Effects of Extreme Heat Events on Emergency Medical Services in King County, WA

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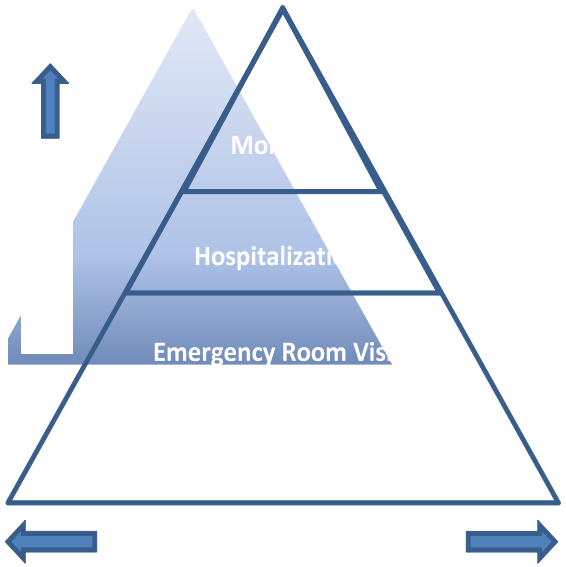
Objectives

1. Characterize the relationship between extreme heat events and emergency medical service (EMS) calls in King County, WA

2. Provide tools for county health officials that assist in identifying at-risk populations, identifying potential stressors on county EMS resources, and integrate management of climate-related health risks into existing communication and emergency preparedness and response plans.

Methods

- Strongly based on methods of Busch Isaksen et al. 2014
- Differences include
  - Study timeframe of 2007-2012 (also May 1st – Sept. 30th)
  - Use of King County Emergency Medical Services (EMS) data



EMS Data

- Two general levels of care
  - Basic Life Support (BLS)
  - Advanced Life Support (ALS)
- Health outcome variable
  - Based on treatment rather than diagnoses
  - Does not use International Classification of Disease (ICD) codes
  - Primary reason for EMS call as determined by EMS personnel
- Additional outcome variables of interest
  - Necessity of EMS transportation
  - Type of location

Descriptive Statistics

Table 1: Descriptive statistics for gender, age, and age groups for both BLS and ALS. Statistics include number of observations (n), percent of total, and mean, min, and max values for age and gender.

	n		% of total		Mean(min, max)	
Demographics	BLS	ALS	BLS	ALS	BLS	ALS
Gender	361434	94565			1.52	1.484
Male	174667	48779	48	52		
Female	186767	45786	52	48		
Age	361434	94565			53 (0, 110)	57(0, 109)
0-4	10436	2141	3	2		
5-14	11414	1654	3	2		
15-44	116587	23194	32	25		
45-64	9887	30426	27	32		
65-84	80221	25407	22	27		
85+	43899	11743	12	12		

