Impact of Extreme Heat in the Region

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https://www.maxpixel.net/Climate-Earth-Hour-Planet-Climate-Change-Globe-4776711

Outline

Extreme Heat in Florida

BRACE

Vulnerability Mapping

Older Adults (Aged 65+)

Infants, Children, Pregnant People

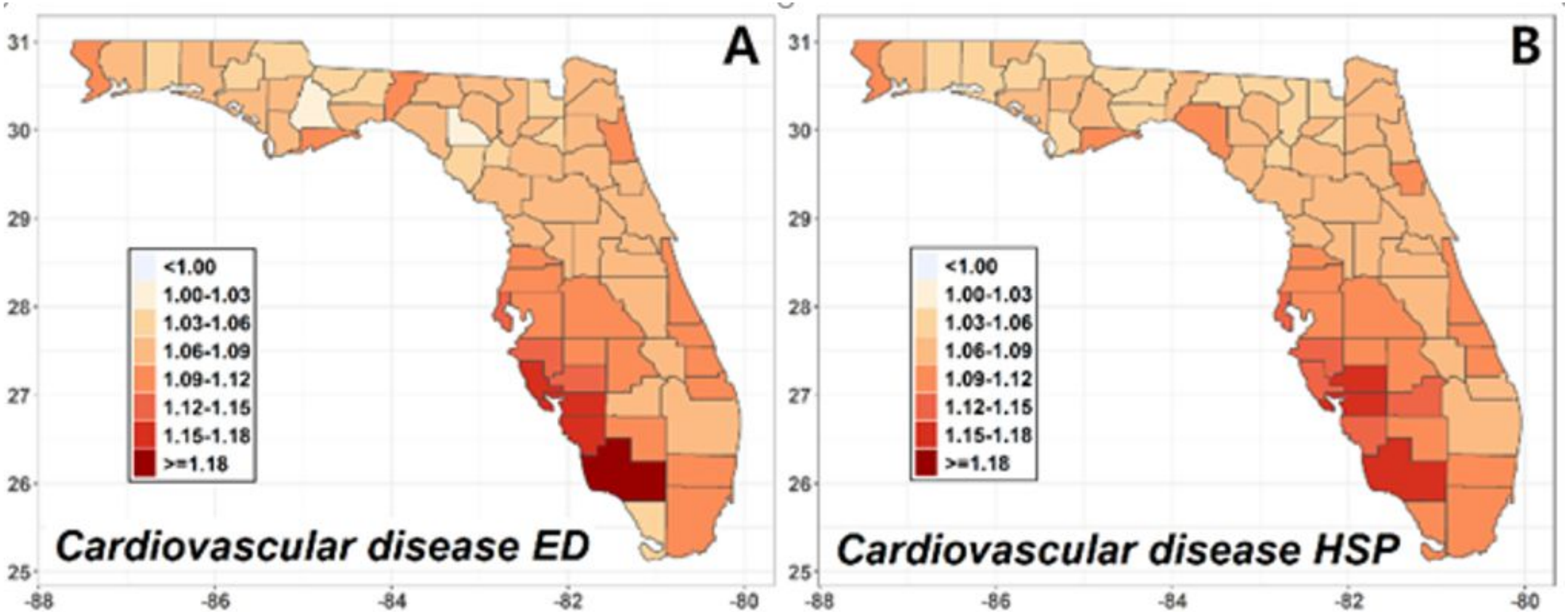
Chronic Conditions

Low Income, Unhoused

Athletes

Outdoor Workers

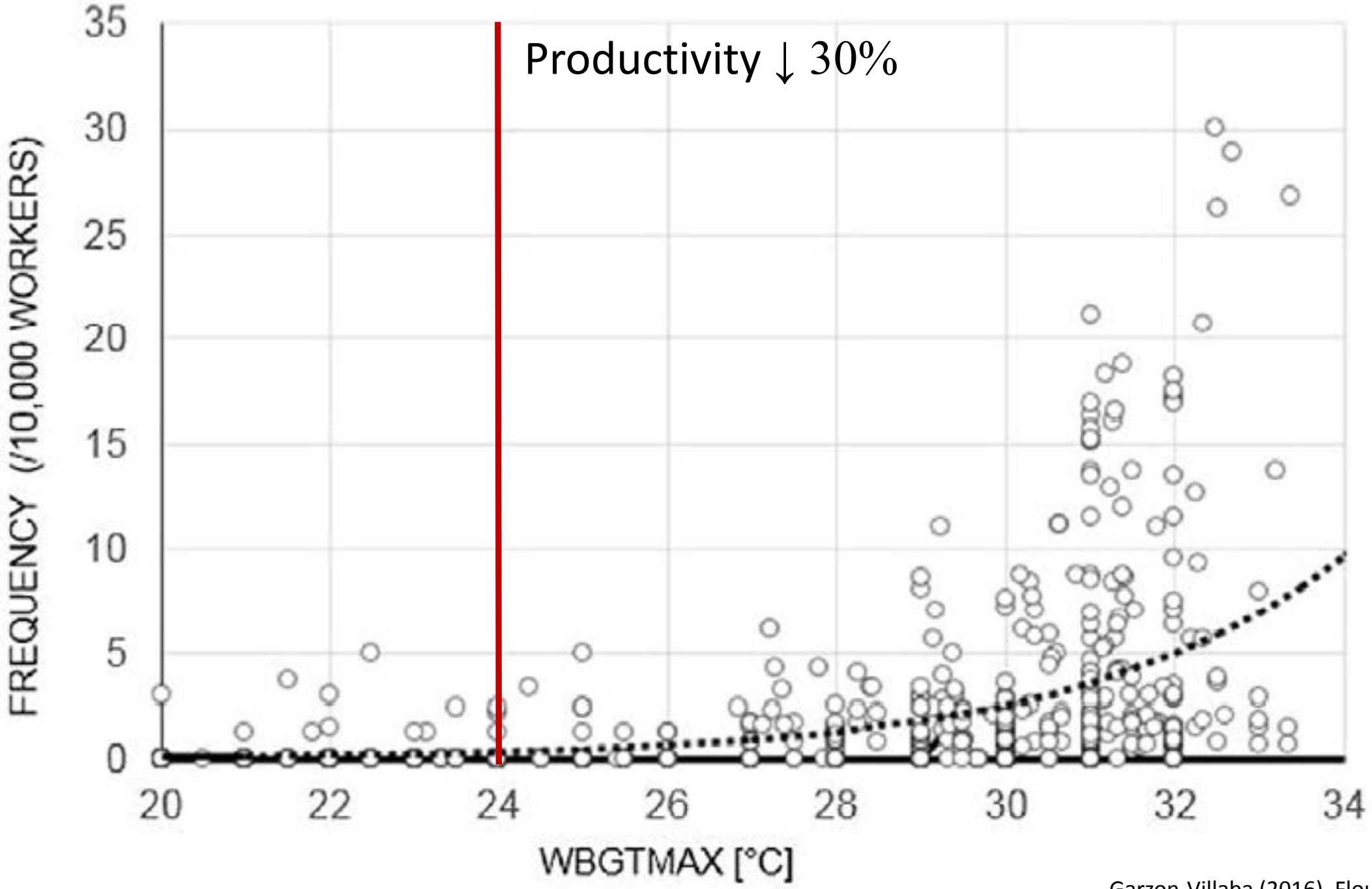
https://www.cdc.gov/disasters/extremeheat/specificgroups.html



