the patient's stated reason for visit), admission reason field (i.e., the provider's noted reason for admission), and discharge diagnosis code field (i.e., ICD-9-CM and ICD-10-CM codes). Heat-related illness visits are displayed as a percentage of total hospital visits by day and monitored for trends.

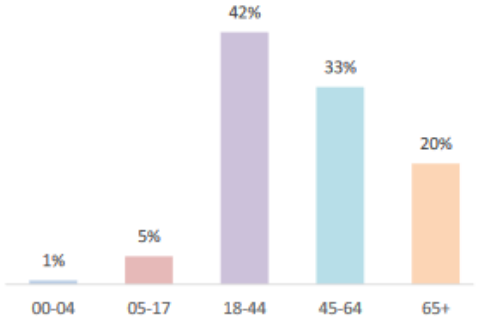
Graph 5. The percentage of emergency and inpatient hospital visits due to environmental heat was not above expected in Week 36.



Graph 6. More males than females have visted the emergency department due to environmental heat among the identified cases.



Graph 7. Most of the idenfied emergency department visits due to environmental heat have been among those 18-44 years of age.



Expanding Efforts

Future Initiatives

Continued collaboration with CSTE

Thank you.

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