Exposure Analysis and Relative Risk Thresholds

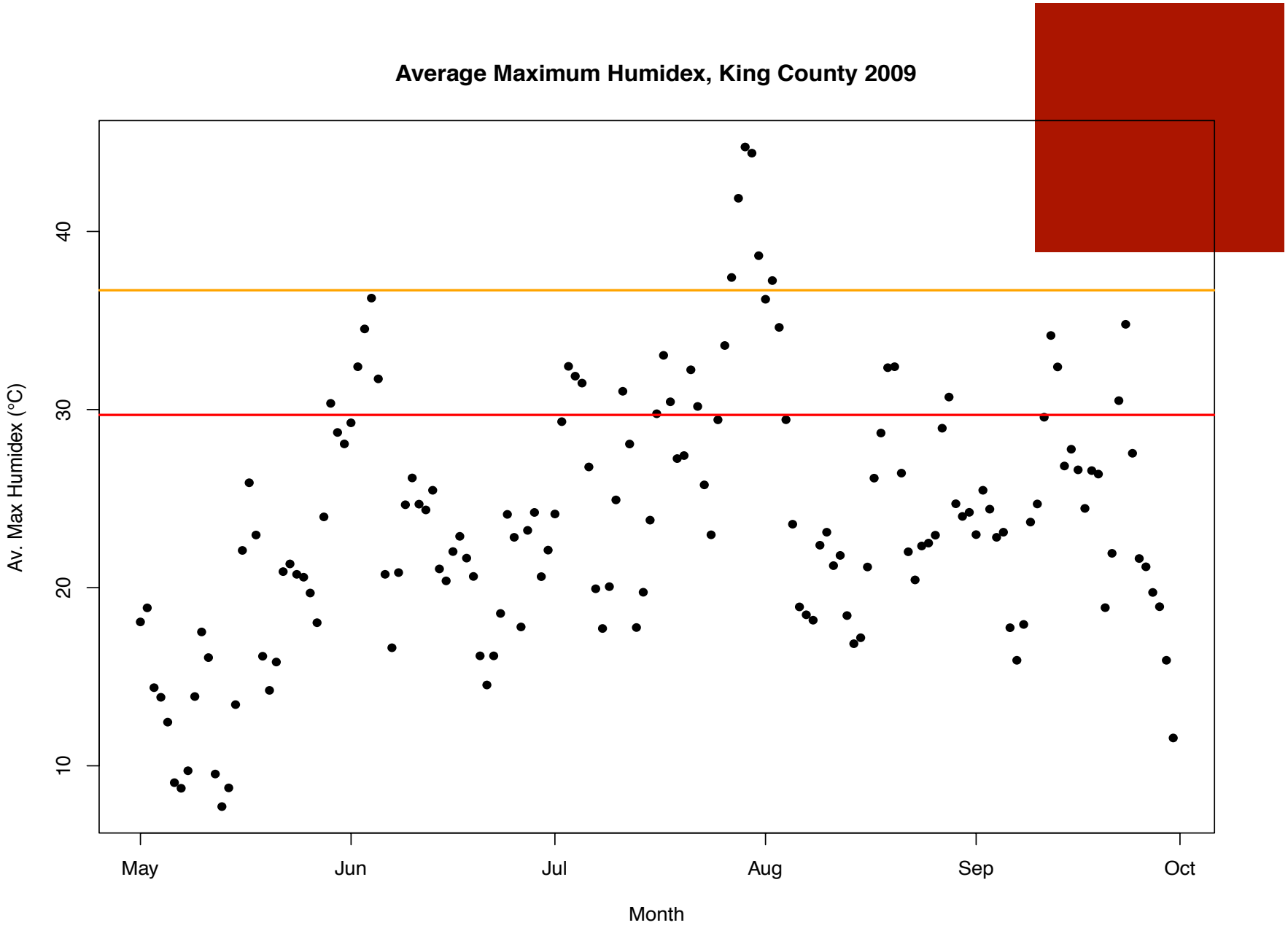
- Threshold with best fit for BLS data is 95th percentile
- Threshold with best fit for ALS data is 99th percentile
- BLS analysis also run with 99th percentile for comparability to other research

Table 2: Mean and max humidex (°C) by summer month for entire study period (2007-2012).

	Humidex °C	
Month	**Mean**	**Max**
May	15.65	36.08
June	19.3	37.75
July	26.94	44.74
August	25.54	41.42
Sept	21.91	34.78

Table3: Exposure analysis descriptive statistics

		95th percentile	99th percentile
Humidex	Celsius	29.7	36.7
	Fahrenheit	85.5	98.1
Days above threshold		112	23
Duration of events (Days)	Most frequent	1	2
	Maximum	9	5


Average Maximum Humidex, King County 2009
Av. Max Humidex (°C)
10
20
30
40
May
Jun
Jul
Aug
Sep
Oct
Month

Relative Risk Results—
All Cause, Trauma, and Non-trauma

- All three analyses produced statistically significant increases in risk (95% CIs) of an EMS call on a 95th or 99th percentile heat day compared to a non heat day for:
  - all causes, all ages;
    - 1.08% (96% CIs: 1.06, 1.09) for BLS 95th percentile
    - 1.16% (95% CIs: 1.13, 1.2) for BLS 99th percentile
    - 1.14% (95% CIs: 1.09, 1.2) for ALS 99th percentile
  - non-trauma, all ages;
    - 1.06% (96% CIs: 1.04, 1.08) for BLS 95th percentile
    - 1.16% (95% CIs: 1.13, 1.2) for BLS 99th percentile
    - 1.13% (95% CIs: 1.07, 1.19) for ALS 99th percentile
  - all causes and non-trauma, 15-44 and 45-64 age groups
- Analyses using BLS data only produced significant results for:
  - all causes and non-trauma, 0-4 and 65-84 age groups;
  - trauma, all ages and 15-44 age groups

Relative Risk Results

[1]Bolded relative risk values are significantly greater than 1 ($p < 0.05$)