Jung et al. (2021)

	Cardiovascular disease	
	ED	HSP
Under 5 years	1.53*	
Over 65 years	2.52*	2.59*
Over 65 years in nursing facilities	1.02*	-
Female	-	-1.45*
Unemployment rate		-1.03*
Housing units with no automobile	-1.21*	-
Children under 18 years living in one-parent families	2.16*	-

Jung et al. (2021)



Garzon-Villaba (2016), Flouris et al. 2018)

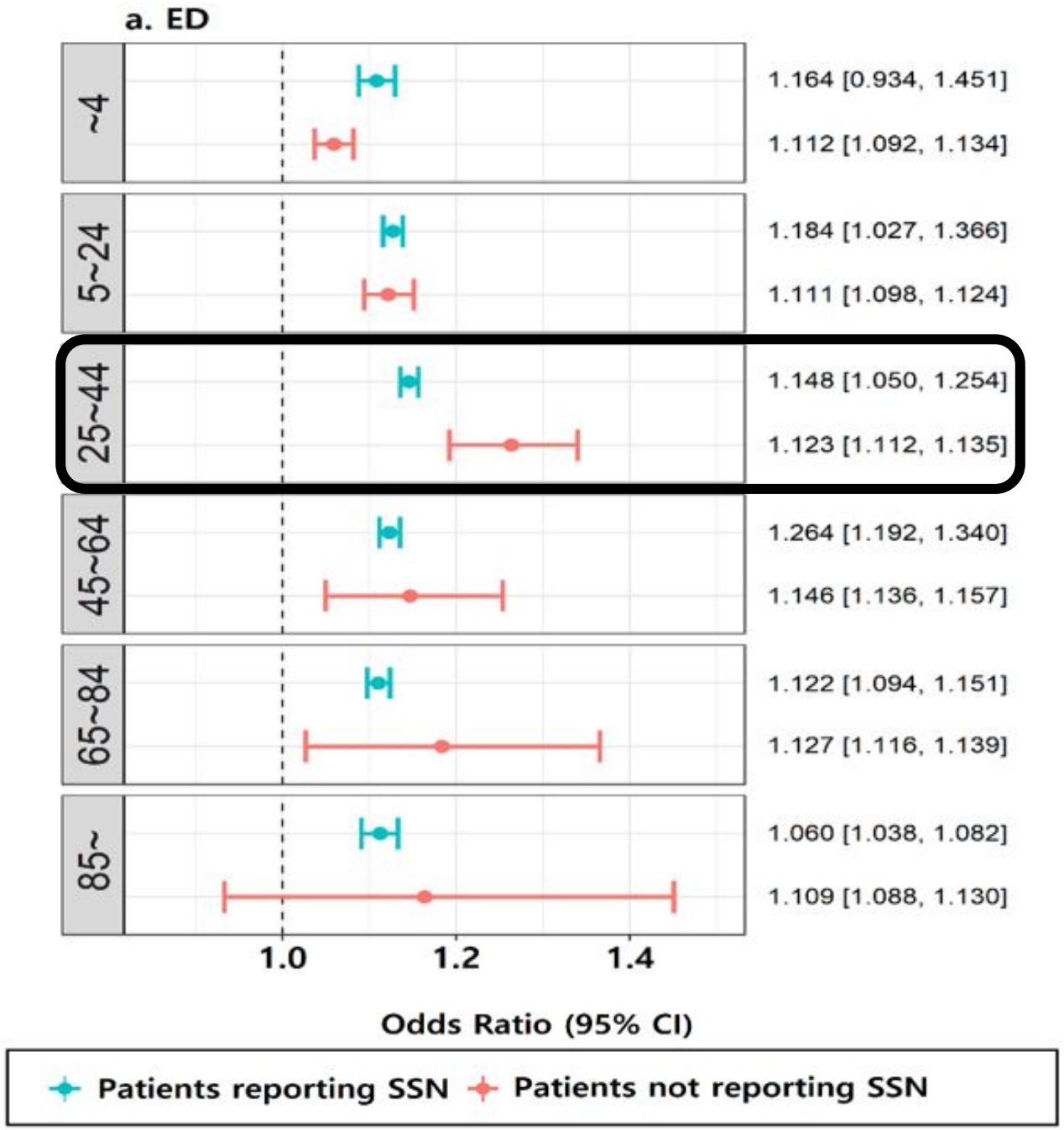
Outdoor Workers

- class of worker
- gender and job roles
- compensation
- citizenship

Municipal Workers

Department	Temp. (C)	Temp. range	Heat index	Heat index range	Outdoor (%)
Fleet	0.1 (1.9)	−5.8 to 2.8	0.3 (2.9)	−7.7 to 5	41.9
Parks and recreation	0.7 (3.8)	−7.4 to 6.5	1.3 (5.7)	−11.6 to 10.1	74.7
Public works	3.3 (0.7)	2.0 to 4.5	5.2 (1.2)	3.0 to 7.1	100.0
Solid waste	0.6 (3.3)	−8.1 to 8.8	0.2 (5.1)	−11.5 to 13.1	60.0
Underground utility	−0.2 (2.7)	−5.5 to 3.4	0.3 (3.4)	−6.4 to 3.8	63.8

Uejio et al. (2018)



Jung et al. (2021)


Direct + Indirect Health Costs
$667 Million
Liu et al. (2019)

