

Heat-Related Illness (HRI) Emergency Department & Inpatient Admissions (Hospitalizations) 2019-2023, Arizona Residents and Non-Residents

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SUMMARY REPORT OF HEAT-RELATED ILLNESS (HRI) CASES IN 2023

Emergency Department Visits

Total number of heat-related illness emergency department visits in Arizona during 2023 is **4,298**



Approximately **68%** of the heat-related illness emergency department visits by males



Most of the heat-related emergency department visits occurred in Maricopa, Pima and Pinal counties



The rate of ED visits among Arizona residents per 100,000 population is highest in La Paz, Yuma and Mohave counties



59% of heat-related cases occurred among Non-Hispanic Whites & **26%** among Hispanics



45% of the heat-related illness cases are seen in 20-44 years of age group



Over **21%** of heat-related illness cases had cardiovascular disease as a comorbidity



Among the listed activities, over **52%** of the heat-related illness cases involved engaging in recreational activities



Inpatient Admissions (Hospitalizations)

Total number of heat-related illness Inpatient admissions in Arizona during 2023 is **1,322**

Around **77%** of the heat related illness Inpatient admissions are males

Most of the heat-related hospitalizations occurred in Maricopa, Pima and Pinal counties

The rate of hospitalizations among Arizona residents per 100,000 population is highest in Gila, Mohave and Maricopa counties

62% of heat-related cases occurred among Non-Hispanic Whites & **21%** among Hispanics

35% of the heat-related illness cases are seen in 45-64 years of age group

Over **66%** of heat-related illness cases had cardiovascular disease as a comorbidity

Among the listed activities, **40%** of the heat-related illness cases involved engaging in recreational activities

Heat-Related Illness by Year

VisitYear	Emergency Department Visit	Inpatient Admission (Hospitalization)
2019	2,944 Of those, 1,902 were heat-caused† (64.6%)	761 Of those, 299 were heat-caused† (39.3%)
2020	2,414 Of those, 1,401 were heat-caused† (58.0%)	894 Of those, 361 were heat-caused† (40.4%)
2021	2,873 Of those, 1,811 were heat-caused† (63.0%)	920 Of those, 412 were heat-caused† (44.8%)
2022	3,268 Of those, 1,966 were heat-caused† (60.2%)	1,039 Of those, 494 were heat-caused† (47.5%)
2023	4,298 Of those, 2,494 were heat-caused† (58.0%)	1,322 Of those, 639 were heat-caused† (48.3%)

†Heat-caused emergency department and inpatient visits (hospitalizations) are visits where the primary diagnosis is listed as exposure to excessive natural heat. Heat-related visits are where exposure to excessive natural heat is listed anywhere in the diagnoses and include those that were heat-caused.



Heat-Related Illness Emergency Department Visits and Inpatient Admissions (Hospitalizations) by Resident Status

Resident Status	2019	2020	2021	2022	2023
AZ Resident Emergency Department Visit	2,649	2,086	2,514	2,830	3,740
AZ Resident Inpatient Admission (Hospitalization)	648	751	772	902	1,101
Non-Resident Emergency Department Visit	295	328	359	438	558
Non-Resident Inpatient Admission (Hospitalization)	113	143	148	137	221



Heat-Related Emergency Department Visits by Sex and Age Group, Arizona Residents and Non-Residents

Sex	2019	2020	2021	2022	2023
Female	931	714	879	1,012	1,389
Male	2,013	1,700	1,994	2,256	2,907

Age Group	2019	2020	2021	2022	2023
Infants <1	8	6	9	10	13
Children 1-14	140	53	114	133	144
Adolescents 15-19	167	121	145	153	197
Young Adults 20-44	1,354	1,088	1,298	1,361	1,949
Middle-Aged Adults 45-64	846	715	805	993	1,294
Elderly 65+	429	431	502	618	701

*Number of visits related to exposure to excessive natural heat were suppressed due to non-zero count less than 6.



