

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

**Indicator:** CC1: Heat related health outcomes

**Measure(s):** CC1.1: Annual number and rate of heat related deaths

**MEASURE DESCRIPTION**

| <b>CC1.1: Annual number and rate of heat related deaths</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <b>Last updated:</b>                                        | June 18, 2009                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Measurement units:</b>                                   | Number and rate per 100,000 population                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Geographic scale:</b>                                    | Statewide                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Time scale:</b>                                          | Annual, 1999-2005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Significance/background:</b>                             | 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). While these 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 mortality effects will vary by region as climate and population characteristics vary. |
| <b>Rationale:</b>                                           | Tracking the number of heat related deaths may assist public health professionals to design targeted adaptation and response options for their specific regional requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Data resources:</b>                                      | CDC Wonder compressed mortality files:<br><a href="http://wonder.cdc.gov/cmfi-icd10.html">http://wonder.cdc.gov/cmfi-icd10.html</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Limitations:</b>                                         | 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).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Related indicators (from other projects):</b>            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Recommendations:</b>                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**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: CC1.1 Annual number and rate of heat related deaths**

### **Obtain Data from the CDC Wonder Website:**

1. Go to the CDC Wonder web site: <http://wonder.cdc.gov/cmfi-icd10.html>
2. Make the following selections in the series of drop down menus:
  - For item #1, select **Year** in the first drop down box for the **Group Results By** option.
  - For #2, choose **States** as the location and then select your state from the menu.
  - For #3, choose the **All** options for AgeGroup, Year, Gender, Race and Urbanization (this should be the default already selected).
  - For #4, click the button for ICD-10 codes and then click on **V01-Y89** and **Open Fully** to choose **X30 (Exposure to excessive natural heat - hyperthermia)** from the drop down menu.
  - For #5, leave **All Causes of Death** selected for Injury Intent and Injury Mechanism.
  - For #6, choose **Rates per 100,000** and **No age-adjusted rates**.
  - For #7, select the first box to **Export Results**, **Show Totals** and **Show Zero Values** should be selected, and choose a precision of **2 decimal places**.
3. Click on **Send** at the bottom of the screen after you have made all the selections above.
4. When the File Download box appears, click on **Save** and save this text (.txt) file to your computer.
5. To open the file, go to the folder where you saved the file, right click on the file name, go to Open With and choose Microsoft Excel.