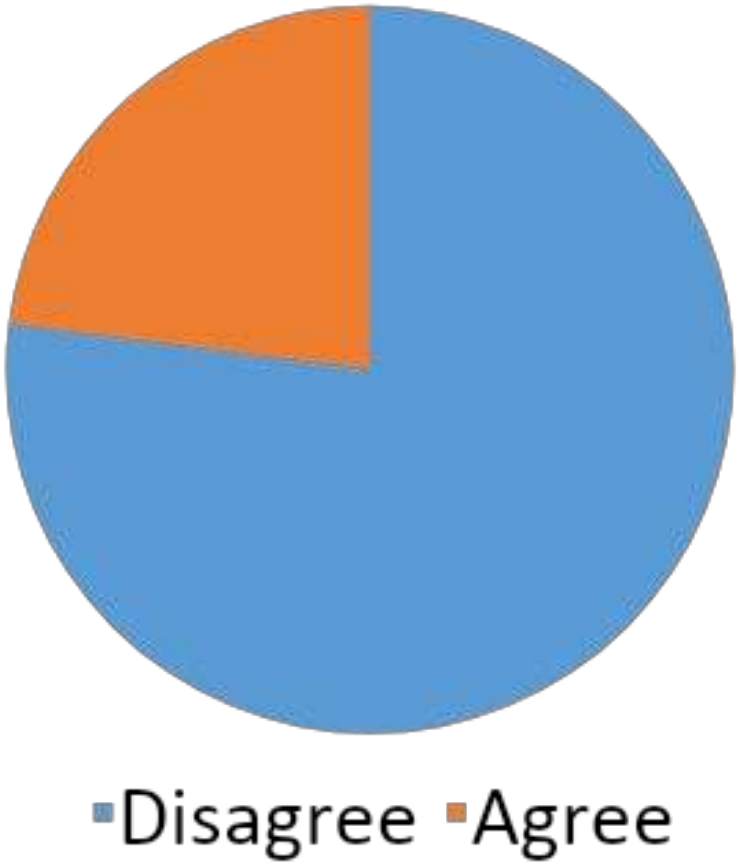
Outline

Extreme Heat in Florida

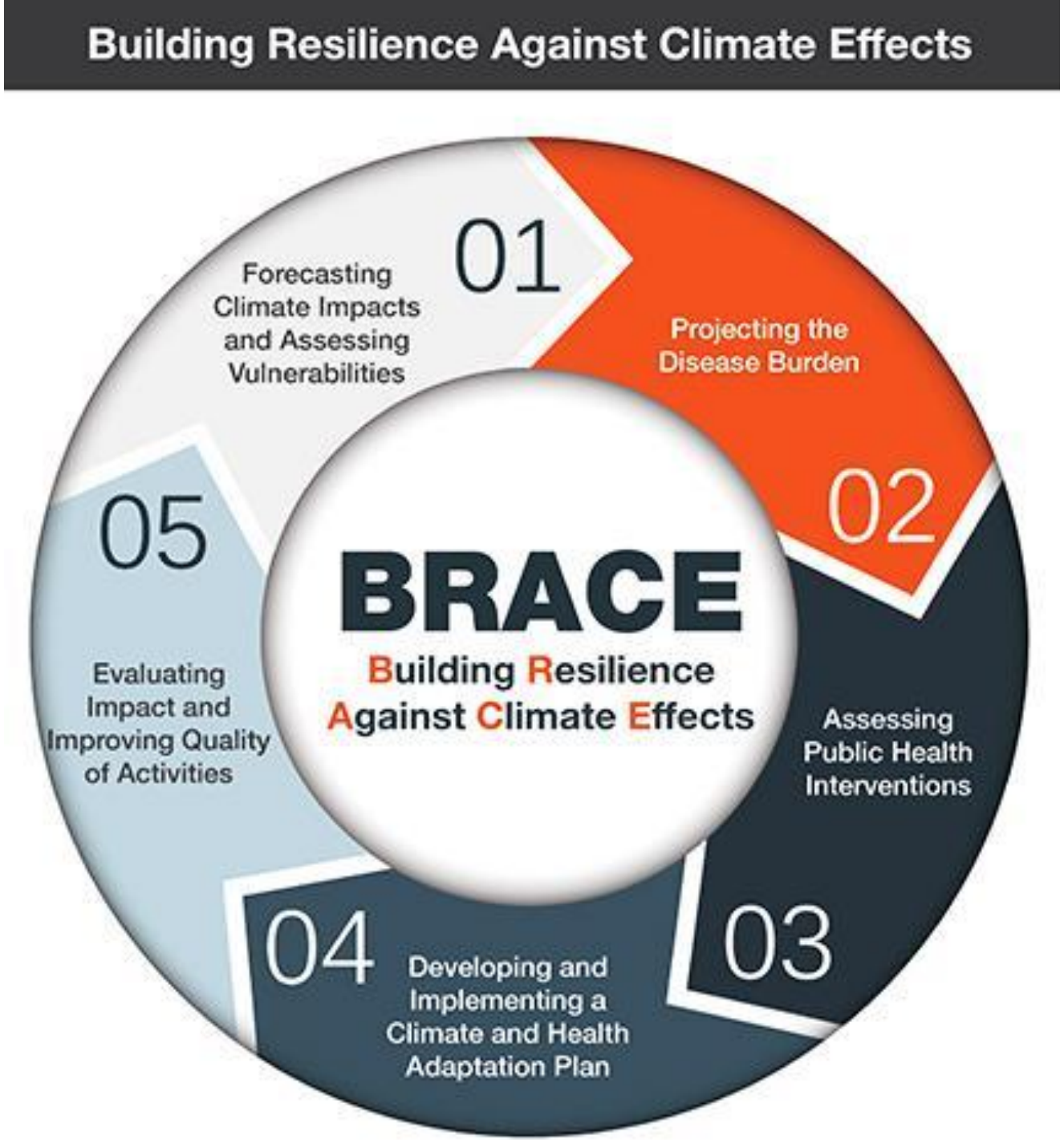
Building Resilience Against Climate Effects

Vulnerability Mapping

“My health department has ample expertise to assess public health impacts associated with climate change”



Maibach et al. (2008); Rosser-Renouf et al. (2016)



Marinucci et al. (2014)