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Heat-Related Inpatient Admissions (Hospitalizations) by Sex and Age Group, Arizona Residents and Non-Residents

Sex	2019	2020	2021	2022	2023
Female	195	178	208	271	306
Male	566	716	712	768	1,013

Age Group	2019	2020	2021	2022	2023
Infants <1	<6*	6	6	8	<6*
Children 1-14	<6*	6	7	<6*	6
Adolescents 15-19	8	10	16	8	10
Young Adults 20-44	227	255	291	334	438
Middle-Aged Adults 45-64	289	360	318	360	461
Elderly 65+	233	257	282	327	404

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Heat-Related Illness Emergency Department Visits by Race/Ethnicity, Arizona Residents and Non-Residents

Race/Ethnicity	2019	2020	2021	2022	2023
American Indian/Alaskan Native	108	94	116	130	188
Asian or Pacific Islander	40	24	32	35	43
Black or African American	213	165	215	289	379
Hispanic	765	575	721	809	1,101
White	1,788	1,526	1,738	1,971	2,530
Other	30	30	51	34	57



Heat-Related Illness Inpatient Admissions (Hospitalizations) by Race/Ethnicity, Arizona Residents and Non-Residents

Race/Ethnicity	2019	2020	2021	2022	2023
American Indian/Alaskan Native	19	32	40	41	64
Asian or Pacific Islander	12	10	7	17	10
Black or African American	70	85	76	85	121
Hispanic	159	165	213	232	273
White	485	585	574	646	825
Other	16	17	10	18	29



Heat-Related Illness Emergency Department Visits by Month, Arizona Residents and Non-Residents

Month	2019	2020	2021	2022	2023
January	<6*	<6*	<6*	<6*	<6*
February	<6*	10	<6*	10	8
March	32	12	20	74	20
April	105	61	102	104	151
May	96	283	194	262	209
June	518	377	890	790	373
July	968	620	789	1,013	2,045
August	859	722	540	585	1,070
September	306	248	285	371	311
October	40	62	29	50	89
November	15	15	16	7	12
December	<6*	<6*	<6*	0	6

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Heat-Related Illness Inpatient Admissions (Hospitalizations) by Month, Arizona Residents and Non-Residents

Month	2019	2020	2021	2022	2023
January	0	<6*	<6*	0	0
February	0	<6*	<6*	0	<6*
March	6	<6*	<6*	7	<6*
April	17	20	20	17	22
May	16	56	42	47	36
June	128	101	290	213	98
July	270	310	250	423	734
August	221	304	195	173	310
September	94	80	101	147	91
October	8	17	10	11	25
November	<6*	0	<6*	0	<6*
December	0	<6*	0	<6*	0

*Number of visits related to exposure to excessive natural heat were suppressed due to non-zero count less than 6.



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Heat-Related Illness Emergency Department Visits by County, Arizona Residents only

County Residence	2019	2020	2021	2022	2023
Apache	10	6	8	8	6
Cochise	47	27	32	31	60
Coconino	20	25	22	25	24
Gila	31	23	18	24	22
Graham	14	18	9	10	24
Greenlee	<6*	<6*	<6*	<6*	<6*
La Paz	10	23	37	38	32
Maricopa	1,545	1,237	1,504	1,816	2,453
Mohave	136	159	180	163	178
Navajo	12	17	23	22	29
Pima	307	214	242	228	358
Pinal	224	186	189	242	309
Santa Cruz	13	<6*	13	6	6
Yavapai	46	39	60	48	54
Yuma	231	105	176	164	184

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Heat-Related Illness Emergency Department Visits Rates by County, Arizona Residents only

