



Environmental Data & Governance Initiative Website Monitoring Report

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Removal of Climate Change Mentions, Links, and Information from the CDC's National Institute for Occupational Safety and Health Website

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Removal of Climate Change Mentions, Links, and Information from the CDC's National Institute for Occupational Safety and Health Website

Overview

In late 2016,¹ the Centers for Disease Control and Prevention's (CDC) National Institute for Occupational Safety and Health (NIOSH) webpages on climate change were altered to remove mentions of the impact of climate change on occupational safety and health. Climate change mentions and information, including many sentences and a chart detailing the relationship between climate change and workplace health and safety, were removed from pages. An entire page linking to government and academic publications addressing the impact of climate change on worker health and safety was removed. There was also a significant removal of content addressing how air pollution, extreme weather, and vector-borne disease contribute to occupational hazards.

Description

The CDC's National Institute for Occupational Safety and Health (NIOSH) altered a portion of its website which details how climate change influences worker health and safety, and identifies plans to mitigate the negative health effects connected to climate change. Explicit mentions of "climate change" were removed, as well as informational sentences and a detailed chart outlining the relationship between climate change and occupational safety and health. This portion of the NIOSH website can still be accessed by navigating from NIOSH's main page to the "Workplace Safety and Health Topics" section and following the "Hazards & Exposures" link.

One of NIOSH's four webpages addressing climate change and occupational health was removed and the remaining three pages were altered. The page title, "CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH", was removed from the top of each page across NIOSH's climate change pages. Other changes that are documented in this report include the removal of links, online resources and content about how climate change impacts occupational health.²

¹ Internet Archive Wayback Machine records can't determine the exact date of these changes, but the Wayback Machine does indicate that these changes occurred after or around the November 8, 2016 Presidential election ([Page 1](#)).

² It should be noted that the NIOSH page "[What's New on the NIOSH Website](#)" ([May 6, 2018](#)), which archives items such as blog posts, press releases and bulletins posted across the NIOSH Website, includes a blog post and press release that contain content similar to the removed content discussed in this report. Therefore, some of the removed content highlighted in this report is still available in a different format at the "What's New On the NIOSH Website" archive. For example, see a NIOSH Science Blog post from November 16, 2016 titled "[Occupational Hazards and Climate](#)" ([December 16, 2017](#)) and an April 5, 2016 press release "[New Climate Change and Health Document includes Effects on Workers](#)" ([December 19, 2017](#))

The most notable changes to the CDC's NIOSH Climate Change webpages are summarized here:

1. Removed mentions of "climate change"

- a. Removed the title "CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH" from each page (1.1a, 2.1a, and 3.1a)
- b. "Climate change" altered to "climate" (1.1a, 1.1d, 2.1b, 2.1k)
- c. "Climate change" replaced with "variation" or "climate variation" (1.1f, 2.1g)

2. Removed content and access to reference documentation addressing relationship between climate change and human health

- a. Removed sentence and link "Although not specific to occupational safety and health, the [3rd National Climate Assessment](#) has a health chapter containing an extensive synthesis of current knowledge and gaps regarding climate change and human health" (2.1m)
- b. Removed sentence and link "Additionally, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change chapter on [human health](#) includes a section that specifically addresses climate change and occupational safety and health". Linking URL leads to removed page last live on [December 12, 2016](#) (2.1n)
- c. Removed section "Other Select Publications" which included multiple references to government and academic documents on climate change and health (3.1i, 3.1j)
- d. Removed page "Related Web Resources" containing links to government and academic resources, including Intergovernmental Panel on Climate Change materials, on climate change (See [Page 4](#))

3. Changed and removed sentences that describe the relationship between climate change and human health

- a. Removed sentence "Although considerable research and planning with regard to climate change has dealt with public health and the environment, little of it has focused on the impact climate change will have on workers." (1.1h)
- b. Changed sentence from "A number of worker populations, both indoors and outdoors, may be particularly vulnerable to threats from climate change." to "A number of both indoor and outdoor worker populations may be particularly vulnerable to climate variations." (2.1g)
- c. Changed sentence from "Impacts to workers can include the direct effects of climate change associated occupational hazards such as: increased ambient temperatures, air pollution, and extreme weather." to "Examples of climate related occupational hazards include high temperatures, air pollution, extreme weather and natural disasters, and biological hazards." (2.1k)

Table of Contents

	Page Title	URL	Status
Page 1	Occupational Safety and Health and Climate (Previously: CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH)	https://www.cdc.gov/niosh/topics/climate/default.html	Altered
Page 2	Impact of Climate on Workers (Previously: Climate Change: A Risk for Workers)	https://www.cdc.gov/niosh/topics/climate/how.html	Altered
Page 3	Related NIOSH Publications (Previously: Related Publications: NIOSH Publications)	https://www.cdc.gov/niosh/topics/climate/publications.html	Altered
Page 4	Related Web Resources	https://www.cdc.gov/niosh/topics/climate/web.html	Removed

Detailed Description of Changes

Page 1: Occupational Safety and Health and Climate

- URL: <https://www.cdc.gov/niosh/topics/climate/default.html>
- Previous title: CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH
- Side-by-side View: 10/13/16 - 12/16/16
- Changes occurred between **Nov 14, 2:31 AM ET and Dec 16, 12:51 PM ET**

Screenshot 1.1

(1.1a) Changed page title from "CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH" to "Occupational Safety and Health and Climate"

(1.1b) Changed banner image

(1.1c) Changed sidebar section link text from "Climate Change and Occupational Safety and Health" to "Occupational Safety and Health and Climate" linking to URL <https://www.cdc.gov/niosh/topics/climate/default.html>.