EMBRACE Workshops

Outline

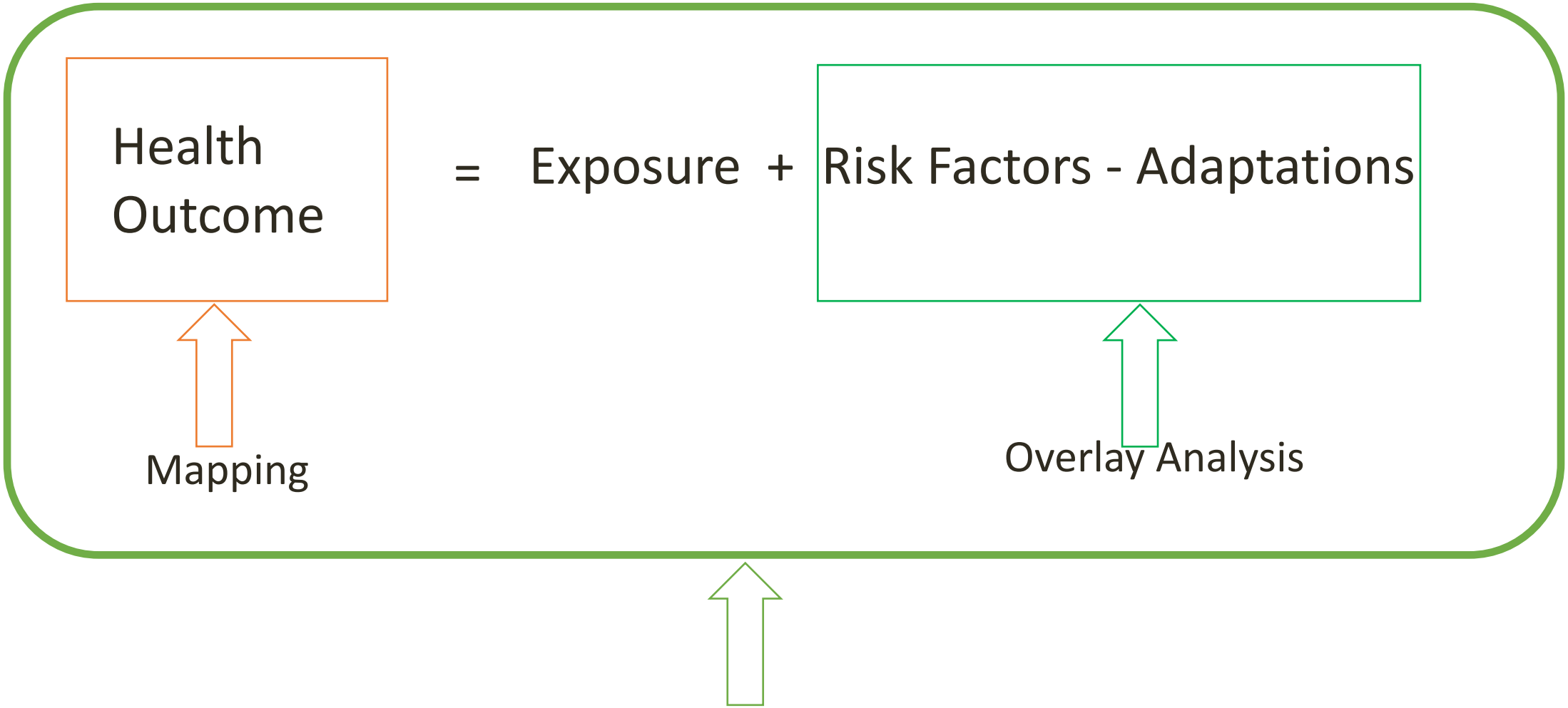
Extreme Heat in Florida

Building Resilience Against Climate Effects

Vulnerability Mapping

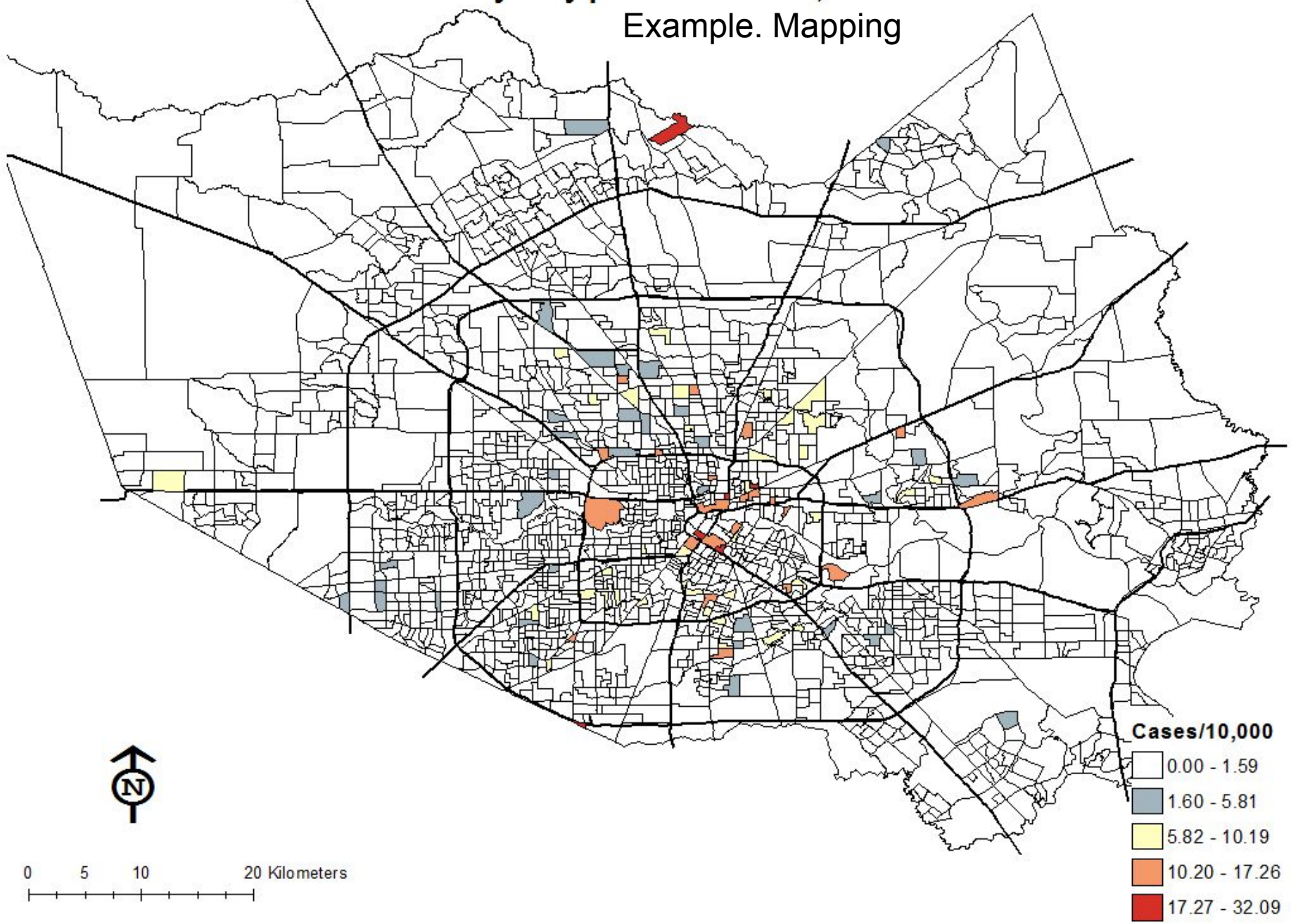
Causes of Extreme Heat Mortality	Mechanism	Treatment/ Intervention
Individual	Overheating Body's Systems Fail	Cooling Body Down Rehydration
Societal	Homelessness Living Alone Crime Historical Zoning	Coordinate Public Broadcasts Cooling Refugee Energy Subsidy A/C Dissemination