County Residence	2019	2020	2021	2022	2023
Apache	13.9	*	12.0	12.0	*
Cochise	35.9	21.5	25.3	24.5	47.4
Coconino	13.6	17.2	14.9	16.7	16.0
Gila	56.2	43.1	33.6	44.6	40.9
Graham	36.4	46.6	23.1	25.6	61.5
Greenlee	*	*	*	*	*
La Paz	45.3	138.7	220.0	225.4	189.8
Maricopa	35.4	27.9	33.4	39.6	53.5
Mohave	62.7	74.3	83.1	73.7	80.5
Navajo	10.6	15.9	21.3	20.3	26.7
Pima	29.4	20.5	22.9	21.3	33.4
Pinal	49.2	43.4	43.0	53.3	68.1
Santa Cruz	24.5	*	26.8	*	*
Yavapai	19.8	16.5	24.9	19.6	22.0
Yuma	100.5	51.3	84.9	78.1	87.7

Note: Crude rates are calculated per 100,000 population. For the years 2019-2022, their respective year estimates were used. For 2023, US Census estimates of the year 2022 were used. Rate calculations utilize the official population estimates from Arizona Department of Health Services: vital statistics - <https://pub.azdhs.gov/health-stats/menu/info/pop/index.php>. *Number of visits related to exposure to excessive natural heat were suppressed due to non-zero count less than 6.



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Heat-Related Illness Inpatient Admissions (Hospitalizations) by County, Arizona Residents only

County Residence	2019	2020	2021	2022	2023
Apache	<6*	<6*	<6*	<6*	<6*
Cochise	<6*	<6*	<6*	<6*	7
Coconino	<6*	<6*	<6*	6	<6*
Gila	<6*	0	<6*	<6*	12
Graham	<6*	<6*	0	0	<6*
Greenlee	<6*	0	0	0	<6*
La Paz	<6*	<6*	<6*	<6*	<6*
Maricopa	433	547	504	669	766
Mohave	28	37	52	33	41
Navajo	<6*	<6*	7	<6*	<6*
Pima	83	74	94	78	152
Pinal	51	50	50	52	60
Santa Cruz	<6*	<6*	0	<6*	<6*
Yavapai	9	<6*	9	7	11
Yuma	24	22	41	37	29

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Heat-Related Illness Inpatient Admissions (Hospitalizations) Rates by County, Arizona Residents only

County Residence	2019	2020	2021	2022	2023
Apache	*	*	*	*	*
Cochise	*	*	*	*	5.5
Coconino	*	*	*	*	*
Gila	*	0.0	*	*	22.3
Graham	*	*	0.0	0.0	*
Greenlee	*	0.0	0.0	0.0	*
La Paz	*	*	*	*	*
Maricopa	9.9	12.3	11.2	14.6	16.7
Mohave	12.9	17.3	24.0	14.9	18.5
Navajo	*	*	6.5	*	*
Pima	7.9	7.1	8.9	7.3	14.2
Pinal	11.2	11.7	11.4	11.5	13.2
Santa Cruz	*	*	0.0	*	*
Yavapai	3.9	*	3.7	2.9	4.5
Yuma	10.4	10.7	19.8	17.6	13.8

Note: Crude rates are calculated per 100,000 population. For the years 2019-2022, their respective year estimates were used. For 2023, US Census estimates of the year 2022 were used. Rate calculations utilize the official population estimates from Arizona Department of Health Services: vital statistics - <https://pub.azdhs.gov/health-stats/menu/info/pop/index.php> . *Number of visits related to exposure to excessive natural heat were suppressed due to non-zero count less than 6.



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Heat-Related Illness Emergency Department Visits by Comorbidity and Substance Use, Arizona Residents and Non-Residents

Comorbidity†	2019	2020	2021	2022	2023
Obese/Overweight	53	43	51	51	62
Mental Disorders	956	780	830	878	1,064
Circulatory Disease	719	647	669	792	919
Respiratory Disease	239	189	213	216	251
No Comorbidity	1,471	1,171	1,554	1,774	2,492

Substance Use	2019	2020	2021	2022	2023
Alcohol Use	56	63	57	64	112
Drug Use	610	509	589	629	699
Combined Alcohol and Drug Use	49	57	30	31	59
No Substance Use	2,229	1,785	2,197	2,544	3,428

† More than 1 comorbidity may be listed in the visit record. All comorbidities identified in a record are represented in these yearly totals.