[2]While statistically significant, the estimate is based on a small number of cases [227 cases on non-heat days, 10 cases on a heat day]

[3]While statistically significant, the estimate is based on a small number of cases [295 cases on non-heat days, 7 cases on a heat day]

[4]While statistically significant, the estimate is based on a small number of cases [1136 cases on non-heat days, 17 cases on a heat day]

[5]While statistically significant, the estimate is based on a small number of cases [567 cases on non-heat days, 12 cases on a heat day]

[6]While statistically significant, the estimate is based on a small number of cases [219 cases on non-heat days, 4 cases on a heat day]

Table 4: Relative risk analysis results for BLS and ALS data. Data presented as increased risk (95% CIs) of an EMS call on a 95th percentile (29.7 C) or a 99th percentile (36.7 C) heat day compared to a non-heat day. Data displayed by age category for all causes, trauma, and non-trauma.[1]

		All Cause	Trauma	Non-Trauma
All Ages	BLS 95th	**1.08 (1.06, 1.09)**	**1.13 (1.07, 1.18)**	**1.06 (1.04, 1.08)**
	BLS 99th	**1.16 (1.13, 1.2)**	**1.11 (1, 1.24)**	**1.16 (1.13, 1.2)**
	ALS 99th	**1.14 (1.09, 1.2)**	1.13 (0.91, 1.17)[2]	**1.13 (1.07, 1.19)**
0-4	BLS 95th	**1.14 (1.07, 1.21)**	**1.35 (1.18, 1.54)**	**1.09 (1, 1.18)**
	BLS 99th	**1.22 (1.07, 1.39)**	**1.33 (1.01, 1.79)**	**1.18 (1, 1.4)**
	ALS 99th	1.09 (0.82, 1.45)	1.47 (0.77, 2.79)	0.98 (0.7, 1.37)
5-14	BLS 95th	**1.07 (1, 1.14)**	1.11 (0.98, 1.25)	1.04 (0.95, 1.14)
	BLS 99th	0.91 (0.79, 1.05)	0.84 (0.63, 1.13)	0.88 (0.71, 1.09)
	ALS 99th	0.78 (0.55, 1.11)	0.97 (0.46, 2.03)[3]	***0.61 (0.38, 0.99)*[4]**
15-44	BLS 95th	**1.11 (1.08, 1.13)**	**1.16 (1.09, 1.23)**	**1.09 (1.06, 1.12)**
	BLS 99th	**1.19 (1.14, 1.25)**	**1.16 (1.01, 1.33)**	**1.22 (1.16, 1.28)**
	ALS 99th	**1.18 (1.08, 1.28)**	1.17 (0.93, 1.47)	**1.13 (1.03, 1.25)**
45-64	BLS 95th	**1.09 (1.07, 1.12)**	**1.12 (1.05, 1.2)**	**1.07 (1.05, 1.1)**
	BLS 99th	**1.17 (1.11, 1.22)**	1.06 (0.91, 1.23)	**1.17 (1.11, 1.23)**
	ALS 99th	**1.2 (1.11, 1.29)**	1.16 (0.83, 1.61)	**1.19 (1.1, 1.29)**
65-84	BLS 95th	**1.05 (1.03, 1.08)**	1.15 (0.97, 1.37)	**1.03 (1.01, 1.07)**
	BLS 99th	**1.15 (1.09, 1.21)**	1.15 (0.97, 1.37)	**1.13 (1.06, 1.2)**
	ALS 99th	1.09 (0.99, 1.19)	0.87 (0.48, 1.55)[5]	1.09 (0.99, 1.2)
85+	BLS 95th	1.02 (0.99, 1.05)	1.07 (0.89, 1.29)	1.02 (0.98, 1.06)
	BLS 99th	**1.14 (1.07, 1.21)**	1.07 (0.89, 1.29)	**1.13 (1.05, 1.22)**
	ALS 99th	**1.13 (1, 1.26)**	0.75 (0.28, 2)[6]	**1.13 (1, 1.27)**

Relative Risk Results—
Subcategories of Health (BLS)

Analysis of BLS data reveals statistically significant increases in risk (95% CIs) of a BLS call on a 95th percentile heat day compared to a non heat day for:

- All ages
  - abdominal/genito-urinary, 1.04 (95% CIs: 1, 1.08)
  - alcohol/drug, 1.08% (95% CIs: 1.03, 1.14)
  - anaphylaxis/allergy reaction, 1.14 (95% CIs: 1.02, 1.27)
  - metabolic/endocrine, 1.11% (95% CIs: 1.04, 1.18)
  - diabetes, 1.08% (95% CIs: 1.01, 1.16)
  - neurological, 1.03% (95% CIs: 1, 1.06)
  - other medical, 1.17% (95% CIs: 1.13, 1.2)
  - heat illness and dehydration, 3.43% (95% CIs: 3.07, 3.84)
- By age group,
  - All 6 age groups: other medical and heat and dehydration
  - 15-45 year olds: psychological and neurological
  - 45-64 year olds: metabolic/endocrine, diabetes, alcohol/drug, and anaphylaxis/allergy
  - 65-84 year olds: metabolic/endocrine and diabetes
  - 85+: metabolic/endocrine

Relative Risk Results

Table 5: Relative risk analysis results for BLS data. Data presented as increased risk (95% CIs) of an EMS call on a 95th percentile (29.7 C) heat day compared to a non-heat day. Data displayed by age category, medical issue, and level of transport.[1]

Medical Issue	All Ages	Years					
		0-4	5-14	15-44	45-64	65-84	85+
All Causes	**1.08 (1.06, 1.09)**	**1.14 (1.07, 1.21)**	**1.07 (1, 1.14)**	**1.11 (1.08, 1.13)**	**1.09 (1.07, 1.12)**	**1.05 (1.03, 1.08)**	1.02 (0.99, 1.05)
Trauma	**1.13 (1.07, 1.18)**	**1.35 (1.18, 1.54)**	1.11 (0.98, 1.25)	**1.16 (1.09, 1.23)**	**1.12 (1.05, 1.2)**	1.15 (0.97, 1.37)	1.07 (0.89, 1.29)
Non-Trauma	**1.06 (1.04, 1.08)**	**1.09 (1, 1.18)**	1.04 (0.95, 1.14)	**1.09 (1.06, 1.12)**	**1.07 (1.05, 1.1)**	**1.03 (1.01, 1.07)**	1.02 (0.98, 1.06)
Abdominal/Genito-Urinary	**1.04 (1, 1.08)**	1.15 (0.81, 1.64)	1.25 (0.96, 1.62)	1.04 (0.98, 1.11)	**1.07 (1, 1.14)**	0.98 (0.9, 1.07)	1.02 (0.91, 1.14)
Alcohol/Drugs	**1.08 (1.03, 1.14)**	1.11 (0.82, 1.51)	1.07 (0.74, 1.54)	1.06 (0.99, 1.13)	**1.13 (1.04, 1.23)**	1.01 (0.84, 1.2)	1.19 (0.84, 1.69)
Anaphylaxis/Allergic Reaction	**1.14 (1.02, 1.27)**	1.29 (0.96, 1.73)	0.93 (0.67, 1.28)	1.07 (0.9, 1.26)	**1.23 (1.01, 1.51)**	1.24 (09.4, 1.63)	1.12 (0.71, 1.71)
