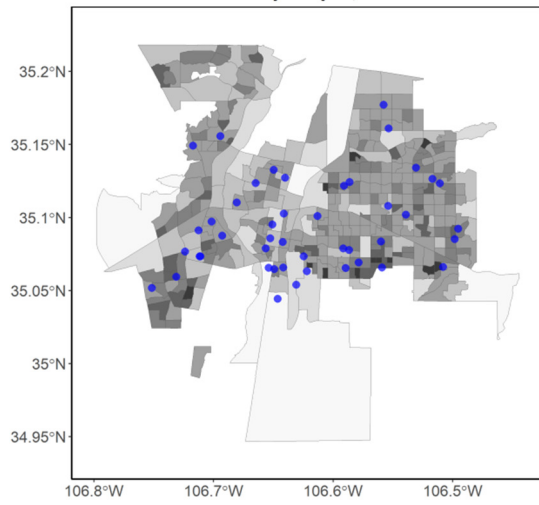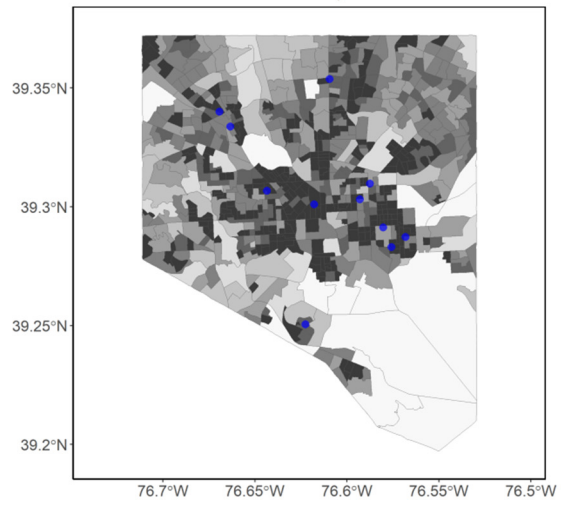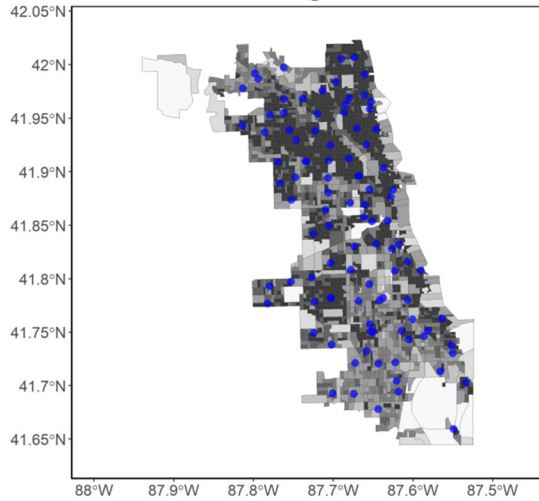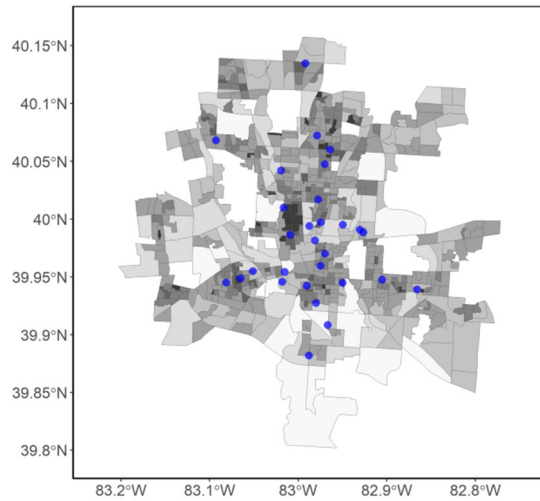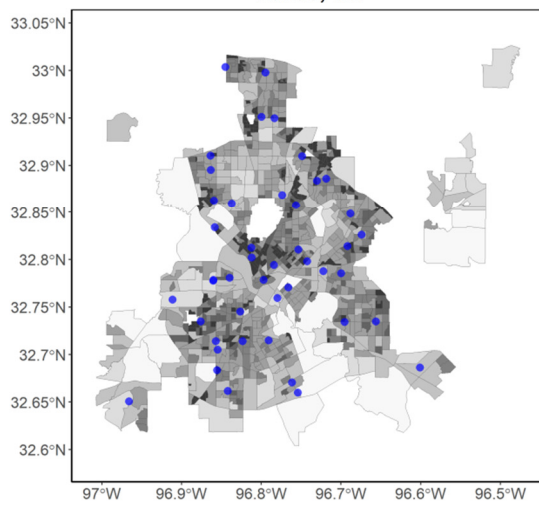**Albuquerque, NM**