Heat-Related Illness Inpatient Admissions (Hospitalizations) by Comorbidity and Substance Use, Arizona Residents and Non-Residents

Comorbidity†	2019	2020	2021	2022	2023
Obese/Overweight	64	72	94	100	110
Mental Disorders	496	591	590	664	883
Circulatory Disease	468	567	602	702	871
Respiratory Disease	284	382	383	426	541
No Comorbidity	69	64	71	83	107
Substance Use	2019	2020	2021	2022	2023
Alcohol Use	53	49	46	48	92
Drug Use	293	377	366	432	559
Combined Alcohol and Drug Use	78	104	84	86	112
No Substance Use	337	364	424	473	559

† More than 1 comorbidity may be listed in the visit record. All comorbidities identified in a record are represented in these yearly totals.



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Heat-Related Illness Emergency Department Visits by Place of Injury and Preceding Activity, Arizona Residents and Non-Residents

Place of Injury	2019	2020	2021	2022	2023
Industrial Site	442	380	442	445	584
Private Residence	1,005	750	950	1,139	1,561
Public Building	94	41	74	89	118
Recreational Site	88	65	92	101	101
Residential Institution	21	26	19	16	29
Street/Highway	518	481	507	596	858
Not Listed	776	671	789	882	1,045
Preceding Activity	2019	2020	2021	2022	2023
Exercise	<6*	12	8	<6*	7
Household Activities	27	13	29	21	26
Occupational	129	114	128	106	98
Recreational	323	272	275	289	259
Sports/Athletics	100	76	95	98	111
Not Listed	2,360	1,927	2,338	2,750	3,797



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*Number of visits related to exposure to excessive natural heat were suppressed due to non-zero count less than 6.

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Heat-Related Illness Inpatient Admissions (Hospitalizations) by Place of Injury and Preceding Activity, Arizona Residents and Non-Residents

Place of Injury	2019	2020	2021	2022	2023
Industrial Site	79	90	80	116	147
Private Residence	238	283	293	342	419
Public Building	25	19	18	20	27
Recreational Site	7	13	8	10	10
Residential Institution	<6*	<6*	<6*	10	7
Street/Highway	226	287	299	321	465
Not Listed	182	197	217	220	244
Preceding Activity	2019	2020	2021	2022	2023
Exercise	0	<6*	<6*	0	<6*
Household Activities	<6*	<6*	<6*	<6*	6
Occupational	22	9	14	25	21
Recreational	28	26	24	29	25
Sports/Athletics	6	7	11	7	8
Not Listed	702	846	868	974	1,260



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Methods

ICD-10 Codes	Description
T67.0	Heat stroke and sunstroke
T67.1	Heat syncope
T67.2	Heat cramps
T67.3	Heat exhaustion from water depletion
T67.4	Heat exhaustion from salt depletion
T67.5	Heat exhaustion, unspecified
T67.6	Heat fatigue, transient
T67.7	Heat edema
T67.8	Other specified heat effects
T67.9	Unspecified effects of heat and light
X30	Exposure to excessive natural heat

- .Criteria adapted from Council of State & Territorial Epidemiologists (CSTE)
- .Methods search entire record for ICD-10 codes
- .ICD codes related to man-made sources of heat were excluded



Methods

ICD-10 Codes	Description
E66	Overweight and obesity
FXX	Mental, behavioral, and neurodevelopmental disorders
IXX	Diseases of the circulatory system
JXX	Diseases of the respiratory system

- . ICD codes related to selected comorbidities are listed here
- . Methods search entire record for ICD-10 codes
- . Substance use codes (ICD-10) for alcohol-and drug-related comorbidities are defined by [ADHS Population Health and Vital Statistics Diagnostics Categories](#)