Common Approaches

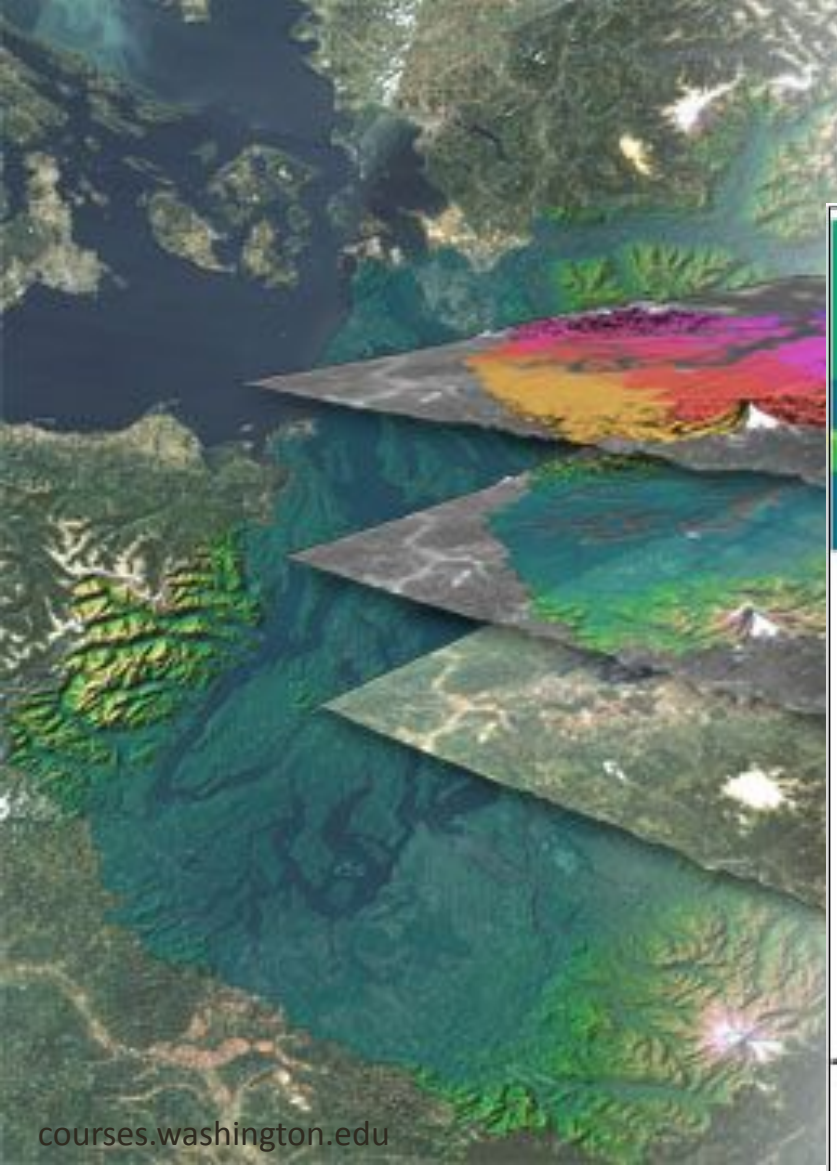


Extreme Heat Mortality Hyperthermia, Houston 1999-2008

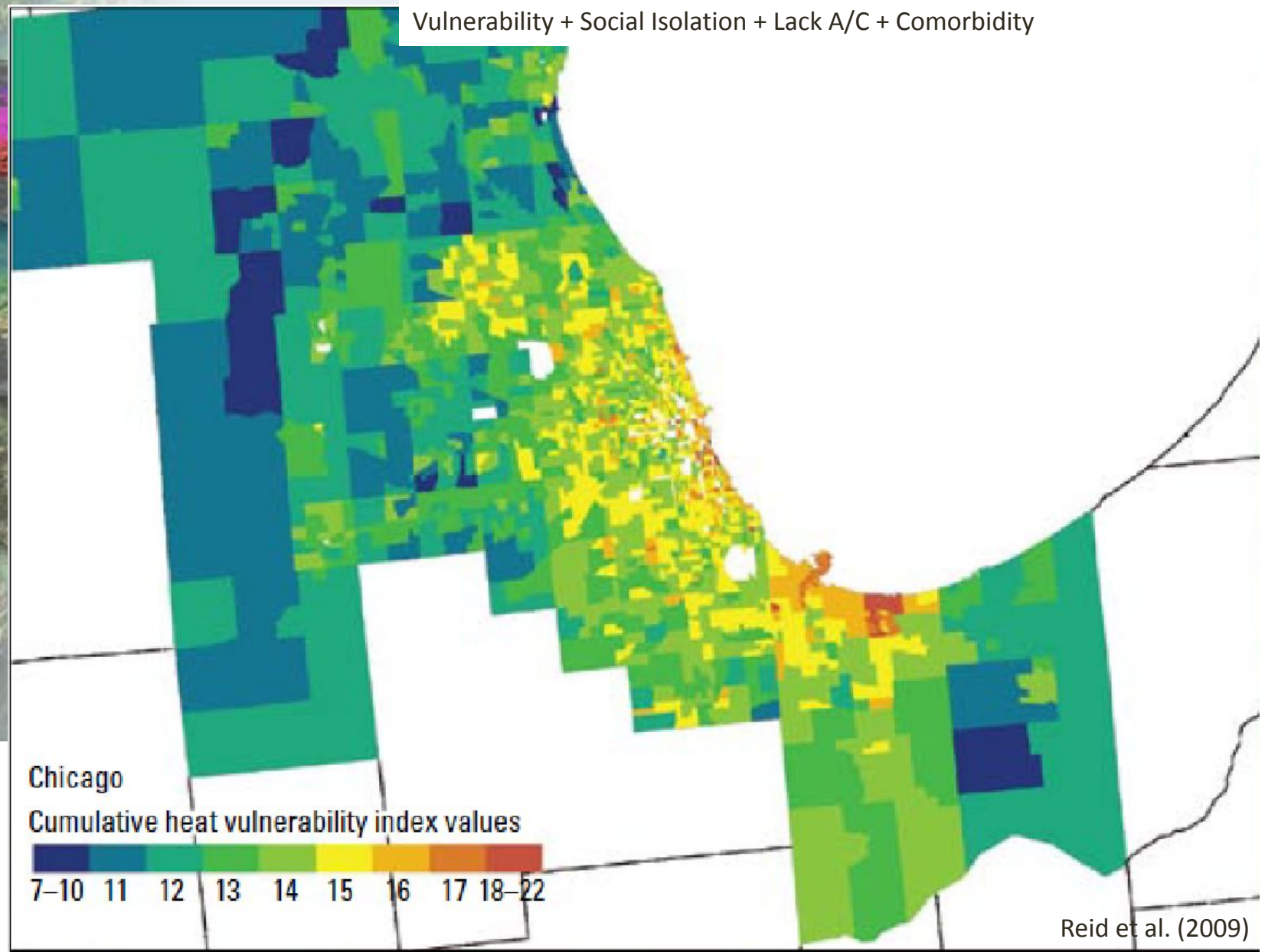
Example. Mapping



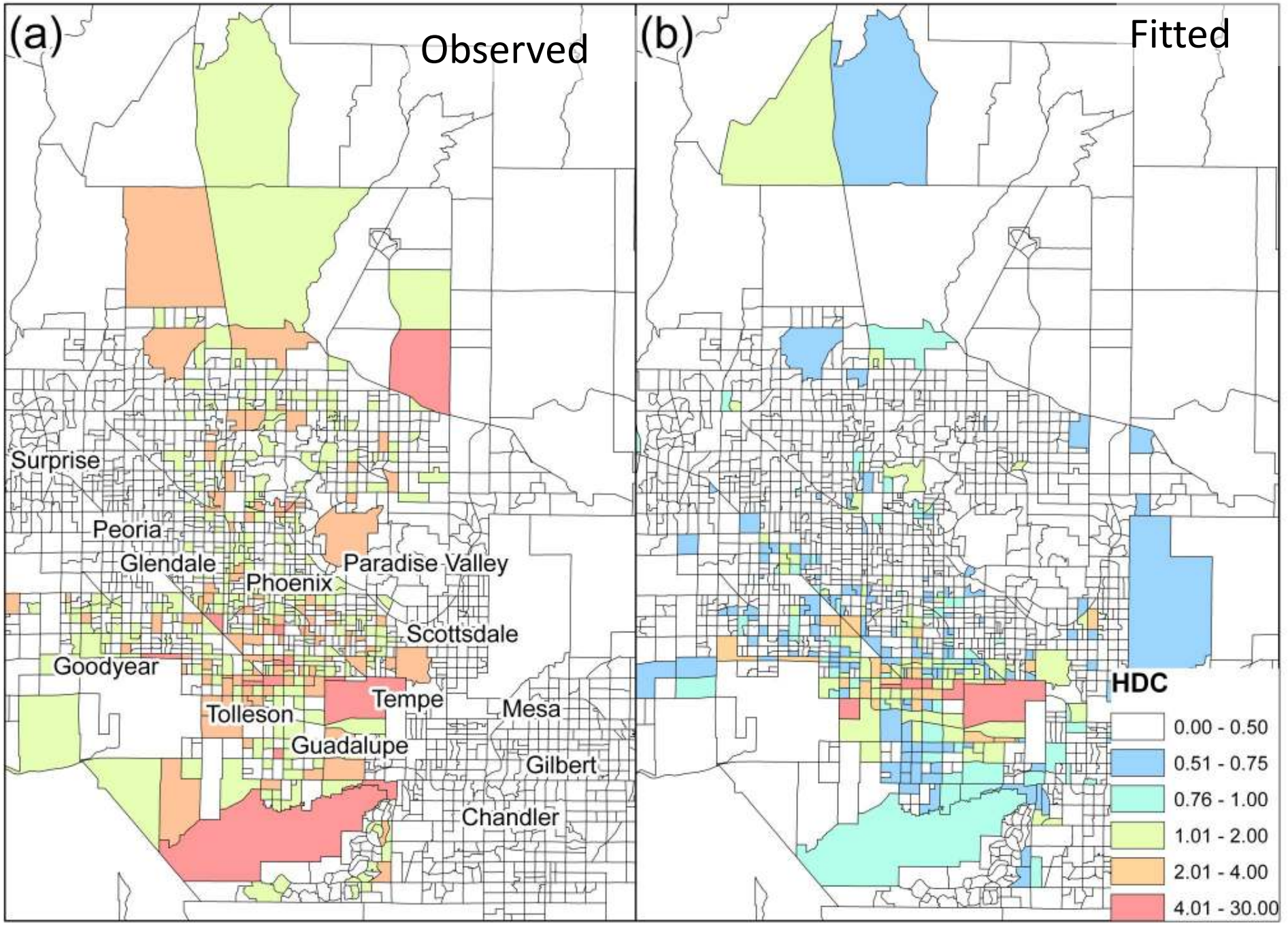
Ex: Overlay Analysis



Vulnerability + Social Isolation + Lack A/C + Comorbidity



Reid et al. (2009)



Uejio et al. (2012)

Phoenix GLMM | Spatial Correlation Structure: Gaussian | N: 1931

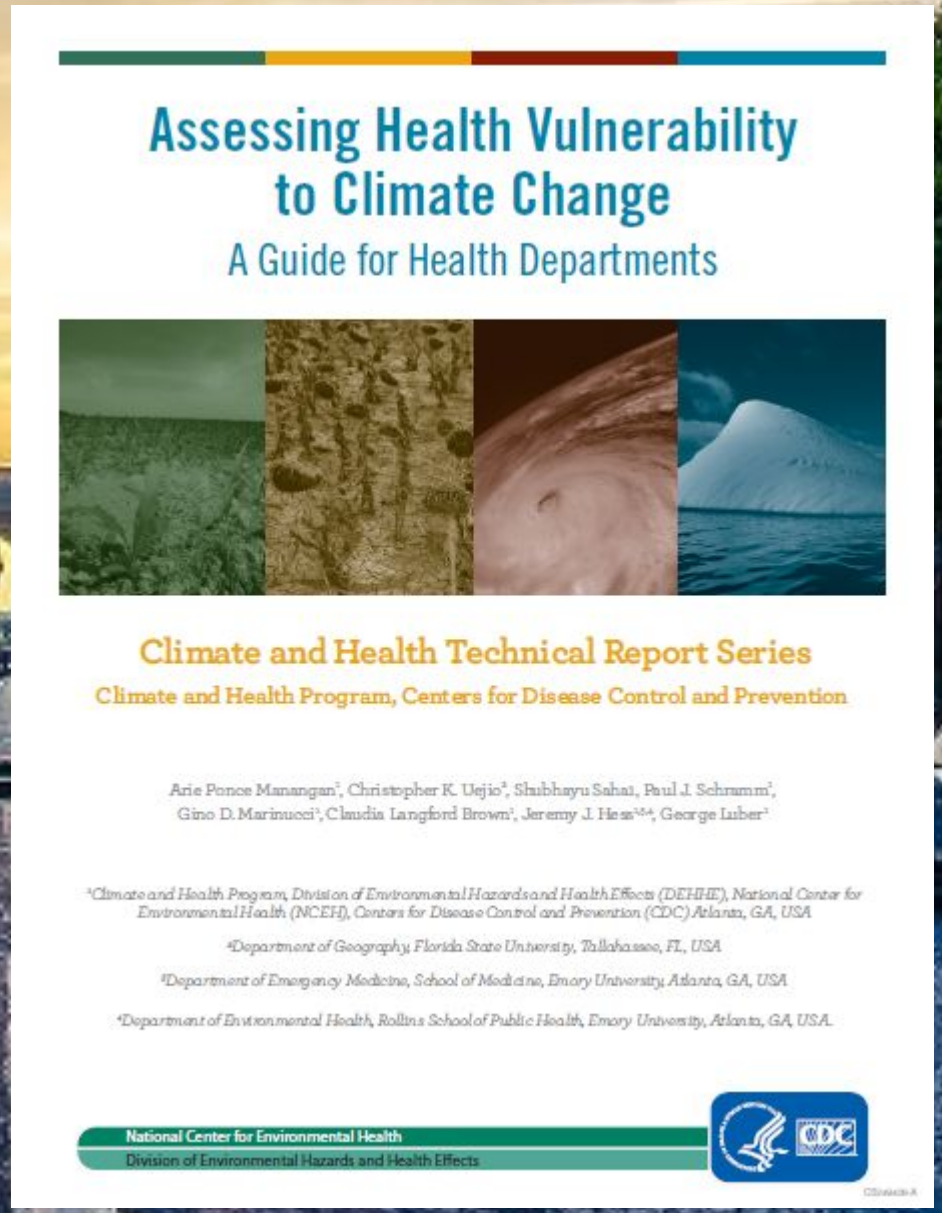
	Odds Ratio	Std.Err	95% CI	p-value
Night time Surface Temperature (ºC)	1.17	0.040	1.09 : 1.25	<0.001
Imperviousness Surface (%)	1.01	0.004	1.01 : 1.02	0.001
Housing Density (100 houses/km^2)	0.82	0.033	0.76 : 0.89	<0.001
Renting (%)	1.01	0.022	1.00 : 1.01	0.003
Linguistically Isolated (%)	1.01	0.000	1.00 : 1.02	0.010
Population aged 65 or older (per 100 people)	0.86	0.045	0.78 : 0.95	0.003
Hispanic (%)	1.01	0.003	1.01 : 1.02	<0.001
People Living Alone (%)	1.03	0.005	1.02 : 1.04	<0.001
Black (%)	1.03	0.007	1.01 : 1.04	<0.001
Asian (%)	0.93	0.030	0.87 : 0.99	0.015
Vacant Households (%)	1.03	0.005	1.02 : 1.04	<0.001
Total Population (per 1000 people)	1.36	0.077	1.21 : 1.51	<0.001
Imperviousness Surface X Housing Density	1.002	0.001	1.001 : 1.003	<0.001