Baltimore, MD

Chicago, IL

Columbus, OH

Dallas, TX

Detroit, MI

Fresno, CA

Kansas City, MO

Long Beach, CA

Louisville, KY

Memphis, TN

Mesa, AZ
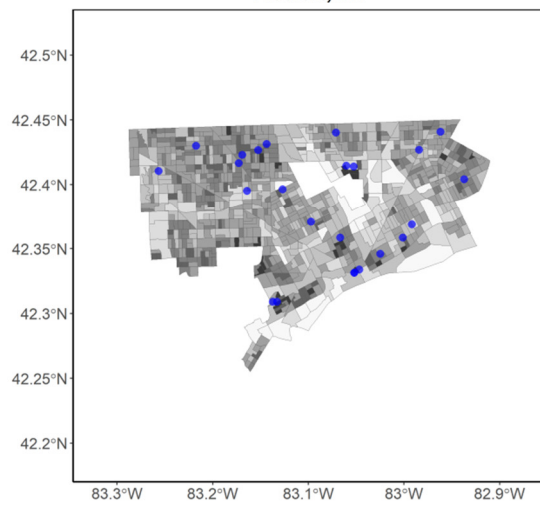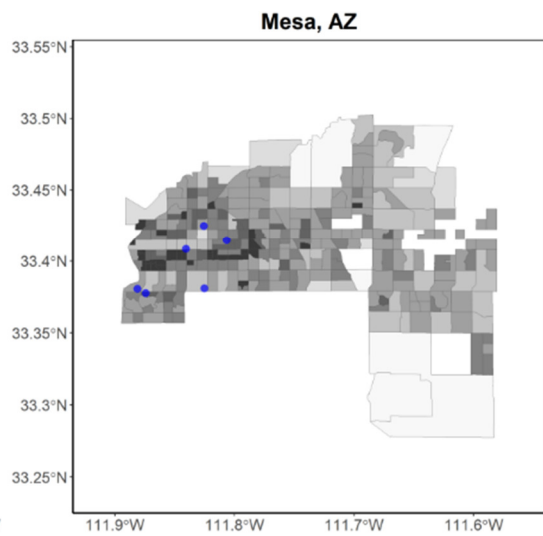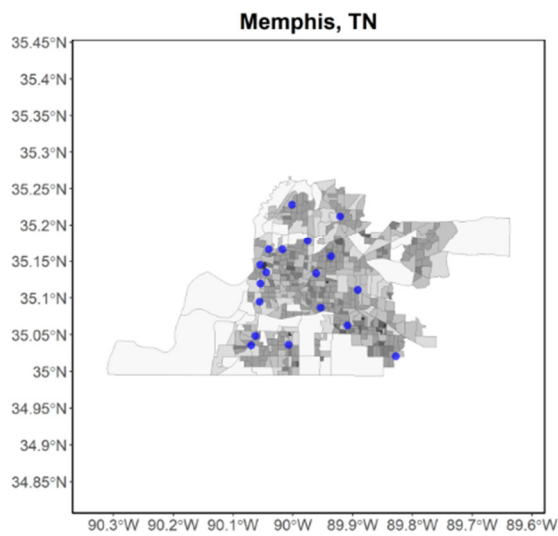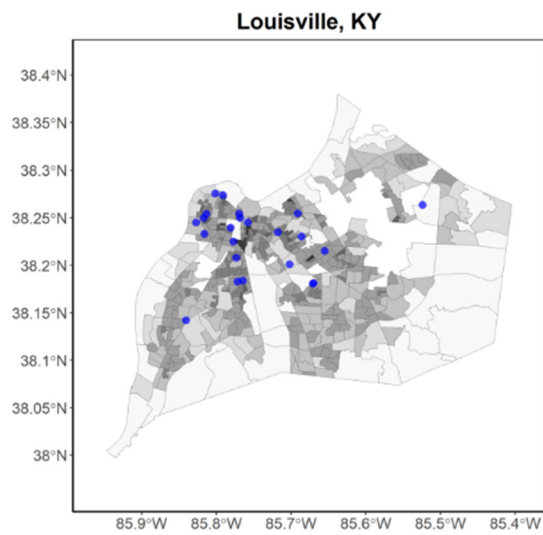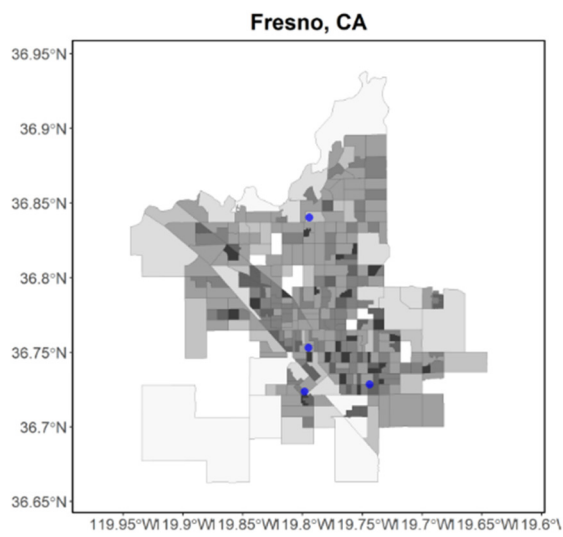
Milwaukee, WI