(1.1d) Changed sidebar section link text from "Climate Change: A Risk for Workers" to "Impact of Climate on Workers" linking to URL <https://www.cdc.gov/niosh/topics/climate/how.html>

(1.1e) Removed sidebar section title "Related Web Resources" linking to URL <https://www.cdc.gov/niosh/topics/climate/web.html>. URL currently leads to a "Page not Found" page. Last available Internet Archive Wayback Machine snapshot of page from [August 2, 2016](#).

(1.1f) Changed sentences from "Climate change is any significant variation in temperature, precipitation, wind, or other type of weather that lasts for decades or longer. These changes have the potential to affect human health in several direct and indirect ways." to "Variation in temperature, precipitation, wind, or other type of weather have the potential to affect human health in several direct and indirect ways."

(1.1g) Changed phrase from "climate events" to "climate conditions"

(1.1h) Removed sentence "Although considerable research and planning with regard to climate change has dealt with public health and the environment, little of it has focused on the impact climate change will have on workers."

(1.1i) Changed link text from "CLIMATE CHANGE: A RISK FOR WORKERS" to "IMPACT OF CLIMATE ON WORKERS" linking to URL <https://www.cdc.gov/niosh/topics/climate/how.html>

(1.1j) Removed link "RELATED WEB RESOURCES". URL currently links to a "Page not Found" page. Last available Internet Archive Wayback Machine snapshot of page from [August 2, 2016](#).

The image displays a side-by-side comparison of the CDC NIOSH website. The left panel shows the version from October 13, 2016, and the right panel shows the version from December 16, 2016.

Left Panel (October 13, 2016):

- Header: CDC Centers for Disease Control and Prevention, CDC 2611 Saving Lives, Protecting People™
- Search bar: SEARCH
- Section: The National Institute for Occupational Safety and Health (NIOSH)
- Workplace Safety & Health Topics: Climate Change and Occupational Safety and Health
- Related Topics: Outdoor Workers, Heat Stress, Poisonous Plants, West Nile Virus, Lyme Disease, Tick-borne Diseases, Natural Disasters, Green, Safe and Healthy Jobs, Insects and Scorpions
- Follow NIOSH: Facebook, Flickr
- Content: CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH, Overview, CLIMATE CHANGE: A RISK FOR WORKERS, RELATED WEB RESOURCES, RELATED PUBLICATIONS

Right Panel (December 16, 2016):

- Header: CDC Centers for Disease Control and Prevention, CDC 2611 Saving Lives, Protecting People™
- Search bar: SEARCH
- Section: The National Institute for Occupational Safety and Health (NIOSH)
- Workplace Safety & Health Topics: Occupational Safety and Health and Climate
- Related Topics: Outdoor Workers, Heat Stress, Poisonous Plants, West Nile Virus, Lyme Disease, Tick-borne Diseases, Natural Disasters, Green, Safe and Healthy Jobs, Insects and Scorpions
- Follow NIOSH: Facebook, Flickr, Pinterest
- Content: Occupational Safety and Health and Climate, Variability in temperature, precipitation, wind, or other type of weather have the potential to affect human health in several direct and indirect ways. The challenge is to research and characterize how these climate impacts may influence worker health and safety and to establish plans for mitigating, responding to, and adapting to current and anticipated health impacts. IMPACT OF CLIMATE ON WORKERS, RELATED PUBLICATIONS

Internet Archive's Wayback Machine: previous version from [November 14, 2016](#) and current version from [December 25, 2016](#). **Note:** EDGI's website monitoring software presents a snapshot from [October 13, 2016](#) above, which is the same as the [November 14, 2016](#) snapshot archived in the Wayback Machine.

Page 2: Impact of Climate on Workers

- URL: <https://www.cdc.gov/niosh/topics/climate/how.html>
- Previous title: Climate Change: A Risk for Workers
- Side-by-side View: 10/15/2016 - 12/16/2016
- Changes occurred between **Oct 16, 5:29 PM ET** and **Dec 16, 1:07 PM ET**

Screenshot 2.1

(2.1a) Removed subdomain title "CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH"

(2.1b) Changed page title from "Climate Change: A Risk for Workers" to "Impact of Climate on Workers"

(2.1c) Changed sidebar section link text from "Climate Change and Occupational Safety and Health" to "Occupational Safety and Health and Climate" linking to URL <https://www.cdc.gov/niosh/topics/climate/default.html>.

(2.1d) Changed sidebar section link text "Climate Change: A Risk for Workers" to "Impact of Climate on Workers" linking to URL <https://www.cdc.gov/niosh/topics/climate/how.html>.

Note: *this change isn't reflected in screenshot 2.1 below.*

(2.1e) Removed sidebar section link "Related Web Resources". Link URL currently leads to "[Page Not Found](#)" page. This removed link is not visible in Screenshot 2.1, but visible in Internet Archive's Wayback Machine, which links to last available page on [August 2, 2016](#).

(2.1f) Changed banner image

(2.1g) Changed sentence from "A number of worker populations, both indoors and outdoors, may be particularly vulnerable to threats from climate change." to "A number of both indoor and outdoor worker populations may be particularly vulnerable to climate variations."

(2.1h) Changed sentence from "Some of these workers may include: emergency responders, health care workers, fire fighters, utility workers, farmers, and transportation workers." to "Examples include: emergency responders, health care workers, fire fighters, utility workers, farmers, manufacturing workers and transportation workers."