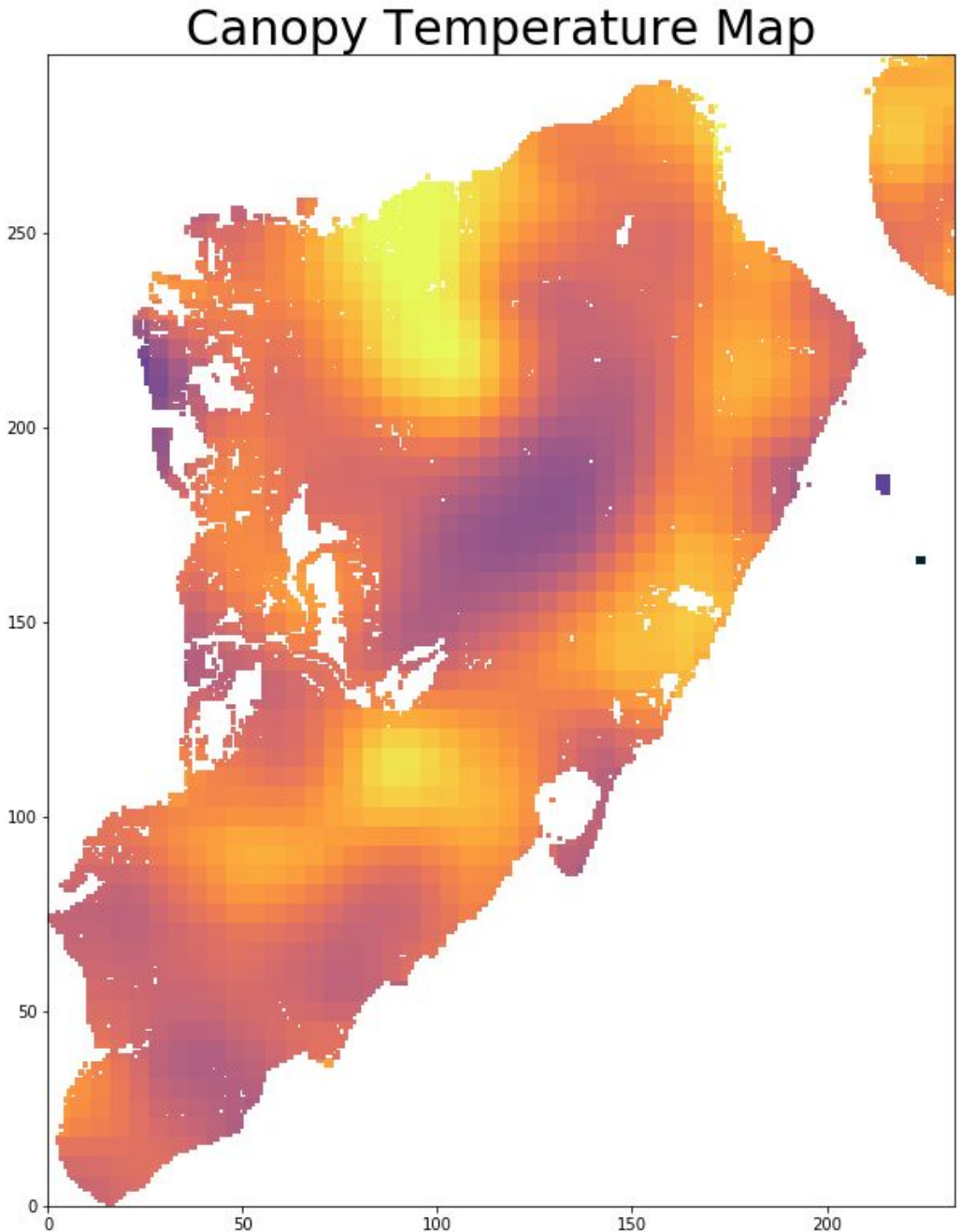
Uejio et al. (2012)