Minneapolis, MN

Nashville, TN

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Riverside, CA

St. Louis, MO

San Antonio, TX

San Jose, CA

Stockton, CA
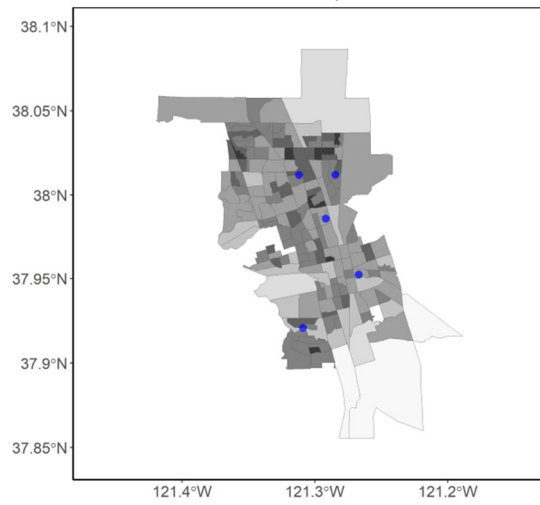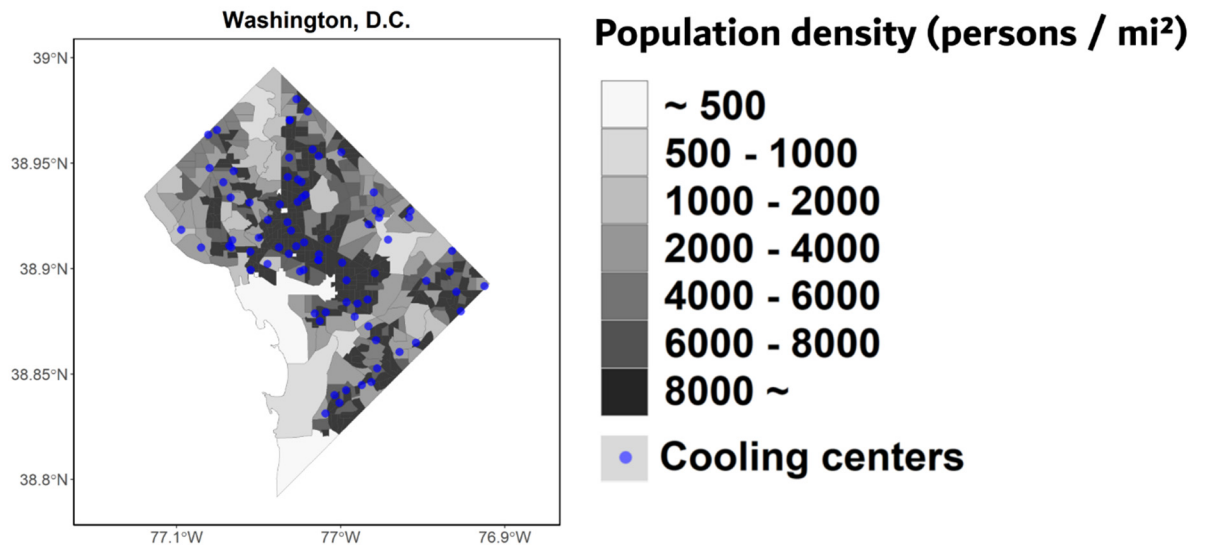
Figure S1. Cooling center locations and population densities.

Table S1. Sources of cooling center in 25 cities.

