How-To Guide: Heat-related Illness Hospitalizations

Provided by CDC's Environmental Public Health Tracking Program

May 2022

PURPOSE AND USE OF THIS DOCUMENT

This document describes the steps for extracting and formatting the necessary data required for the Tracking Program's Nationally Consistent Data and Measures (NCDM) for heat-related illness hospitalizations.

HOW-TO GUIDE

	Description
Measures	Heat-related Illness Hospitalizations
Data Source(s)	Inpatient Hospitalization Admissions
NCDM Data Requirements	• Health outcome = Heat-related illness • State/county of residence • Hospital admission year/month • Age group • Sex Optional: • Race and ethnicity
Definitions Relevant to Indicator	*Admission Date*: The date of the hospital admission; month, day, and year. Month and year of admission are required in data submitted to CDC. *Discharge Date*: The date of discharge from hospital. *Duplicate Records*: More than one record for the same person with the same hospital admission data (e.g., where sex, date of birth, admission date, and ZIP code have exactly same information). *E-Codes*: In ICD-9-CM, external causes of injury and poisoning (E-codes) includes the external causes of injuries and poisonings and adverse effects of drugs and substances. E-codes are supplemental to the assignment of ICD-9-CM diagnosis codes and not used as the primary or principal diagnosis.

	Description
	Event/Event Year: A hospital admission for the health outcome of interest during specific calendar year. Event year is based only upon admission year, even when discharge year is different. *Heat-related Illness*: Heat-related Illness is defined as a constellation of explicit effects of hot weather on the body including heat stroke and sunstroke (hyperthermia), heat syncope/collapse, heat exhaustion, heat cramps, heat fatigue, heat edema, and other/unspecified clinical effects attributed to excessive heat exposure. It only includes cases that occurred **during May 1 to September 30** of each calendar year. Heat-related Illness is classified as **any** primary or other diagnosis code; ICD-9-CM: 992, or E- code E900.0 or E900.9 (excluding E code E900.1); ICD-10-CM: T67, X30, or X32 (excluding W92). *Hospital Transfers*: Generally, a patient discharged from one facility and readmitted to a second facility on the same day (within 24 hours). *Hospitalization/ Hospital Admission*: Condition of being placed (admission) or treated as a patient in an acute care hospital for treatment as an inpatient. Treatment as an out-patient is not considered to be hospitalization. To be considered as inpatient hospitalization, a minimum stay is required (often over 23 hours). *Multiple Admissions*: Second or subsequent admission for the same person for the same primary diagnosis code but on a different date and related to a separate event within a given year. Multiple admissions are considered separate events (generally at least 48 hours apart). *Out-of-State Admissions*: When a resident of your city/county/state is admitted to a hospital located in another state (usually an abutting state). *Primary Diagnosis Code:* The first diagnosis field(s) of the coded clinical record (i.e., primary or principal diagnosis). *ICD-9-CM*: Prior to October 1, 2015, diagnosis codes are represented by ICD-9-CM codes (the International Classification of Diseases, 9th Revision, Clinical Modification). *ICD-10-CM*: As of October 1, 2015, diagnosis codes are represented by ICD-10-CM codes (the International Classification of Diseases, 10th Revision, Clinical Modification). *Resident*: Any person with a residential address in your city/county/state at the time of the hospital admission.
HTG Requirements and Cautions	• This How-to Guide provides instructions for the development of the dataset for submission to CDC and for calculating the required and optional measures. The Data Dictionary should be referred to for the standardized definitions and notations of the variables to be submitted to CDC. The data file should be converted to the .XML file format and the required header inserted into the XML file, according to the Schema found on SharePoint. Additional How-to Guide is available for instructions for calculating the measures. • *Data Source:* The data source is an individual level state inpatient hospital admission data based on primary diagnosis at an acute care facility. Please consult your data