(2.1i) Changed sentence from "Workers may also be exposed to conditions that the general public can elect to avoid, and workforce increases are likely in jobs that are most affected by climate change such as wildland firefighting, as well as in industries that will emerge in response to it, including renewable energy." to "Workers may also be exposed to weather and climate conditions that the general public can elect to avoid."

(2.1j) Changed sentence from "For worker populations such as migrant workers and day laborers who may have inadequate housing or other social and economic constraints, the health effects of climate change may be additive from exposure both at work and at home." to "For worker populations such as migrant workers and day laborers who may have inadequate housing or other social and economic constraints, the adverse health effects of exposure to climate-related hazards in the workplace could be exacerbated by exposure to similar hazards in the home."

(2.1k) Changed sentence from "Impacts to workers can include the direct effects of climate change associated occupational hazards such as: increased ambient temperatures, air

pollution, and extreme weather.” to “Examples of climate related occupational hazards include high temperatures, air pollution, extreme weather and natural disasters, and biological hazards.”

(2.1l) Removed sentences “Additionally, indirect climate change associated occupational hazards are likely to occur from vector-borne diseases and expanded habitats, industrial transitions, emerging industries (e.g., renewable energy, carbon sequestration, and ‘green industries’), increased use of pesticides, and changes in the built environment. These are all areas where research is needed to better understand and characterize the potential risks and develop strategies to mitigate or adapt to these hazards. A framework for considering the relationship between climate change and occupational safety and health to increase our knowledge of climate change is depicted below [Schulte and Chun 2009]. This framework outlines the multidisciplinary research necessary to better understand workers at risk by hazard, occupation, and geographic location.” For more on this framework, see screenshot 2.2 below.

(2.1m) Removed sentence and link “Although not specific to occupational safety and health, the [3rd National Climate Assessment](#) has a health chapter containing an extensive synthesis of current knowledge and gaps regarding climate change and human health.”

(2.1n) Removed sentence and link “Additionally, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change chapter on [human health](#) includes a section that specifically addresses climate change and occupational safety and health.” Linking URL leads to removed page last available on [December 12, 2016](#).

CDC – Impact of Climate on Workers – NIOSH Workplace Safety & Health Topics


<https://www.cdc.gov/niosh/topics/climate/how.html>

From: October 15, 2016, 11:36:11 AM EDT

Comparison: Side-by-Side Rendered

To: December 16, 2016, 1:07:10 PM EST

CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH




Climate Change: A Risk for Workers

A number of worker populations, both indoors and outdoors, may be particularly vulnerable to threats from climate change. Some of these workers may include: emergency responders, health care workers, fire fighters, utility workers, farmers, and transportation workers. Climate change can amplify existing health and safety issues and new unanticipated hazards may emerge. Workers may also be exposed to conditions that the general public can elect to avoid, and workforce increases are likely in jobs that are most affected by climate change such as wildland firefighting, as well as in industries that will emerge in response to it, including renewable energy. For worker populations such as migrant workers and day laborers who may have inadequate housing or other social and economic constraints, the health effects of climate change may be additive from exposures both at work and at home.

Impacts to workers can include the direct effects of climate change associated occupational hazards such as: increased ambient temperatures, air pollution, and extreme weather. Additionally, indirect climate change associated occupational hazards are likely to occur from vector-borne diseases and expanded habitats, industrial transitions, emerging industries (e.g., renewable energy, carbon sequestration, and “green industries”), increased use of pesticides, and changes in the built environment.

These are all areas where research is needed to better understand and characterize the potential risks and develop strategies to mitigate or adapt to these hazards. A framework for considering the relationship between climate change and occupational safety and health to increase our knowledge of climate change is depicted below [Schulte and Chun 2009]. This framework outlines the multidisciplinary research necessary to better understand workers at risk by hazard, occupation, and geographic location. Although not specific to occupational safety and health, the [3rd National Climate Assessment](#) has a health chapter containing an extensive synthesis of current knowledge and gaps regarding climate change and human health. Additionally, the Fifth Assessment Report of the Intergovernmental Panel on Climate Change chapter on [human health](#) includes a section that specifically addresses climate change and occupational safety and health.

Impact of Climate on Workers



A number of both indoor and outdoor worker populations may be particularly vulnerable to climate variations. Examples include: emergency responders, health care workers, fire fighters, utility workers, farmers, manufacturing workers, and transportation workers. Climate conditions can amplify existing health and safety issues and could lead to new unanticipated hazards. Workers may also be exposed to weather and climate conditions that the general public can elect to avoid. For worker populations such as migrant workers and day laborers who may have inadequate housing or other social and economic constraints, the adverse health effects of exposure to climate-related hazards in the workplace could be exacerbated by exposure to similar hazards in the home.