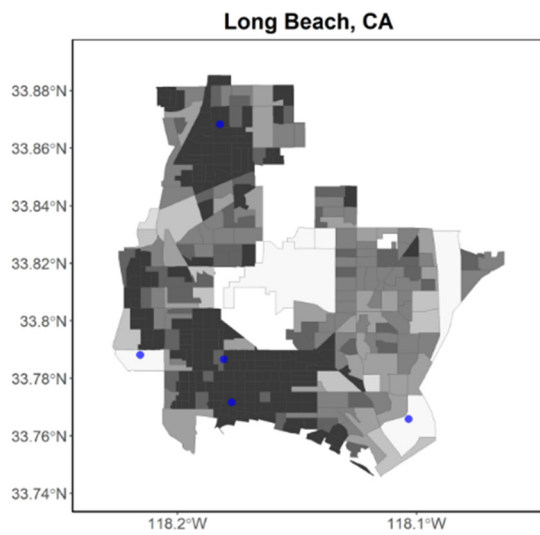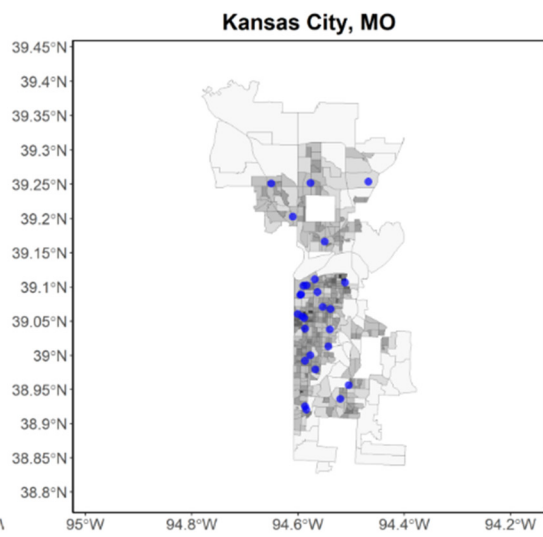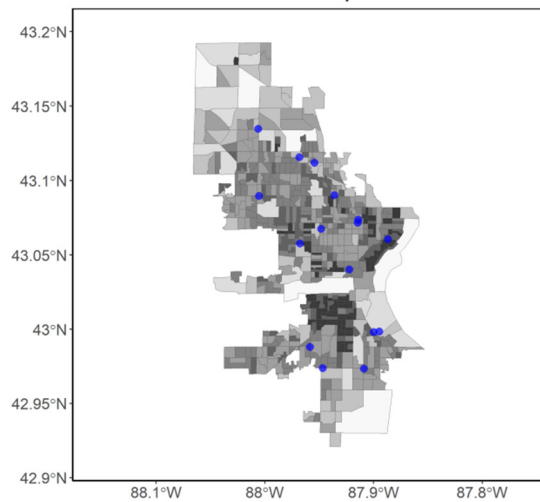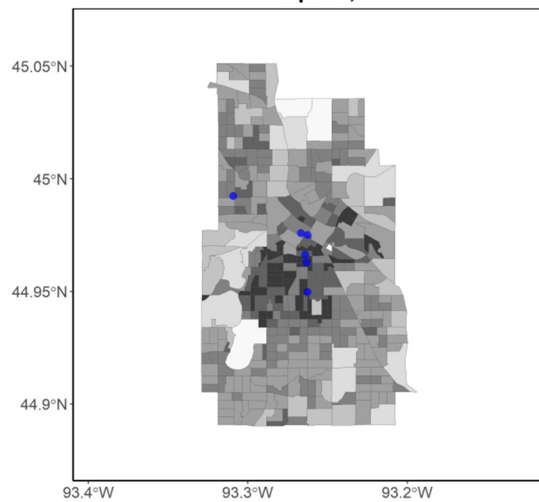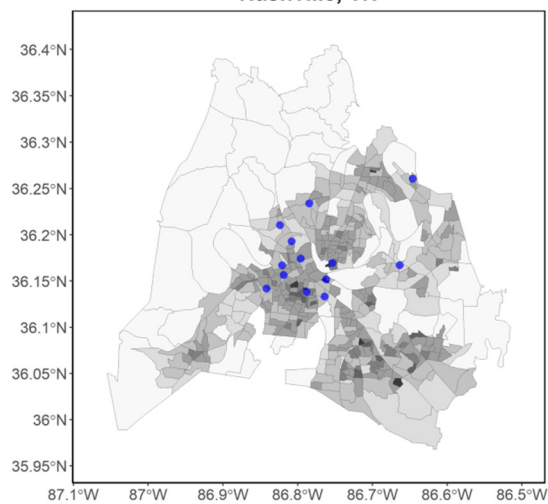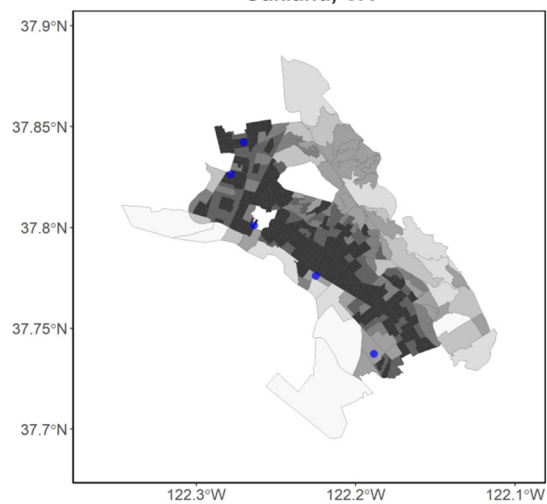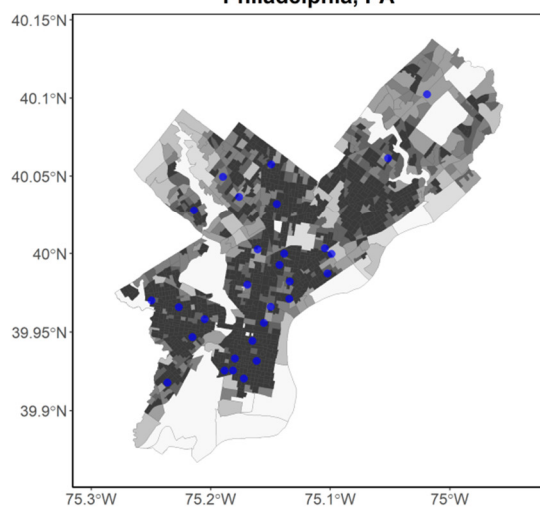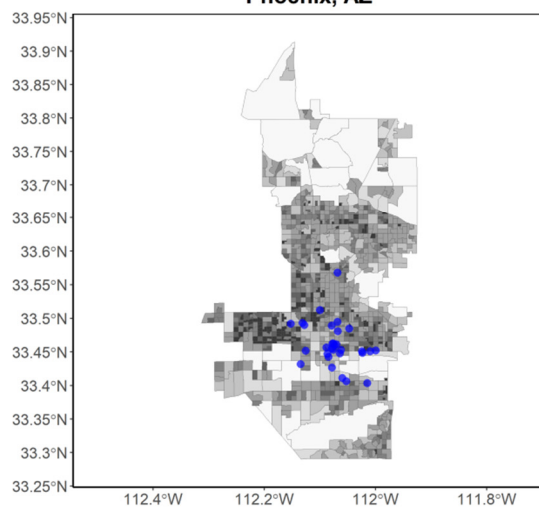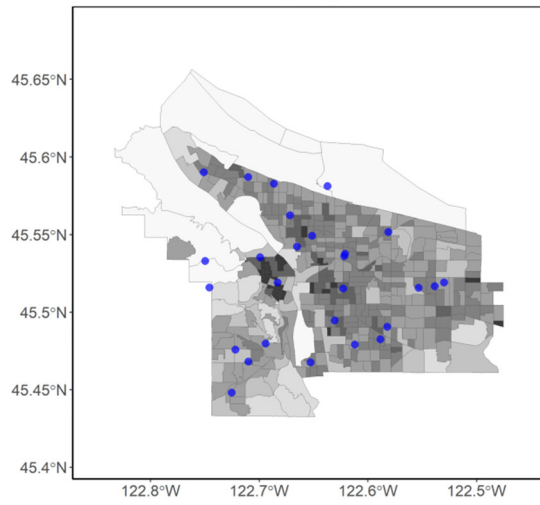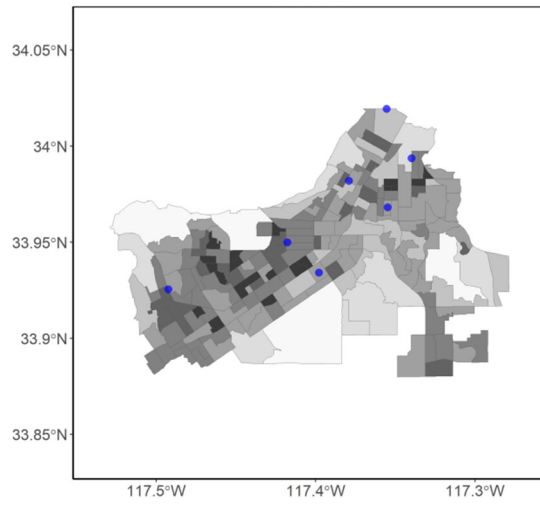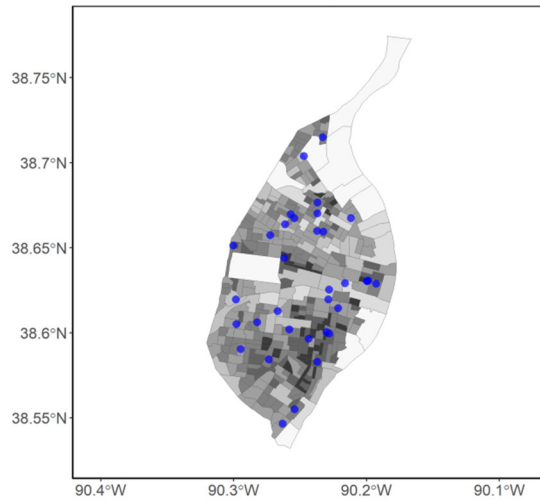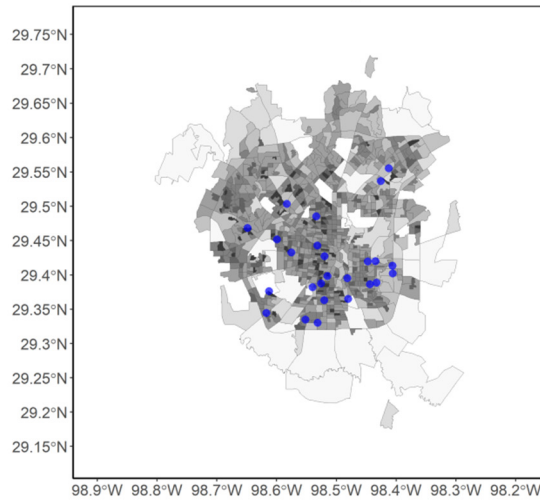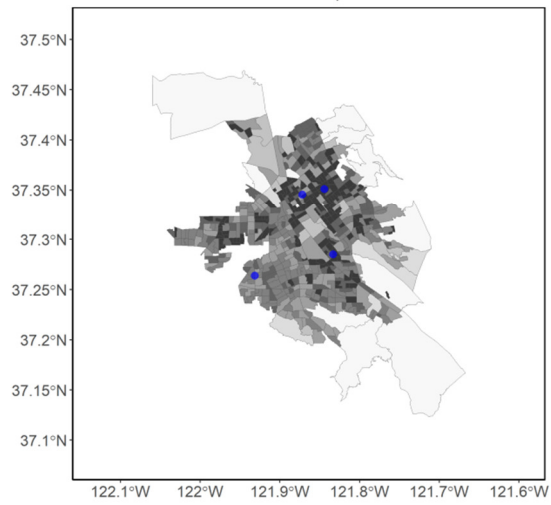| City	Type	Sources
Albuquerque, NM	City government's websites	https://www.cabq.gov/family/news/visit-one-of-many-public-facilities-to-cool-down-during-albuquerque2019s-heat-wave [Accessed on 10 January 2021]
Baltimore, MD	City government's websites	https://health.baltimorecity.gov/sites/default/files/health/attachments/CodeRedCoolingCenters_5.pdf [Accessed on 25 September 2020]
Chicago, IL	GIS portal	https://data.cityofchicago.org/Health-Human-Services/Cooling-Centers-Map/cj7n-sh49 [Accessed on 10 January 2021]