	Description
	steward and data mangers to understand the variables and coding system, specifically for race and ethnicity variables. • *Complete Dataset Guidelines:* The Tracking Network's NCDM are based upon date of admission because of the goal of relating a hospitalization event with an environmental event. Most hospitalization data (inpatient and outpatient) are released in annual discharge-based datasets; sometimes quarterly files are also released. Because the NCDM is based on admission date, it is necessary to have the dataset of the year of interest as well as that for the subsequent year (or first quarter of the subsequent year) in order to capture admissions that were discharged in the subsequent year. For example, 2005 data should not be submitted prior to receipt of either the first quarter 2006 or annual 2006 discharge dataset from the data steward. Some discretion on this rule is allowed if a program can show that inclusion of the subsequent year's data does not impact the data for the year of interest to a degree that would require re-submission. Re-submission due to incomplete data should be avoided. • *Duplicate Records:* This How-to Guide presumes that the user has removed duplicate records (see definitions for more information), while keeping multiple admissions. • *Out-of-State Admissions*: Admissions of residents to out-of-state hospitals should be included when available but are not required to be included. For states with significant out-of-state admissions, it is preferable to wait until the out-of-state data are available for inclusion so as to avoid the need for re-submission of more complete data in the future. However, some consideration of timeliness is also appropriate; if out-of-state data are overly delayed then submission without them is acceptable. It is noted that some states must include out-of-state admissions of its residents. Use the Metadata Creation Tool (MCT) to acknowledge the disposition of these admissions and provide any additional information about out-of-state data. • *Federal Facilities:* Admissions to federal facilities, such as Veteran's Hospitals, are not included. Be certain to inform CDC if your state requires that your dataset includes admissions to federal facilities so that the measures can be appropriately footnoted. • *Transfers:* Hospitalizations due to transfers between acute care hospitals (for any outcome except AMI) are not excluded from the counts/measures to be generated. Use the MCT to capture if and how transfers were excluded.
Step #1	From state inpatient hospital admission data with duplicate records already removed, select all hospital records that meet the following criteria: • **Admitted** during the year(s) of interest • State of residence is your state • Date of admission is not missing Retain, at least, the following variables. Additional variables may be necessary depending on your state's data. The actual names of the variables may differ. Please consult your data steward and data mangers to understand the variables and coding system, specifically for race and ethnicity variables.

	Description
	• State of residence • County of residence* • Date of admission • Date of discharge • Date of birth or age at time of admission • Sex • Race • Ethnicity • Primary diagnosis code • Other diagnosis fields or E-code fields * County of residence data collection varies by state. These methods can include a patient self-reporting county of residence, data organizations assigning county of residence by ZIP code, or geocoding patient address. Recipients that have access to patient address and have geocoded that address have observed disagreement between the county of residence field and the geocoded county. This is likely due to data vendors assigning county by ZIP code, which can overlap county boundaries. When possible, use the geocoded county of residence for data accuracy. For more information, please refer to the **Environmental Public Health Tracking Program - Geocoding Standards** document.
Step #2a (ICD-10-CM)	Flag all admissions where primary or other diagnosis code is "T67.*, X30.*, or X32.* (exclude W92.*)" by creating a variable (*for example Ishospital*) that takes the value of 1, if admission is due to diagnosis codes targeted; else its value is 2. Select cases having any of the following ICD-10-CM codes as a primary diagnosis or other diagnoses. In ICD-10-CM structure, codes can be up to 7 characters in length and 7th character used to provide information about the characteristic of the encounter (A: initial encounter, D: subsequent encounter, S: sequela): **ICD-10-CM Description** *T67.*: Effects of heat and light* T67.0*: Heatstroke and sunstroke T67.1*: Heat syncope T67.2*: Heat cramp T67.3*: Heat exhaustion, anhydrotic T67.4*: Heat exhaustion due to salt depletion T67.5*: Heat exhaustion, unspecified T67.6*: Heat fatigue, transient T67.7*: Heat edema T67.8*: Other effects of heat and light T67.9*: Effect of heat and light, unspecified *X30.*: Exposure to excessive natural heat* *X32.*: Exposure to sunlight* *Note: '*' includes all sub variations*