Cardiovascular	0.97 (0.93, 1.01)	1.61 (0.92, 2.83)	0.45 (0.19, 1.1)	0.99 (0.88, 1.1)	1.03 (0.97, 1.1)	0.93 (0.87, 0.99)	0.93 (0.85, 1.02)
Metabolic/Endocrine	**1.11 (1.04, 1.18)**	1.23 (0.47, 3.19)	1.2 (0.6, 2.44)	0.98 (0.86, 1.11)	**1.15 (1.04, 1.27)**	**1.18 (1.05, 1.32)**	**1.12 (1.05, 1.19)**
Diabetes	**1.08 (1.01, 1.16)**	0.77 (0.17, 3.5)	1.19 (0.5, 2.83)	0.92 (0.79, 1.07)	**1.14 (1.02, 1.28)**	**1.16 (1.02, 1.32)**	1 (0.74, 1.35)
Neurological	**1.03 (1, 1.06)**	1 (0.87, 1.15)	0.99 (0.83, 1.17)	**1.06 (1, 1.12)**	1.03 (0.97, 1.09)	1.02 (0.97, 1.08)	0.99 (0.92, 1.07)
Suspected CVA	0.97 (0.89, 1.05)	0.57 (0.06, 4.95)	--	1.2 (0.85, 1.71)	0.94 (0.8, 1.12)	0.97 (0.86, 1.1)	0.96, 0.83, 1.11)
Suspected TIA	***0.6 (0.42, 0.85)***	1 (0.82, 1.22)	1 (0.82, 1.22)	--	0.7 (0.37, 1.36)	0.64 (0.4, 1.02)	***0.57 (0.34, 0.96)***[2]
Seizure	1.01 (0.95, 1.08)	1.09 (0.87, 1.37)	0.96 (0.76, 1.22)	1.03 (0.94, 1.12)	1.03 (0.92, 1.15)	0.85 (0.68, 1.08)	0.91 (0.6, 1.37)
Febrile Seizure	0.96 (0.8, 1.15)	0.96 (0.79, 1.16)	1.2 (0.55, 2.6)	0.67 (0.16, 2.79)	1.64 (0.56, 4.76)	1.48 (0.17, 12.76)	0.35 (0.05, 2.58)
OBGYN	1.06 (0.95, 1.19)	0.87 (0.29, 2.59)	0.67 (0.07, 6.04)	1.07 (0.95, 1.2)	1.15 (0.65, 2.02)	0.53 (0.12, 2.38)	0.95 (0.37, 2.41)
Other Medical	**1.17 (1.13, 1.2)**	**1.22 (1.05, 1.42)**	**1.26 (1.06, 1.49)**	**1.24 (1.18, 1.31)**	**1.14 (1.09, 1.2)**	**1.16 (1.1, 1.21)**	**1.12 (1.05, 1.19)**
Heat Illness & Dehydration	**3.43 (3.07, 3.84)**	**3.89 (2.08, 7.29)**	**4.22 (2.67, 6.69)**	**4.41 (3.65, 5.32)**	**4.09 (3.39, 4.93)**	**2.91 (2.52, 3.37)**	**2.63 (2.19, 3.15)**
Psychological	1.03 (0.98, 1.08)	1.68 (0.78, 3.6)	0.99 (0.72, 1.34)	**1.07 (1.01, 1.14)**	0.99 (0.91, 1.08)	0.93 (0.8, 1.07)	0.84 (0.64, 1.1)
Respiratory	0.99 (0.95, 1.04)	0.95 (0.81, 1.12)	0.77 (0.45, 1.32)	0.86 (0.68, 1.09)	1.01 (0.94, 1.09)	1.08 (0.92, 1.25)	1.06 (0.86, 1.31)
Asthma	1.02 (0.85, 1.23)	1.42 (0.84, 2.41)	0.77 (0.44, 1.33)	1.1 (0.83, 1.46)	0.84 (0.56, 1.25)	1.09 (0.66, 1.8)	1.47 (0.55, 3.93)
Emphysema/COPD	0.95 (0.77, 1.18)	1 (0.82, 1.22)	--	0.82 (0.1, 6.38)	0.87 (0.57, 1.33)	1.16 (0.88, 1.52)	***0.41 (0.18, 0.96)***[3]