Columbus, OH	City government's websites	https://www.columbus.gov/recreationandparks/recreation-centers/All-Community-Centers/ [Accessed on 10 January 2021]
Dallas, TX	City government's websites	https://dallascityhall.com/departments/officeemergencymanagement/Pages/Heat-Advisory-Cooling-Stations.aspx [Accessed on 10 January 2021]
Detroit, MI	City government's websites	https://www.waynecounty.com/elected/executive/cooling-centers-in-wayne-county.aspx [Accessed on 25 September 2020]
Fresno, CA	City government's websites	https://www.fresno.gov/parks/cooling-centers/ [Accessed on 10 January 2021]
Kansas City, MO	GIS portal	https://data.mo.gov/Health/Missouri-Cooling-Centers-Map/2wki-9iz8 [Accessed on 25 September 2020]
Long Beach, CA	City government's websites	http://www.longbeach.gov/park/business-operations/about/cooling-center-locations/ [Accessed on 10 January 2021]
Louisville, KY	GIS portal	https://www.arcgis.com/apps/webappviewer/index.html?id=f9b70338e9884006a527fd31655ae85d [Accessed on 10 January 2021]
Memphis, TN	GIS portal	https://tdh.maps.arcgis.com/apps/MapTools/index.html?appid=687ac7d097ea4f67b7be3094ff4e907d [Accessed on 10 January 2021]