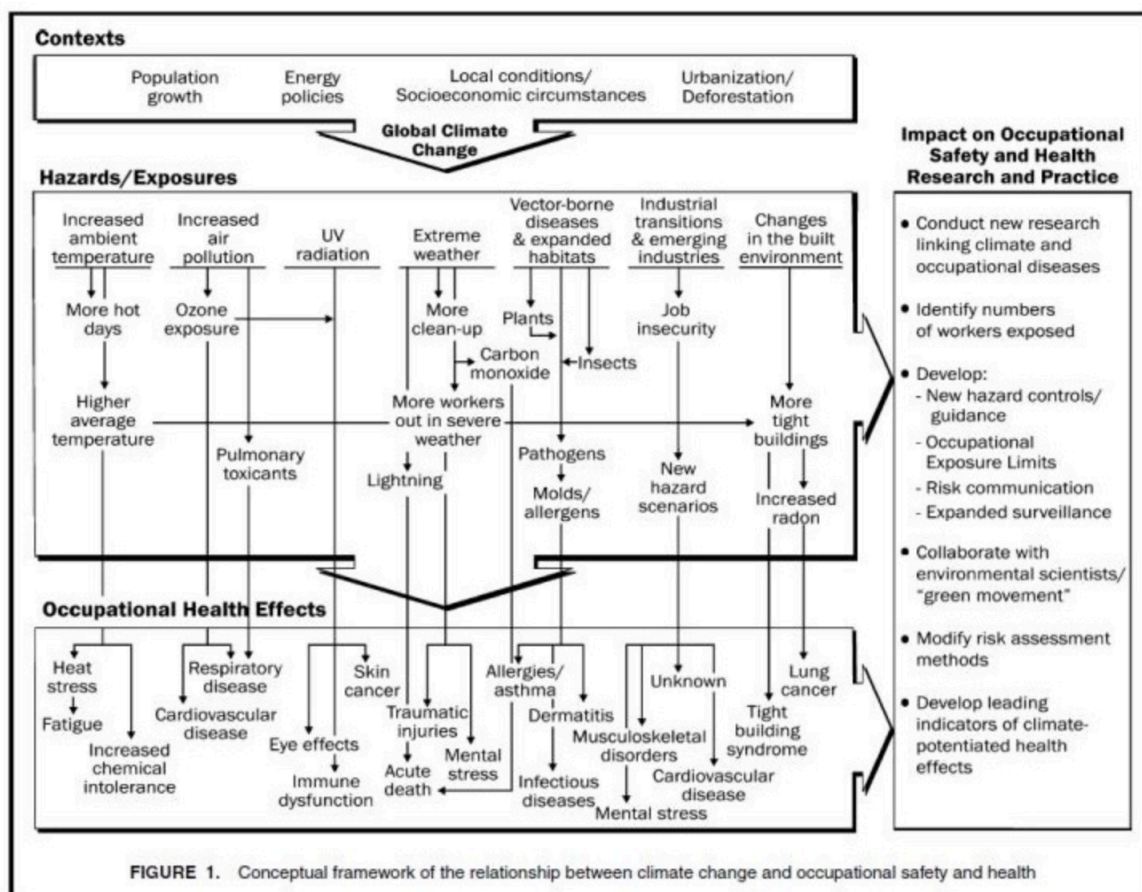
Examples of climate related occupational hazards include high temperatures, air pollution, extreme weather and natural disasters, and biological hazards.

- Occupational Exposure to Heat and Hot Environments**
 Workers who are exposed to extreme heat, prolonged work in hot environments or engaged in strenuous physical activity may be at risk for heat stress. Heat stress can lead to heat stroke, heat exhaustion, rhabdomyolysis (muscle tissue breakdown), and death. Occupational exposure to heat has also been associated with increased risk of traumatic injury. More NIOSH resources are available on the [heat stress topic page](#): www.cdc.gov/niosh/topics/heatstress
- Air Pollution**
 Air pollution has been linked with both acute and chronic health effects such as heart disease, respiratory diseases, and allergic disorders. Air pollutants that are known to affect respiratory health include ground level ozone and particle pollution. Numerous factors including workplace location and weather conditions may affect occupational exposure to air pollution. Current and forecasted air quality index information, and air quality action day alerts for your location are available at www.airnow.gov

Internet Archive’s Wayback Machine: previous version from [October 16, 2016](#) and current version from [December 16, 2016](#)

Screenshot 2.2 (continuation from Screenshot 2.1)

(2.2a) Removed image “Figure 1. Conceptual framework of the relationship between climate change and occupational safety and health.” For description of Figure 1, see point 2.1l above under Screenshot 2.1.



Internet Archive’s Wayback Machine: previous version from [October 16, 2016, 21:29:04 GMT](#) and current version from [December 16, 2016, 18:07:10 GMT](#)

Screenshot 2.3 (continuation from Screenshot 2.2)

(2.3a) Removed section title “What occupational hazards are affected by climate change?”

(2.3b) Changed subsection title from “Increased ambient temperatures” to “Occupational Exposure to Heat and Hot Environments”

(2.3c) Changed sentences from

“Higher temperatures or longer, more frequent periods of heat may result in greater [heat stress](#), which may lead to more cases of heat-related illness such as heat stroke or heat exhaustion, decreased chemical tolerance, and fatigue. There may also be indirect effects including reduced vigilance regarding safety and increased risk of injury and irritability that may lead to carelessness.”

to

"Workers who are exposed to extreme heat, prolonged work in hot environments or engaged in strenuous physical activity may be at risk of heat stress. Heat stress can lead to heat stroke, heat exhaustion, rhabdomyolysis (muscle tissue breakdown), and death. Occupational exposure to heat has also been associated with increased risk of traumatic injury. More NIOSH resources are available on the heat stress topic page: <http://www.cdc.gov/niosh/topics/heatstress/>."