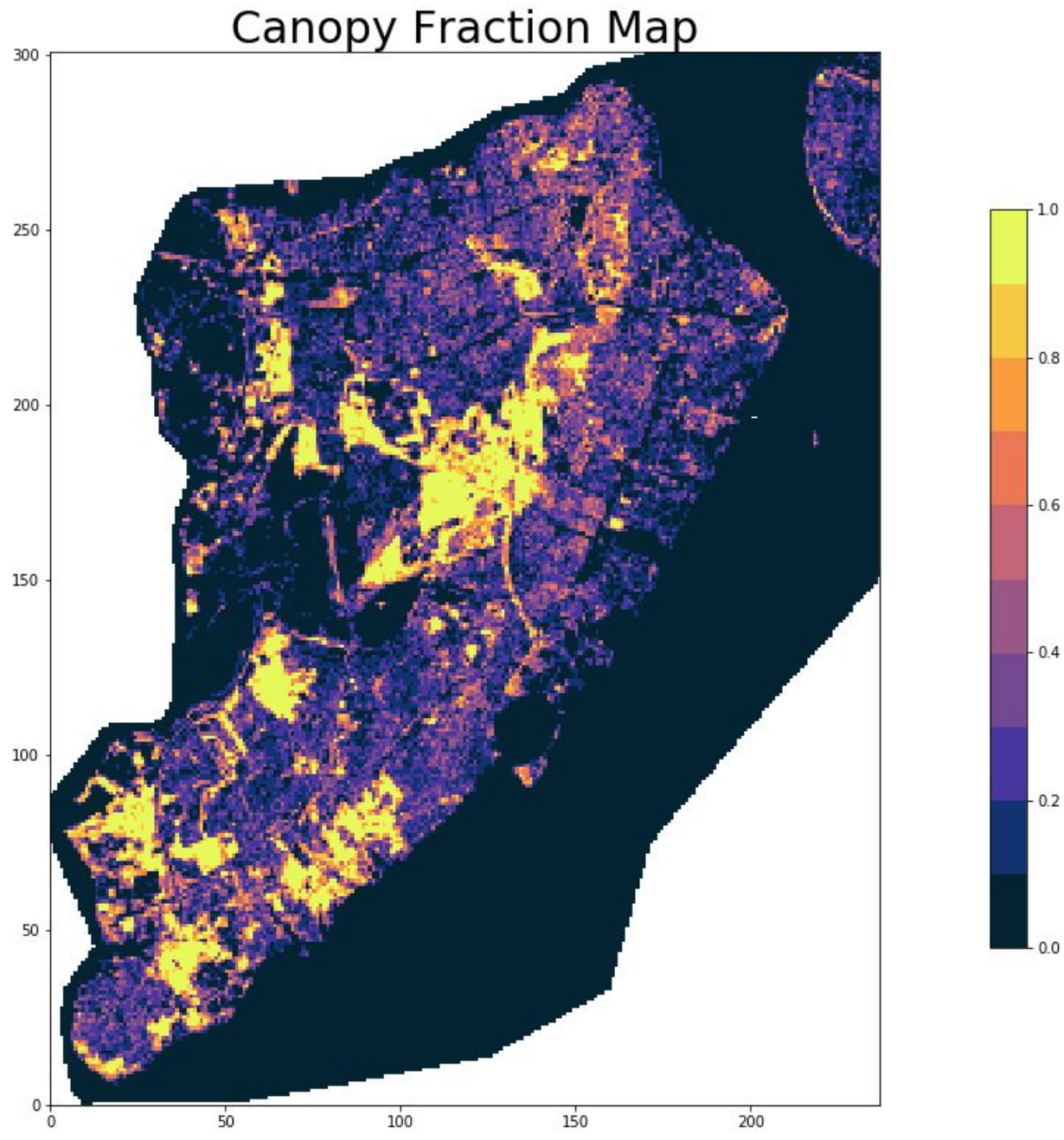
Applications

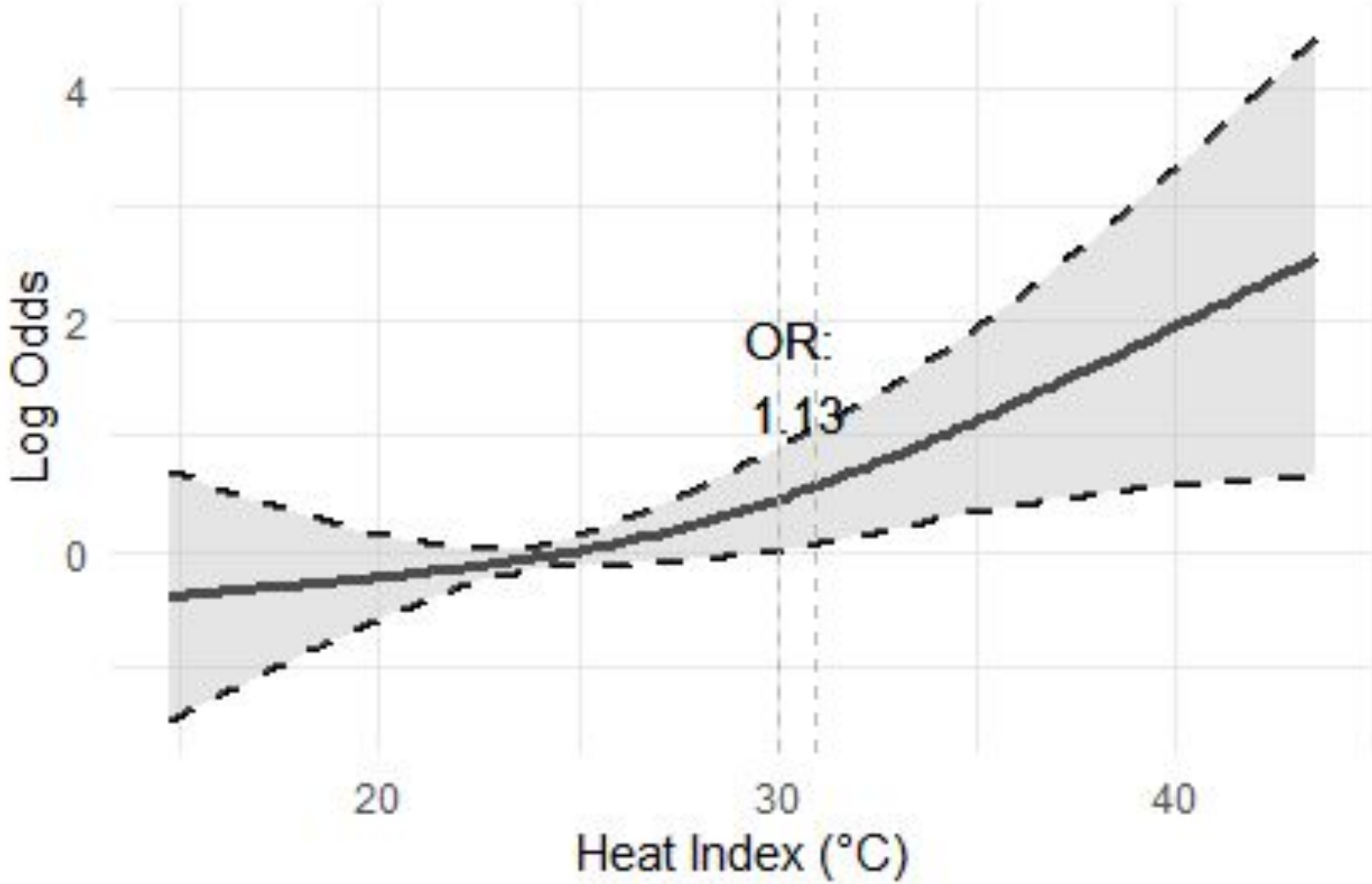
Everyone @ risk

Guiding decision making




Canopy Temperature Map
0
50
100
150
200
250


Canopy Fraction Map
0
50
100
150
200
250
300
1.0
0.8
0.6
0.4
0.2
0.0


4
2
0
Log Odds
OR:
1.13
20
30
40
Heat Index (°C)

Thanks!

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