Mesa, AZ	GIS portal	https://azmag.maps.arcgis.com/apps/MapSeries/index.html?appid=be76 34cb523d4c048106890c98dc3a75&folderid=126f08d6351a4c3a8eb485a11ca ff1f8 [Accessed on 10 January 2021]
Milwaukee, WI	City government's websites	https://city.milwaukee.gov/health/pageshares/Cooling-Sites.htm [Accessed on 25 September 2020]
Minneapolis, MN	GIS portal	https://www.hennepin.us/residents/health-medical/cooling-centers [Accessed on 10 January 2021]
Nashville, TN	GIS portal	https://tdh.maps.arcgis.com/apps/MapTools/index.html?appid=687ac7d 097ea4f67b7be3094ff4e907d [Accessed on 10 January 2021]
Oakland, CA	City government's websites	https://www.shelteroak.org/cooling-centers.html [Accessed on 10 January 2021]
Philadelphia, PA	GIS portal	https://www.arcgis.com/apps/webappviewer/index.html?id=0afe8e198c d84da6a51ca4af027a7056 [Accessed on 10 January 2021]
Phoenix, AZ	GIS portal	https://azmag.maps.arcgis.com/apps/MapSeries/index.html?appid=be76 34cb523d4c048106890c98dc3a75&folderid=126f08d6351a4c3a8eb485a11ca ff1f8 [Accessed on 25 September 2020]
Portland, OR	GIS portal	https://www.arcgis.com/apps/webappviewer/index.html?id=0856c38202 954fc19ce55f4d60794324&extent=-13716579.5946,5688527.9073,- 13634027.6041,5740734.3976,102100 [Accessed on 25 September 2020]
