

California Building Resilience Against Climate Effects (CalBRACE) Project

Short Title: Outdoor Workers

Full Title: Percent of population employed and aged \geq 16 years working outdoors

CalBRACE Domain: Population Sensitivity

Why is this important to health?

Outdoor workers are at an increased risk of experiencing the health impacts of climate change. Working in an environment that is excessively hot poses a risk factor for heat health effects among persons who work outdoors. Farm workers and day laborers tend to have lower incomes and belong to communities of color, both of which are factors that increase the risk of adverse health effects due to climate change.¹ In California, the socioeconomic status of immigrants working in the agricultural and construction sectors makes them particularly vulnerable to direct and indirect effects of climate change.² Strenuous working conditions, language barriers, exposure to chemicals such as pesticides, and limited capacity to protect their rights influence health outcomes exacerbated by climate change. Outdoor occupations most at risk of heat stroke include construction, refining, surface mining, hazardous waste site activities, agriculture, forestry, and fishing.²

Summary of Evidence for Climate and Health

A review of miners, construction workers, farm laborers, first responders, and military personnel emphasized that heat-related illness may be the most common cause of nonfatal environmental emergency department admission in the United States.³ A case-control study of mortality from the 2003 heat wave in France identified manual labour workers as having been at increased risk.⁴ In California, agricultural and construction workers have experienced severe heat-related illness and death.⁵ During 1992-2006, the United States had a total of 68 farm workers die from heat stroke, representing a heat stroke rate nearly 20 times greater than all civilian workers in the country.¹

Key References:

1. Centers for Disease Control and Prevention. Heat-Related Deaths Among Crop Workers --- United States, 1992--2006. Atlanta, GA: Centers for Disease Control and Prevention; 2008.
2. Schulte PA, Chun H. Climate Change and Occupational Safety and Health: Establishing a Preliminary Framework. *Journal of Occupational and Environmental Hygiene*. 2009; 6(9): 542-554.
3. Gronlund CJ. Racial and Socioeconomic Disparities in Heat-Related Health Effects and Their Mechanisms: A Review. *Current Epidemiology Reports*. 2014; 1: 165-173.
4. Vandentorren S, Croisier A, Declercq B, et al. August 2003 heat wave in France: risk factors for death in elderly people living at home. *European Journal of Public Health*. 2006; 16(6): 583-91.
5. Morello-Frosch R, Pastor M, Sadd J, et al. The Climate Gap: Inequalities in How Climate Change Hurts Americans and How to Close the Gap; 2009.

What is the Indicator?

Detailed Definition

- Indicator (percent) =
$$\frac{\text{Population with jobs working outdoors}}{\text{Total Civilian Employed Population 16 years and older}}$$
- Stratification: 8 race/ethnicity strata (African American, American Indian Alaska Native, Asian, Hispanic or Latino, Native Hawaiian and Other Pacific Islander, White, Two or more races, Total)
- Interpretation: Populations working jobs outdoors are more sensitive to health impacts of climate change.

Data Source and Methodology

- American Community Survey (ACS) (<http://factfinder2.census.gov>).
 - Years available: 2006-2010, 2011-2015
 - Geographies available: census tracts, cities/towns, counties, county divisions, regions (derived), state

The estimates of individuals working outdoors were obtained from the ACS (C24010 table, S2401 table) and included farming, fishing, forestry, construction, and extraction occupations. Standard errors of the estimates were obtained from the margin of error provided by the ACS. Population-weighted regional estimates and standard errors were calculated. Regions in the BRACE project are based on county aggregations in the [Adaptation Planning Guide Understanding Regional Characteristics](#).

Limitations

Sample population includes all civilian noninstitutionalized employed population 16 years and older. Data on occupation, industry, and class of worker are collected for the respondent's current primary job or the most recent job for those who are not employed but have worked in the last 5 years. Although the prevalence of multiple jobs is low, data on some labor force items may not exactly correspond to the reported occupation, industry, or class of worker of a respondent. Changes in the occupational classification system limit comparability of the data from one year to another. Estimates by race/ethnicity are not present at place level and census tract level geography due to unstable data (relative standard errors greater than 30%).