	Description
	Remove any records having ICD-10-CM code W92.* (exposure to excessive heat of man-made origin) as a cause of injury or other diagnosis. Retain only admissions identified as targeted diagnosis codes.
Step #2b (ICD-9-CM)	Flag all admissions where primary diagnosis code is "992.* or E900.0 or E900.9 (exclude E900.1)" by creating a variable (*for example Ishospital*) that takes the value of 1, if admission is due to diagnosis codes targeted; else its value is 2. Select cases having any of the following ICD-9-CM codes as a primary diagnosis, injury cause, or other diagnoses: **ICD-9-CM Description** 992.0 Heat stroke and sunstroke 992.1 Heat syncope 992.2 Heat cramps 992.3 Heat exhaustion from water depletion 992.4 Heat exhaustion from salt depletion 992.5 Heat exhaustion, unspecified 992.6 Heat fatigue, transient 992.7 Heat edema 992.8 Other specified heat effects 992.9 Unspecified effects of heat and light E900.0 Health effect caused by excessive heat due to weather (e.g., sunstroke, ictus solaris/heatstroke) E900.9 Effect from unknown cause of excessive heat ***Remove*** any records having E code E900.1 (man-made source of heat) as a cause of injury or other diagnosis. Retain only admissions identified as targeted diagnosis codes.
Step #3	Retain or select only those admissions that occurred from May 1 to September 30 (required step for heat-related Illness hospitalizations and ED data only)
Step #4	<u>AgeGroup</u> Create AgeGroup variable using either patient's date of birth and date of admission or age at time of admission. The base format for AgeGroup is by 5-year age groups beginning 0-4 and ending with 85+ resulting in 18 age groups plus one for unknown. Hospitalization counts must be submitted to CDC by these 5-year age groups coded from 1 to 19 (see Data Dictionary). <u>Race and Ethnicity (optional)</u> Race and ethnicity variables are optional for submission to CDC. If race and ethnicity data is being provided, be sure that the coding structure conforms to that laid out in the Data Dictionary. Counts and measures may be generated for recipient portals without specifying race or ethnicity if these data are missing or considered unreliable/inaccurate. Note: For Race and ethnicity, the code 'W' includes White alone. The code 'B' includes Black alone. The code 'O' includes American Indian or Alaskan Native or Asian or Pacific

	Description
	Islander or two or more races. The code 'H' includes those who are 'Hispanic alone' and those who are both 'Hispanic and non-Hispanic'.
Step #5	Create variable "MonthlyHosp" and summarize data by the following variables coded according to data dictionary: • AdmissionMonth • AgeGroup • County (patient's county of residence as 5-digit FIPS code) • Ethnicity (if using) • Race (if using) • Sex • YearAdmitted Do not expand dataset to include all combinations of these variables where MonthlyHosp equals zero. CDC will expand data and fill in zeros after data are validated. If missing combinations of these variables should not be interpreted as zero (for example, county X didn't report data in year Y), then please include this information in your metadata.
Step #6	Create the following variables and code according to data dictionary: • HealthOutcomeID
Step #7	Create new variable called "RowIdentifier" • RowIdentifier should be a sequence of numbers from 1 to the number of rows in your dataset.
Step #8	Order the variables according to the schema • RowIdentifier • AdmissionMonth • AgeGroup • County • Ethnicity (optional) • HealthOutcomeID • MonthlyHosp • Race (optional) • Sex • YearAdmitted
Step #9	Convert to XML Before converting to XML, create separate data files for each year of data. The data file should be converted to the .XML file format and the required header inserted into the XML file, according to the Schema found on SharePoint. Insert your state FIPS code in the XML header. This completes the required steps for data submission.

CDC'S ENVIRONMENTAL PUBLIC HEALTH TRACKING PROGRAM

Contact us: trackingsupport@cdc.gov

Visit the Tracking Network today: www.cdc.gov/ephtracking

Follow us on social media:

- Twitter (@CDC_EPHTracking)
- Facebook (facebook.com/CDCEPHTracking)