(2.3d) Changed text in section titled "Air Pollution" from

"Elevated temperatures can increase levels of air pollution including ground-level ozone. Outdoor workers have longer exposure to air pollutants which may be linked to chronic health effects such as respiratory diseases or [allergic disorders](#). The frequency and severity of wildfires is projected to increase resulting in higher levels of particulate matter and other air pollutants."

to

"Air pollution has been linked with both acute and chronic health effects such as heart disease, respiratory diseases, and allergic disorders. Air pollutants that are known to affect respiratory health include ground level ozone and particle pollution. Numerous factors including worksite location and weather conditions may affect occupational exposure to air pollution. Current and forecasted air quality index information, and air quality action day alerts for your location are available at www.airnow.gov."

(2.3e) Changed text in section titled "Extreme Weather" from

"Extreme weather events or [natural disasters](#) such as [floods](#), landslides, storms, droughts, and [wildfires](#) are becoming more frequent and intense. Weather disasters may be associated with deaths, injuries, diseases, and mental [stress](#). Workers involved in rescue and cleanup have more exposure to risky conditions as the frequency and severity of extreme weather events increase."

to

"Extreme weather events or [natural disasters](#), such as [floods](#), landslides, storms, lightning, droughts, and [wildfires](#) are associated with occupational deaths, injuries, diseases, and mental [stress](#). Workers involved in rescue, cleanup and restoration are exposed to hazardous conditions both during and after extreme weather events."

(2.3f) Removed sentences from "Extreme Weather" section: "Extreme weather events may also cause damage to infrastructure (e.g., power, roads, and transportation) and buildings. Workers could be put in new or unfamiliar circumstances leading to a high risk of traumatic injury. Disruptions to information technology could lead to standards of control not being applied or the inability to recognize hazards. Some workers may be at increased risk of [violence](#) if mobility, electricity, food, and shelter become compromised. [Carbon monoxide](#) poisoning may also be an issue in areas where generators and engines are being run with poor ventilation. The impact of more frequent and intense weather events on mental health and stress is another consideration."

(2.3g) Changed section title from "Vector-borne diseases and expanded habitats" to "Biological Hazards"

(2.3h) Changed section text from

“Changing temperatures and shifting rainfall can affect habitats of vectors, pathogens, hosts, and allergens. Increases prevalence and distribution of water-borne and food-borne pathogens could affect workers, particularly emergency responders and health care workers. Pollen may increase from earlier flowering and longer pollen seasons. Increasing numbers of hurricanes and floods could lead to more houses with mold and more remediation and construction workers exposed. Mold may lead to allergic as well as non-allergic or irritant asthma. Increasing temperatures and carbon dioxide in the atmosphere may increase the growth and wider distribution of poison ivy and other [poisonous plants](#). Changes in temperatures have also affected tick and mosquito populations increasing their populations, extending their transmission seasons, and expanding the seasons and areas they can be found. Outdoor workers may be at increased risk for mosquito-borne diseases (e.g., [West Nile virus infection](#) [linking URL leads to page no longer available (03/12/16) with redirect to <https://www.cdc.gov/niosh/topics/outdoor/mosquito-borne/westnile.html>] and [tick-borne diseases](#) (e.g., [Lyme disease](#)). Expanded vector ranges and the introduction of diseases not previously prevalent in the United States (e.g., dengue and chikungunya virus infection) will result in the increased use of pesticides, potentially placing workers at increased risk for exposure.”

to

“Climate conditions such as temperature and rainfall affect the prevalence and distribution of vectors, pathogens, hosts and allergens. Associated health impacts include food-borne and water-borne diseases; asthma and allergies triggered by pollen; mold-related asthma; skin and lung irritation from poisonous plants; and vector-borne disease such as Lyme disease, dengue, chikungunya and Zika virus disease. The most vulnerable occupational groups may include outdoor workers, emergency responders, post-disaster remediation and construction workers, and health care workers. In addition to the direct health impacts associated with biological hazards, exposure to [pesticides](#) has been associated with a variety of adverse occupational health outcomes.”

(2.3i) Removed section titled “Industrial transitions and emerging industries” including sentences “Climate change may impact various industries. Extreme weather events and damaged infrastructure and buildings may negatively impact the economy and employment, resulting in job insecurity and affecting health. Other industries that offer ‘greener’ technologies may grow and be a source of new employment, although they may have occupational hazards as well. Emerging industries, increased production of nuclear energy, and recycling all have hazards that will need to be identified and controlled.”

(2.3j) Changed section title “Changes in the built environment” to “Indoor Climate.” In this section, removed sentence “Many industrial settings, such as paper mills, are not climate controlled and the higher temperatures resulting from climate change will increase heat exposure to these workers.” Added sentences: “In response to concerns about our climate and environment there has been an expansion in energy efficiency and

environmentally-friendly practices. For example, the International Renewable Energy Agency estimates that there were 769,000 renewable energy jobs in the US in 2015, the Bureau of Labour Statistics estimated the number of jobs in all green goods and services to be 3.4 million, a figure that has likely increased in the years since these data were collected. It is important to ensure that worker safety and health concerns in these emerging industries are identified and addressed. More information about NIOSH's work in this area can be found here: www.cdc.gov/niosh/topics/ptd/greenjobs.html"

What occupational hazards are affected by climate change?

Increased ambient temperatures

Higher temperatures or longer, more frequent periods of heat may result in greater **heat stress**, which may lead to more cases of heat-related illnesses such as heat stroke or heat exhaustion, decreased chemical tolerance, and fatigue. There may also be indirect effects including reduced vigilance regarding safety and increased risk of injury and irritability that may lead to carelessness.

Air pollution

Elevated temperatures can increase levels of air pollution including ground-level ozone. Outdoor workers have longer exposure to air pollutants which may be linked to chronic health effects such as respiratory diseases or **allergic disorders**. The frequency and severity of wildfires is projected to increase resulting in higher levels of particulate matter and other air pollutants.

