

**STATE ENVIRONMENTAL HEALTH INDICATORS COLLABORATIVE (SEHC)
CLIMATE CHANGE INDICATORS**

Indicator: CC1: Heat related health outcomes

Measure(s): CC1.2: Annual number and rate of heat related hospitalizations

MEASURE DESCRIPTION

CC1.2: Annual number and rate of heat related hospitalizations	
Last updated:	June 18, 2009
Measurement units:	Number and rate per 100,000 population
Geographic scale:	Statewide
Time scale:	Annual (available years vary by state)
Significance/background:	According to the published literature, climate change is projected to increase the number of heat related deaths between 47 and 95% in NY by 2050 and 2-7 fold for California by 2090 with partial reduction in out years due to adaptation (Knowlton 2007, Hayhoe 2004). The projections cited are for mortality only however one would expect that heat-related hospitalizations where the patient recovers would also increase. Additionally while the projections are specific to certain locales, it is reasonable to expect other regions to incur similar climate penalties. Further, the U.S. population over age 65 is projected to be 20% by 2030 (over 50 million people) (Day 1996). Older adults are physiologically and socially more vulnerable (Khosla and Guntupalli, 1999; Klinenberg, 2002) to hot weather and heat waves. The actual hospitalizations will vary by region as climate and population characteristics vary.
Rationale:	Tracking the number of heat related deaths may assist public health professionals to design targeted adaptation and response options for their specific regional requirements.
Data resources:	Agency for Healthcare Research and Quality (AHRQ) HCUPnet: http://hcupnet.ahrq.gov/ 992 Effects of heat and light Excludes: burns (940.0-949.5) diseases of sweat glands due to heat (705.0-705.9) malignant hyperpyrexia following anesthesia (995.86) sunburn (692.71, 692.76-692.77) 992.0 Heat stroke and sunstroke Heat apoplexy Heat pyrexia Ictus solaris Siriasis Thermoplegia 992.1 Heat syncope Heat collapse

	992.2 Heat cramps 992.3 Heat exhaustion, anhydrotic Heat prostration due to water depletion Excludes: that associated with salt depletion (992.4) 992.4 Heat exhaustion due to salt depletion Heat prostration due to salt (and water) depletion 992.5 Heat exhaustion, unspecified Heat prostration NOS 992.6 Heat fatigue, transient 992.7 Heat edema 992.8 Other specified heat effects 992.9 Unspecified
Limitations:	Annual counts for many states are too small for producing stable rate calculations. Other options for presenting rates are to combine years or states (for example, by region). Statistics are based on hospitals that meet the definition of "community hospital" -- nonfederal, short-term, general and other specialty hospitals, including public hospitals and academic medical centers. Excluded are federal, rehabilitation, and psychiatric hospitals, as well as alcoholism/chemical dependency treatment facilities.
Related indicators (from other projects):	
Recommendations:	

References

Day, J.C., 1996: *Population Projections of the United States by Age, Sex, Race, and Hispanic Origin: 1995- 2050*. U.S. Bureau of the Census, Current Population Reports, P25-1130, U.S. Government Printing Office, Washington, D.C.

Hayhoe, K. D. Cayan, C.B. Field, P.C. Frumhoff, E.P Maurer, N.L. Miller, *et al.*, 2004: Emissions pathways, climate change and impacts on California. *Proceedings of the National Academy of Sciences of the United States of America*, **101(34)**, 12,422-12,427.

Khosla, R. and K.K. Guntupalli, 1999: Heat-related illnesses. *Critical Care Clinics*, **15(2)**, 251-263.

Klinenberg, E., 2002: *Heat Wave: A Social Autopsy of Disaster in Chicago*. The University of Chicago Press, Chicago.

Knowlton, K., B. Lynn, R. Goldberg, C. Rosenzweig, C. Hogrefe, J. Rosenthal, *et al.*, 2007: Projecting heat-related mortality impacts under a changing climate in the New York City region. *American Journal of Public Health*, **97(11)**, 2028-2034.

HOW-TO GUIDE: CC1.2 Annual number and rate of heat related hospitalizations

1. Go to the AHRQ web site: <http://hcupnet.ahrq.gov/>
2. On this first screen, select **State Statistics on All Stays** under the section **Statistics on Hospital Stays**.
3. On the next screen, select **Researcher, medical professional** to describe yourself.
4. On the next screen, for the type of query choose the option **Trends**.
5. The next screen shows the years available for each state. Click on the arrow next to your state.
6. On the next screen, click on the second option **Specific diagnoses by ICD-9-CM**.
7. On the next screen, select **Principal diagnosis** or **All listed diagnoses**.
8. On the next screen, you will see a box for entering specific codes. In this box, type **992** and check the option for statistics for **All codes combined**.
9. For the outcome options on the next screen, choose **Number of discharges**.
10. For patient and hospital characteristics on the next screen, select **All patients in all hospitals**. Leave the other options unchecked.
11. The next screen is the results screen. This screen shows the total number of heat hospitalizations (where heat is the principal diagnosis) for the year you selected for your state.
12. To calculate the annual rates per 100,000 population, obtain the total population for your state for the year of interest from census data. Divide the number of heat related hospitalizations by the total population and then multiply by 100,000.