[1]Bolded relative risk values are significantly greater than 1 ($p < 0.05$) ; -- indicates too few cases available to calculate

[2]While statistically significant, the estimate is based on a small number of cases [221 cases on non-heat days, 17 cases on a heat day]

[3]While statistically significant, the estimate is based on a small number of cases [107 cases on non-heat days, 6 cases on a heat day]

Relative Risk Results—Transportation

Table 6: Relative risk analysis results for BLS and ALS data. Data presented as increased risk (95% CIs) of an EMS call on a 95th percentile (29.7 C) or a 99th percentile (36.7 C) heat day compared to a non-heat day. Data displayed by age category for all transportation categories.[1]

		No Transportation	BLS Transportation	ALS Transportation	Other Transportation
All Ages	BLS 95th	**1.12 (1.09, 1.15)**	**1.07 (1.05, 1.09)**	1.02 (0.99, 1.06)	**1.08 (1.03, 1.13)**
	BLS 99th	**1.22 (1.16, 1.28)**	**1.14 (1.1, 1.19)**	**1.09 (1.02, 1.17)**	1.09 (0.99, 1.19)
	ALS 99th	**1.2 (1.07, 1.35)**	**1.18 (1.1, 1.27)**	**1.1 (1.03, 1.18)**	1.06 (0.81, 1.39)
0-4	BLS 95th	**1.2 (1.09, 1.32)**	**1.16 (1.05, 1.29)**	1.05 (0.86, 1.28)	1.05 (0.91, 1.21)
	BLS 99th	**1.23 (1.02, 1.49)**	**1.37 (1.12, 1.67)**	1.03 (0.68, 1.58)	1.09 (0.81, 1.46)
	ALS 99th	1.46 (0.8, 2.68)	1.21 (0.75, 1.96)	1.06 (0.7, 1.59)	0.36 (0.9, 1.46)
5-14	BLS 95th	1.08 (0.98, 1.18)	1.06 (0.96, 1.16)	1.05 (0.83, 1.31)	1.06 (0.92, 1.22)
	BLS 99th	0.98 (0.79, 1.21)	0.86 (0.69, 1.07)	1.05 (0.65, 1.7)	0.81 (0.57, 1.14)
	ALS 99th	0.5 (0.18, 1.38)	0.87 (0.47, 1.63)	0.95 (0.58, 1.57)	0.31 (0.4, 2.33)
15-44	BLS 95th	**1.14 (1.1, 1.19)**	**1.09 (1.07, 1.12)**	**1.06 (1, 1.14)**	**1.08 (1.01, 1.16)**
	BLS 99th	**1.26 (1.16, 1.36)**	**1.16 (1.09, 1.22)**	**1.2 (1.06, 1.37)**	**1.16 (1.01, 1.33)**
	ALS 99th	**1.32 (1.08, 1.62)**	1.05 (0.91, 1.2)	**1.21 (1.06, 1.38)**	**1.54 (1.03, 2.3)**
45-64	BLS 95th	**1.12 (1.07, 1.17)**	**1.08 (1.05, 1.11)**	1.04 (0.98, 1.1)	**1.09 (1, 1.19)**
	BLS 99th	**1.26 (1.15, 1.37)**	**1.14 (1.08, 1.21)**	**1.14 (1.02, 1.28)**	0.92 (0.75, 1.12)
	ALS 99th	1.26 (1.04, 1.53)	**1.23 (1.1, 1.37)**	**1.17 (1.05, 1.31)**	1.14 (0.7, 1.84)
65-84	BLS 95th	**1.1 (1.05, 1.15)**	**1.04 (1.01, 1.08)**	1 (0.94, 1.06)	**1.11 (1, 1.23)**
	BLS 99th	**1.18 (1.07, 1.31)**	**1.14 (1.08, 1.21)**	1.04 (0.92, 1.18)	**1.31 (1.06, 1.61)**
	ALS 99th	1.06 (0.83, 1.36)	**1.19 (1.05, 1.35)**	1.04 (0.93, 1.18)	0.48 (0.19, 1.21)
85+	BLS 95th	**1.07 (1, 1.14)**	1.01 (0.97, 1.05)	0.98 (0.9, 1.07)	1.01 (0.85, 1.2)
	BLS 99th	**1.19 (1.04, 1.35)**	**1.16 (1.07, 1.25)**	0.91 (0.76, 1.1)	1.16 (0.82, 1.63)
	ALS 99th	1.13 (0.81, 1.59)	**1.35 (1.15, 1.59)**	0.89 (0.74, 1.59)	1.75 (0.83, 3.68

[1]Bolded relative risk values are significantly greater than 1 ($p < 0.05$)

Time Series Results

- BLS and ALS analyses both contain statistically significant increases in EMS calls for every 1 degree increase above their respective threshold (40.7 C for BLS and 39.7 C for ALS data) for:
  - all causes, all ages;
    - 6.6% (95% CIs: 4.5%, 8.7%) for BLS
    - 3.8% (95% CIs: 1.1%, 6.5%) for ALS.
  - all causes, 45-64 year olds;
  - non-trauma, all ages category;
  - other medical, all ages, 15-44, 45-64, and 65-84 age groups;
  - heat and dehydration, all ages, 15-44, 45-64, 65-84, and 85+ age groups;
  - emphysema/COPD, 15-44 age group;

- BLS only
  - all causes, all age groups;
  - non trauma, all age groups excluding 0-4;
  - Metabolic, 0-4 and 5-14 age groups;
  - Diabetes, 15-44 age group;
  - Neurological , 45-64 age group;
  - suspected TIA, 64-85 age group;
  - febrile seizures, 0-4 age group;
  - other medical, 0-4, 5-14, and 85+ age groups;
  - psychological, all ages and the 5-14 and 45-64 age groups;
  - asthma, 15-44 age group.

Time Series Results

Table 7: Time-series analysis results for BLS data. Percent changes in daily EMS calls presented for every 1 degree increase above 40.7 C humidex (95 CIs). Data displayed by age category, medical issue, and level of transport.