Extreme weather

Extreme weather events or **natural disasters** such as **floods**, landslides, storms, lightning, droughts, and **wildfires** are becoming more frequent and intense. Weather disasters may be associated with deaths, injuries, diseases, and mental stress. Workers involved in rescue and cleanup have more exposure to risky conditions as the frequency and severity of extreme weather events increase. Extreme weather events may also cause damage to infrastructure (e.g. power, roads, and transportation) and buildings. Workers could be put in new or unfamiliar circumstances leading to a high risk of traumatic injury. Disruptions to information technology could lead to standards of control not being applied or the inability to recognize hazards. Some workers may be at increased risk of **violence** if mobility, electricity, food, and shelter become compromised. **Carbon monoxide** poisoning may also be an issue in areas where generators and engines are being run with poor ventilation. The impact of more frequent and intense weather events on mental health and stress is another consideration.

Vector-borne diseases and expanded habitats

Changing temperatures and shifting rainfall can affect habitats of vectors, pathogens, hosts, and allergens. Increased prevalence and distribution of water-borne and food-borne pathogens could affect workers, particularly emergency responders and health care workers. Pollen may increase from earlier flowering and longer pollen seasons. Increasing numbers of hurricanes and floods could lead to more houses with mold and more remediation and construction workers exposed. Mold may lead to allergic as well as non-allergic or irritant asthma. Increasing temperatures and carbon dioxide in the atmosphere may increase the growth and wider distribution of poison ivy and other **poisonous plants**. Changes in temperatures have also affected tick and mosquito populations increasing their populations, extending their transmission seasons, and expanding the seasons and areas they can be found. Outdoor workers may be at increased risk for mosquito-borne diseases (e.g. **West Nile virus infection**) and **tick-borne diseases** (e.g. **Lyme disease**). Expanded vector ranges and the introduction of diseases not previously prevalent in the United States (e.g. dengue and chikungunya virus infection) will result in the increased use of pesticides, potentially placing workers at increased risk for exposure.

Industrial transitions and emerging industries

Climate change may impact various industries. Extreme weather events and damaged infrastructure and buildings may negatively impact the economy and employment, resulting in job insecurity and affecting health. Other industries that offer "greener" technologies may grow and be a source of new employment, although they may have occupational hazards as well. Emerging industries, increased production of nuclear energy, and recycling all have hazards that will need to be identified and controlled.

Changes in the built environment

High temperatures increase the need for climate-controlled buildings. Building-related illnesses (e.g. tight building syndrome or sick building syndrome), sometimes related to **indoor air quality**, may occur, especially in buildings with **air conditioning**, **water damage**, or energy-efficient "tight" buildings with microbial-contaminated humidifiers or air handlers that use biocides. Tight buildings may also lead to radon buildup in work areas such as smaller rooms, storage areas, or offices. Many industrial settings, such as paper mills, are not climate controlled and the higher temperatures resulting from climate change will increase heat exposure to these workers.

Extreme Weather

Extreme weather events or **natural disasters** such as **floods**, landslides, storms, lightning, droughts, and **wildfires** are associated with occupational deaths, injuries, diseases, and mental stress. Workers involved in rescue, cleanup and restoration are exposed to hazardous conditions both during and after extreme weather events.

Biological Hazards

Climate conditions such as temperature and rainfall affect the prevalence and distribution of vectors, pathogens, hosts and allergens. Associated health impacts include food-borne and water-borne diseases; asthma and allergies triggered by pollen; mold-related asthma; skin and lung irritation from poisonous plants; and vector-borne disease such as Lyme disease, dengue, chikungunya and Zika virus disease. The most vulnerable occupational groups may include outdoor workers, emergency responders, post-disaster remediation and construction workers, and health care workers. In addition to the direct health impacts associated with biological hazards, exposure to **pesticides** has been associated with a variety of adverse occupational health outcomes.

Indoor Climate

High temperatures increase the need for climate-controlled buildings. Building-related illnesses (e.g. tight building syndrome or sick building syndrome), sometimes related to indoor air **quality**, may occur, especially in buildings with **air conditioning**, **water damage**, or energy-efficient "tight" buildings with microbial-contaminated humidifiers or air handlers that use biocides. Tight buildings may also lead to radon buildup in work areas such as smaller rooms, storage areas, or offices.

In response to concerns about our climate and environment there has been an expansion in energy efficiency and environmentally-friendly practices. For example, the International Renewable Energy Agency estimates that there were 769,000 renewable energy jobs in the US in 2015. In 2011, the US Bureau of Labor Statistics estimated the number of jobs in all green goods and services to be 3.4 million, a figure that has likely increased in the years since these data were collected. It is important to ensure that worker safety and health concerns in these emerging industries are identified and addressed. More information about NIOSH's work in this area can be found here: www.cdc.gov/niosh/topics/ptd/greenjobs.html

Related Topics

Outdoor Workers
Heat Stress
Poisonous Plants
West Nile Virus
Lyme Disease
Tick-borne Diseases
Natural Disasters
Green, Safe and Healthy Jobs
Insects and Scorpions

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Internet Archive's Wayback Machine: previous version from [October 16, 2016](http://www.cdc.gov/niosh/topics/ptd/greenjobs.html) and current version from [December 16, 2016](http://www.cdc.gov/niosh/topics/ptd/greenjobs.html)

Page 3: Related NIOSH Publications

- URL: <https://www.cdc.gov/niosh/topics/climate/pubs.html>
- Previous title: Related Publications: NIOSH Publications
- Side-by-side View: 08/02/2016 - 12/16/2016
- Changes occurred between **Aug 2, 2016 1:46 PM ET** and **Dec 16, 2016 1:07 PM ET**

Screenshot 3.1

(3.1a) Removed subdomain title "CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH"

(3.1b) Changed page title from "Related Publications: NIOSH Publications" to "Related NIOSH Publications"

(3.1c) Changed sidebar section link text from "Climate Change and Occupational Safety and Health" to "Occupational Safety and Health and Climate" linking to URL <https://www.cdc.gov/niosh/topics/climate/default.html>.