Riverside, CA	GIS portal	https://www.capriverside.org/Cool-Centers [Accessed on 25 September 2020]
St. Louis, MO	GIS portal	https://www.arcgis.com/apps/webappviewer/index.html?id=a40c7955be 2f41f09a4e11520c6ee34b [Accessed on 10 January 2021]
San Antonio, TX	City government's websites	https://www.sanantonio.gov/gpa/News/ArtMID/24373/ArticleID/19170/ City-of-San-Antonio-announces-three-cooling-centers-will-open-to-the- public-today-thru-Friday-and-extended-hours-for-some-locations [Accessed on 10 January 2021]
San Jose, CA	City government's websites	https://siliconvalleystrong.org/heat/ [Accessed on 10 January 2021]
Stockton, CA	City government's websites	http://www.stocktonca.gov/government/departments/communityServic es/communityCenters.html [Accessed on 10 January 2021]
Washington, DC	GIS portal	https://opendata.dc.gov/datasets/bd51c0c373d844fa9654a7a02da23d6f_0 [Accessed on 10 January 2021]
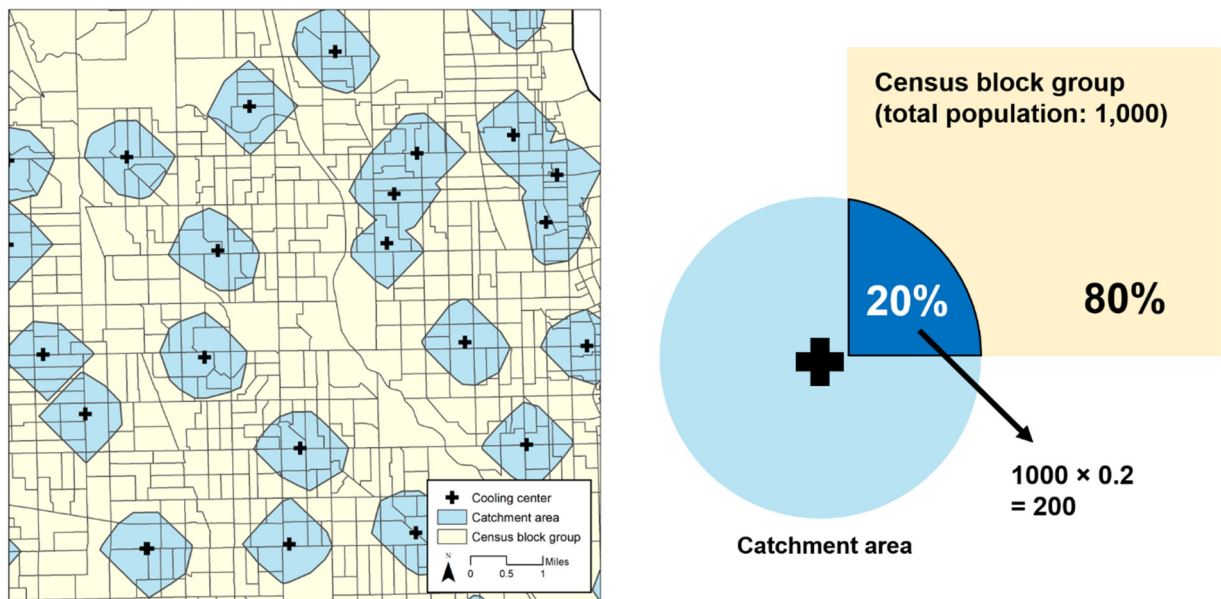
Figure S2. Illustration of catchment areas.
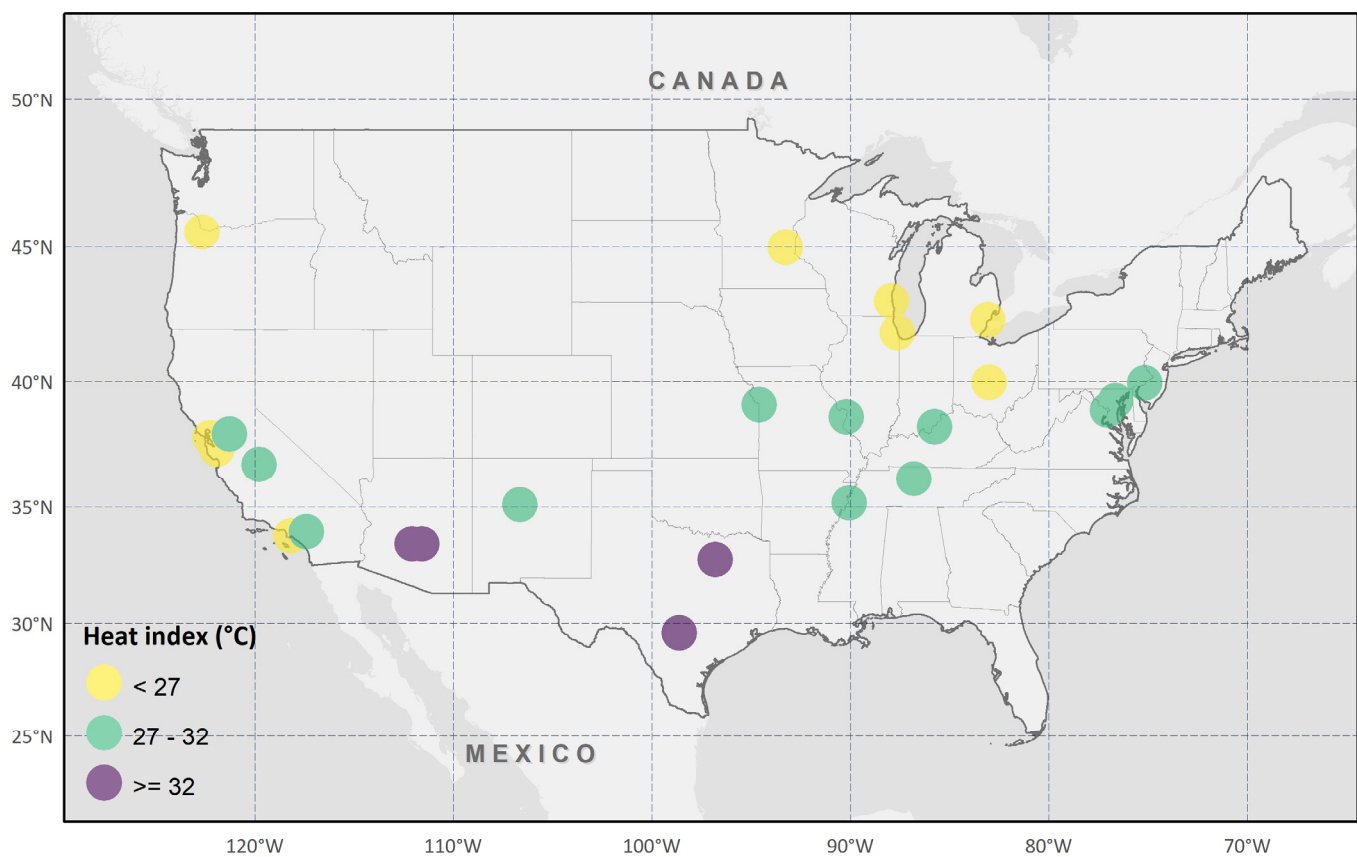
Figure S3. Spatial distribution of heat index.