Medical Issue	All Ages	Years					
		0-4	5-14	15-44	45-64	65-84	85+
All Causes	**6.6 (4.5, 8.7)**	**11.6 (1. 7, 22.4)**	4.7 (-5.5, 15.9)	**5.1 (1. 9, 8.3)**	**8.6 (5.3, 12.1)**	**7.6 (3.7, 11.7)**	**8.1 (2.9, 13.6)**
Trauma	-4.3 (-10.2, 2.0)	3.4 (-17.2, 29.1)	14.5 (-33.9, 10.6)	***-11.5 (-19.5, -2.6)***	-2.9 (-13.1, 8.5)	4.5 (-7.1, 17.6)	7.0 (-8.1, 24.7)
Non-Trauma	**10.0 (7.6, 12.5)**	-0.5 (-100, Inf)	**7.9 (4.5, 11.5)**	**10.9 (6.2, 15.8)**	-0.5 (-100, Inf)	**7.9 (4.5, 11.5)**	**10.9 (6.2, 15.8)**
Abdominal/Genito-Urinary	3.9 (-2. 5, 10.7)	40.2 (-3.1, 102.8)	-60.2 (-94.6, 194.8)	7.6 (-2.6, 19)	4.0 (-6. 9, 16.2)	2.7 (-10.3, 17.6)	-5.4 (-22.9, 16.1)
Alcohol/Drugs	-3.3 (-11.5, 5.7)	-0.3 (-43.2, 75.0)	--	-0.4 (-10.6, 11.0)	-4.5 (-18.3, 11.6)	-34.4 (-67.3, 31.7)	3.3 (-43.3, 88.4)
Anaphylaxis/Allergic Reaction	-12.7 (-30.1, 9. 1)	-88.6 (-99.9, 2021)	-11.4 (-54.2, 71.3)	-16.6 (-43.9, 24.1)	-23.2 (-53.4, 26.7)	13.3 (-23. 8, 68.3)	30.7 (-25.7, 130)
Cardiovascular	2.5 (-4.2, 9.6)	--	--	15.6 (-0.1, 33.6)	4.9 (-4.7, 15.6)	-3.1 (-13.4, 8.6)	-2.2 (-16.9, 15.0)
Metabolic/Endocrine	2.3 (-7.1, 12.6)	**91.2 (7.6, 239.5)**	**95.9 (12.9, 240.1)**	15.8 (-1.6, 36.1)	-1.6 (-17.1, 16.8)	-11 (-28.8, 11.2)	-7.1 (-38.8, 41.1)
Diabetes	1.9 (-8.8, 13. 9)	--	--	**22.2 (2.8, 45.2)**	-6.5 (-25, 16.4)	-1.5 (-21.1, 23.0)	-90.2 (-100, 2062.3)
Neurological	**5.9 (1, 11.1)**	14.3 (-6.7, 39.9)	7.5 (-18.1, 41.0)	1.1 (-7.3, 10.3)	**11.2 (2.9, 20.2)**	5.0 (-4.1, 14.9)	3.3 (-8.9, 17.2)
Suspected CVA	8.7 (-4.2, 23.4)	--	--	13.1 (-35.2, 97.2)	-2.4 (-28.5, 33.4)	15.3 (-2.8, 36.7)	5.0 (-17.5, 33.7)
Suspected TIA	24.1 (-18.4, 88.7)	14.8 (-100, Inf)	15.1 (-100, Inf)	--	17.7 (-51.7, 186.9)	**48.9 (4.7, 111.6)**	--
Seizure	-3.7 (-14.2, 8.1)	-9.7 (-45.1, 48.5)	5.6 (-29.8, 58.9)	-6.9 (-21.3, 10.2)	3.2 (-14.2, 24.2)	-7.6 (-41.8, 46.8)	--
Febrile Seizure	20.4 (-2.2, 48.1)	**25.0 (0.8, 55.2)**	--	--	--	--	--
OBGYN	2.9 (-15.6, 25.4)	--	--	1.3 (-18, 25.2)	41.1 (-19.1, 146. 3)	--	--
Other Medical	**23.5 (19.6, 27.4)**	**31.3 (11.7, 54.4)**	**3.3 (21.5, 69.0)**	**25.1 (18.1, 32.6)**	**20.9 (14.2, 28)**	**22.1 (15.0, 29.7)**	**23.0 (13.9, 32. 9)**
Heat Illness & Dehydration	**48.5 (39.9, 57.7)**	49.2 (-4, 131.9)	33.9 (-4.8, 88.3)	**48.1 (34.4, 63.1)**	**46 (31.2, 62.4)**	**42.1 (27.8, 58)**	**59 (39.9, 80.7)**
Psychological	**11.5 (4.1, 19.4)**	--	**42.6 (1.9, 99.5)**	6.6 (-3.3, 17.4)	**15.7 (3.3, 29.6)**	11.7 (-10.9, 39.9)	27.1 (-6.5, 72. 9)
Respiratory	3.1 (-3.7, 10.4)	-0.5 (-24.9, 32)	-8.2 (-43.7, 48.2)	11.7 (-2.1, 27.6)	0.7 (-11. 8, 14.9)	-3.1 (-15.6, 11.2)	9.2 (-6.8, 27.8)
Asthma	9.4 (-16.9, 43.9)	--	-54.1 (-98.3, 1130.4)	**39.0 (6.0, 82.3)**	--	--	--
Emphysema/COPD	14.31 (-14.91, 53.55)	-3.9 (-100, Inf)	--	**129.7 (23.3, 327.8)**	18.9 (-26.2, 91.5)	-47.1 (-83.6, 70.7)	83.4 (18.7, 183.2)