(3.1d) Changed sidebar section link text from "Climate Change: A Risk for Workers" to "Impact of Climate on Workers" linking to URL <https://www.cdc.gov/niosh/topics/climate/how.html>. **Note:** *this change isn't captured in the screenshot below but is visible when navigating to the Wayback Machine links below the screenshot.*

(3.1e) Removed sidebar section link "Related Web Resources", which linked to URL <https://www.cdc.gov/niosh/topics/climate/web.html>. URL currently leads to a "[Page not Found](#)" page. Internet Archive Wayback Machine links to last available page on [August 2, 2016](#).

(3.1f) Changed banner image

(3.1g) Changed citation style of four references

(3.1h) Removed "[Link to embed: <https://health2016.globalchange.gov/>]"

(3.1i) Removed section title "Other Select Publications"

(3.1j) Removed following references from section "Other Select [sic] Publications":

- [IPPC \[2014\]. Fifth Assessment Report: Climate Change \(AR5\)](#). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Kjellstrom T, Butler AJ, Lucas RM, Bonita R [2010]. Public health impact of global heating due to climate change: potential effects on chronic non-communicable diseases. *Int J Public Health* 55(2): 97-103.
- Kjellstrom, T, Gabrysch S, Lemke B, Dear K [2009]. [The 'Hothaps' programme for assessing climate change impacts on occupational health and productivity: an invitation to carry out field studies](#). *Global Health Action* Nov;2:1-7.
- Kjellstrom T, Weaver HJ [2009]. Climate change and health: impacts, vulnerability, adaptation and mitigation. *N S W Public Health Bull* 20(1-2): 5-9.
- McMichael AJ [2013]. Globalization, climate change, and human health. *N Engl J Med* 368(14): 1335-1343.
- Melillo JM, Richmond TC, Yohe GW [2014]. [Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program, 841 pp. doi:10.7930/JOZ31WJ2](#).

- NIEHS [2010]. [A human health perspective on climate change: A report outlining the research needs on the human health effects of climate change](#). Environmental Health Perspectives (EHP); National Institute of Environmental Health Sciences.
- Nilsson M, Kjellstrom T [2010]. Climate change impacts on working people: how to develop prevention policies. Glob Health Action 3.
- Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn, 2014: Human health: impacts, adaptation, and co-benefits. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754.

CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH



Related Publications

NIOSH Publications

Kiefer M, Watson J. III Wind — Climate Change and Industrial Hygiene. The Synergist (American Industrial Hygiene Association magazine). November 2015. Available at: <https://synergist.aha.org/201511-IIIwind/> [↗](#)

Schulte P, Bhattacharya A, Butler C, Chun H, Jacklitsch B, Jacobs T, Kiefer M, Lincoln J, Pendergrass S, Shire J, Watson J, Wagner G. Advancing the Framework for Considering the Effects of Climate Change on Worker Safety and Health. Journal of Occupational and Environmental Hygiene. Published online: April 26th 2016. <http://www.niehs.nih.gov/submit/?term=Advancing+the+Framework+for+Considering+the+Effects+of+Climate+Change+on+Worker+Safety+and+Health+Journal+of+Occupational+and+Environmental+Hygiene> [↗](#)

Schulte PA, Chun H [2009]. Climate change and occupational safety and health: establishing a preliminary framework. [↗](#) | J Occup Environ Hyg 6(9):542-554.

Gamble J, Balbus J, Berger M, Bouye K, Campbell V, Chief K, Conlon K, Crimmins A, Flanagan B, Gonzalez-Maddux C, Hallisey E, Hutchins S, Jantarassami L, Khoury S, Kiefer M, Kolling J, Lynn K, Manangan A, McDonald M, Morello-Frosch R, Redsteer M, Sheffield P, Thigpen Tart K, Watson J, Whyte K, Wolkin A, 2016: Ch. 9: Populations of Concern. The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. U.S. Global Change Research Program, Washington, DC, 247-286. <http://dx.doi.org/10.7930/J0081B01> [↗](#)
[Link to embed: <https://health2016.globalchange.gov/>] [↗](#)

Other Select Publications

IPCC [2014]. Fifth Assessment Report: Climate Change [AR5]. [↗](#) | Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC [2014]. Fifth Assessment Report: Climate Change [AR5]. [↗](#) | Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Kjellstrom T, Butler AJ, Lucas RM, Bonita R [2010]. Public health impact of global heating due to climate change: potential effects on chronic non-communicable diseases. Int J Public Health 55(2): 97-103.

Kjellstrom T, Gabrysich S, Lemke B, Dear K [2009]. The 'Hothang' programme for assessing climate change impacts on occupational health and productivity: an invitation to carry out field studies. [↗](#) | Global Health Action Nov;2:1-7.