Table S2. Total population coverage and standardized population coverage of study cities.

City	Total Population Coverage (%)	Standardized Population Coverage (%)
Albuquerque, NM	13.3	0.3
Baltimore, MD	10.4	0.9
Chicago, IL	25.9	0.3
Columbus, OH	6.7	0.2
Dallas, TX	6.7	0.1
Detroit, MI	9.4	0.4
Fresno, CA	1.9	0.5
Kansas City, MO	8.1	0.3
Long Beach, CA	7.0	1.4
Louisville, KY	5.2	0.2
Memphis, TN	3.3	0.2
Mesa, AZ	2.1	0.3
Milwaukee, WI	9.8	0.6
Minneapolis, MN	5.7	1.0
Nashville, TN	2.7	0.2
Oakland, CA	7.0	1.4
Philadelphia, PA	17.6	0.6
Phoenix, AZ	3.0	0.1
Portland, OR	13.0	0.5
Riverside, CA	4.4	0.6
St. Louis, MO	27.1	0.7
San Antonio, TX	3.0	0.1
San Jose, CA	2.1	0.4
Stockton, CA	3.9	0.8
Washington, DC	57.5	0.7
Average	10.3	0.5
Standard deviation	11.9	0.4

Table S3. Separate SPCs for selected subpopulation groups and reference groups.

City	Age		Black		Hispanic		Insurance		Poverty	
	≥65	≤64 (Ref)	Yes	No (Ref)	Yes	No (Ref)	No	Own (Ref)	Below	Above (Ref)
Albuquerque, NM	0.30	0.29	0.36	0.29	0.31	0.28	0.33	0.29	0.41	0.27
Baltimore, MD	0.91	0.95	0.84	1.11	1.04	0.94	1.08	0.94	1.15	0.91
Chicago, IL	0.25	0.26	0.25	0.27	0.26	0.26	0.27	0.26	0.27	0.26
Columbus, OH	0.21	0.23	0.28	0.21	0.26	0.23	0.27	0.23	0.35	0.20
Dallas, TX	0.16	0.15	0.12	0.16	0.16	0.15	0.15	0.15	0.13	0.16
Detroit, MI	0.40	0.39	0.34	0.60	0.35	0.40	0.40	0.39	0.36	0.39
Fresno, CA	0.42	0.47	0.61	0.46	0.66	0.29	0.66	0.46	0.80	0.37
Kansas City, MO	0.26	0.30	0.34	0.27	0.28	0.29	0.33	0.28	0.34	0.28
Long Beach, CA	1.06	1.45	1.57	1.37	1.68	1.19	1.83	1.36	2.12	1.27
Louisville, KY	0.19	0.21	0.43	0.14	0.13	0.21	0.20	0.21	0.44	0.17
Memphis, TN	0.19	0.18	0.20	0.14	0.19	0.18	0.19	0.18	0.24	0.16
Mesa, AZ	0.16	0.32	0.30	0.30	0.54	0.20	0.43	0.28	0.49	0.26
Milwaukee, WI	0.58	0.62	0.76	0.52	0.30	0.69	0.48	0.61	0.66	0.55
Minneapolis, MN	0.86	0.95	1.96	0.72	1.31	0.92	1.53	0.89	1.65	0.74
Nashville, TN	0.14	0.21	0.42	0.13	0.09	0.22	0.14	0.22	0.52	0.15
Oakland, CA	1.43	1.41	1.29	1.44	1.45	1.38	1.85	1.36	1.86	1.31
Philadelphia, PA	0.56	0.62	0.57	0.63	0.60	0.61	0.62	0.61	0.66	0.59
Phoenix, AZ	0.08	0.10	0.14	0.10	0.12	0.09	0.13	0.09	0.15	0.08
Portland, OR	0.45	0.49	0.49	0.48	0.42	0.49	0.50	0.48	0.51	0.48
Riverside, CA	0.58	0.62	0.74	0.61	0.73	0.49	0.81	0.60	0.82	0.61
St. Louis, MO	0.70	0.74	0.75	0.72	0.69	0.73	0.70	0.73	0.73	0.73
San Antonio, TX	0.13	0.12	0.13	0.12	0.15	0.06	0.16	0.11	0.18	0.11
San Jose, CA	0.32	0.42	0.24	0.42	0.82	0.23	0.68	0.40	0.52	0.41
Stockton, CA	0.87	0.79	0.76	0.79	0.78	0.79	0.77	0.78	0.97	0.73
Washington, DC	0.68	0.74	0.63	0.81	0.80	0.72	0.72	0.73	0.66	0.75
Average	0.48	0.52	0.58	0.51	0.56	0.48	0.61	0.51	0.68	0.48