Time Series Results —Transportation

Significant results primarily indicate no transportation or BLS transportation above the threshold humidex

Table 8: Time-series analysis results for BLS and ALS data. Percent changes in daily EMS calls presented for every 1 degree increase above 40.7 C humidex (95 CIs) for BLS and above 39.7 C humidex for ALS. Data displayed by age category and level of transport.

Medical Issue	All Ages	Years					
		0-4	5-14	15-44	45-64	65-84	85+
BLS Data							
No Transportation	**10.88 (7.28, 14.6)**	**19.15 (5.56, 34.49)**	**18 (3.65, 34.33)**	**7.24 (1.83, 12.94)**	**16.02 (9.78, 22.62)**	**8.16 (0.7, 16.18)**	7.62 (-2.43, 18.71)
BLS Transport	**7.04 (4.5, 9.65)**	9.02 (-6.87, 27.61)	-1.66 (-17.06, 16.6)	4.15 (0.1, 8.37)	**8.02 (3.78, 12.43)**	**8.94 (4.12, 13.98)**	**9.71 (3.51, 16.29)**
ALS Transport	-1.08 (-6.65, 4.83)	-1.67 (-31.08, 40.27)	13.49 (-18.46, 57.96)	-4.19 (-14.51, 7.37)	3.15 (-5.43, 12.5)	-2.66 (-12.34, 8.1)	-6.4 (-21.11, 11.04)
Other Transport	3.78 (-2.99, 11.02)	-11.68 (-34.93, 19.88)	-22.51 (-46.86, 13)	8.19 (-1.59, 18.94)	-7.91 (-22.09, 8.85)	15.9 (0.48, 33.69)	20.19 (-3.66, 49.95)
ALS Data							
No Transportation	**10.02 (3.8 , 16.6)**	15.68 (-15.28, 57.94)	10.94 (-22.12, 58.05)	**12.77 (2.96, 23.51)**	**12.77 (2.96, 23.51)**	2.95 (-10.57, 18.51)	-4.14 (-24.15, 21.15)
BLS Transport	**7.23 (3.39 , 11.21)**	3.17 (-22.07, 36.6)	-15.8 (-51.73, 46.89)	-0.58 (-8.18, 7.64)	**11.87 (5.68, 18.43)**	**8.2 (0.87, 16.07)**	9.25 (-0.57, 20.03)
ALS Transport	-1.35 (-5.45 , 2.93)	-0.32 (-23.16, 29.31)	7.9 (-17.02, 40.31)	-2.97 (-10.7, 5.44)	1.78 (-4.62, 8.62)	-3.77 (-11.14, 4.22)	-3.59 (-14.6, 8.83)
Other Transport	5.99 (-7.73 , 21.75)	-100 (-100, Inf)	-100 (-100, Inf)	5.98 (-15.33, 32.64)	6.29 (-18.49, 38.6)	-2.05 (-33.31, 43.85)	**40.44 (5.43, 87.07)**

Limitations

- Potential for duplication of patients due to EMS collects data by vehicle rather than by patient.
- Missing data
  - Exclusions of missing age and gender data
  - Missing data in other variables
- Lagging not assessed at this time
- Potential misclassification of disease

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