Kjellstrom T, Weaver HJ [2009]. Climate change and health: impacts, vulnerability, adaptation and mitigation. N S W Public Health Bull 201-2(1): 5-9.

McMichael AJ [2013]. Globalization, climate change, and human health. N Engl J Med 368(14): 1335-1343.

Mellilo JM, Richmond TC, Yohe GW [2014]. Climate Change Impacts in the United States: The Third National Climate Assessment. U.S. Global Change Research Program. 841 pp. doi:10.7930/J0231WJ2 [↗](#) |

NIEHS [2010]. A human health perspective on climate change: A report outlining the research needs on the human health effects of climate change. [↗](#) | Environmental Health Perspectives (EHP); National Institute of Environmental Health Sciences.

Nilsson M, Kjellstrom T [2010]. Climate change impacts on working people: how to develop prevention policies. Glob Health Action 3.

Smith, K.R., A. Woodward, D. Campbell-Lendrum, D.D. Chadee, Y. Honda, Q. Liu, J.M. Olwoch, B. Revich, and R. Sauerborn, 2014: Human health: impacts, adaptation, and co-benefits. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 709-754.

Related NIOSH Publications



Advancing the framework for considering the effects of climate change on worker safety and health. [↗](#) | Schulte P, Bhattacharya A, Butler C, Chun H, Jacklitsch B, Jacobs T, Kiefer M, Lincoln J, Pendergrass S, Shire J, Watson J, Wagner G. J Occup Environ Hyg. 2016; 13(11): 847-865.

Worker Health and Safety and Climate Change in the Americas: What we know and Research Needs. [↗](#) | Kiefer M, Rodriguez-Guzman J, Watson J, van Wendel de Joode B, Mergler D, Soares da Silva. Rev Panam Salud Publica. 2016; 40(3):192-97.

Ch. 9: Populations of Concern. [↗](#) | The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment. [↗](#) | Gamble J, Balbus J, Berger M, Bouye K, Campbell V, Chief K, Conlon K, Crimmins A, Flanagan B, Gonzalez-Maddux C, Hallisey E, Hutchins S, Jantarassami L, Khoury S, Kiefer M, Kolling J, Lynn K, Manangan A, McDonald M, Morello-Frosch R, Redsteer M, Sheffield P, Thigpen Tart K, Watson J, Whyte K, Wolkin A, 2016: U.S. Global Change Research Program, Washington, DC, 247-286.

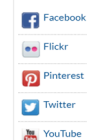
III Wind — Climate Change and Industrial Hygiene. [↗](#) | Kiefer M, Watson J. The Synergist (American Industrial Hygiene Association magazine). November 2015.

Climate change and occupational safety and health: establishing a preliminary framework. [↗](#) | Schulte PA, Chun H. J Occup Environ Hyg. 2009; 6(9):542-554.

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Page 4: Related Web Resources (page removed)

- URL: <https://www.cdc.gov/niosh/topics/climate/web.html>
- Page removed between **August 2, 2016 5:43 PM ET** and **November 13, 2017 9:26 PM ET**. (*Note: The unusually wide range of times is due to the fact that EDGI was not tracking these pages. Instead, we accessed past versions through the Internet Archive's Wayback Machine*)

Screenshot 4.1

Removed page included links (and accompanying descriptions) to government and academic resources on climate change:

["CDC Climate and Health](#)

The CDC climate and public health framework was established due to a recognition by several scientists that there was a need to prepare for the inevitability of climate change, and the impact it would likely have on the health of US residents and the world population in general. In FY2009, CDC formally established its Climate and Health Program.

[Intergovernmental Panel on Climate Change \(IPCC\)](#)

The IPCC is a scientific body under the backings of the United Nations (UN). It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change.

[Environmental Protection Agency \(EPA\) Climate Change](#) [linking URI leads to removed page, see [January 19, 2017](#) snapshot]

The EPA has information regarding collecting greenhouse gas emissions data, reducing emissions and promoting clean energy, research contributions, partnerships, and helping communities plan and prepare for climate change.

[National Institute of Environmental Health Sciences \(NIEHS\) Climate Change and Human Health](#)

NIEHS has information on climate change-related engagement and education, health impacts, ongoing activities, research and funding opportunities, and other resources.

[U.S. Global Change Research Program \(USGCRP\) Link Climate and Health](#)

USGCRP coordinates climate and health-related research and monitoring, vulnerability and risk assessments, and communication, education, and engagement efforts across the Federal Government, in partnership with organizations in the United States and around the world.

[USGCRP 2014 National Climate Assessment Report: Human Health](#)

Climate change threatens human health and well-being in many ways, including impacts from increased extreme weather events, wildfire, decreased air quality, and illnesses transmitted by food, water, and diseases carriers such as mosquitoes and ticks. Explore impacts to human health.

[MedlinePlus Climate Change](#)

MedlinePlus is the National Institutes of Health's Web site for patients and their families and friends. Produced by the National Library of Medicine, it brings you information about issues in language you can understand."

The National Institute for Occupational Safety and Health (NIOSH)

Workplace Safety & Health Topics


Climate Change and Occupational Safety and Health

Climate Change: A Risk for Workers

Related Publications

Related Web Resources


Providing National and World Leadership to Prevent Workplace Illnesses and Injuries



NIOSH > Workplace Safety & Health Topics > Climate Change and Occupational Safety and Health

CLIMATE CHANGE AND OCCUPATIONAL SAFETY AND HEALTH

[f](#)
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Related Web Resources

[CDC Climate and Health](#)

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