

ELEMENT 1 RESOURCES

CLIMATE RISKS AND COMMUNITY VULNERABILITIES ASSESSMENT

STEP 1: Climate Risk Assessment

KEY RESOURCES FOR CLIMATE PROJECTIONS

[*Climate Inspector*](#)

U.S. Climate Resilience Toolkit

This website allows the user to review four different climate projections for any given location. Explore projected changes in temperature or precipitation, and download maps, trend data, or projected annual cycle data. This requires some understanding of the variation between climate models.

[*NOAA Climate Change Portal*](#)

National Oceanic and Atmospheric Administration (NOAA)

This website allows the user to display or download climate projection output from the Coupled Model Intercomparison Project (CMIP5) that informed the IPCC Fifth Assessment Report. It contains user-friendly drop-down menus of models, atmospheric fields, and time.

KEY RESOURCES FOR MAPPING GRAPHICS

[*CanVis*](#)

U.S. Climate Resilience Toolkit

This tool allows the user to apply a map of a campus or facility to better visualize sea level rise projection impacts. This downloadable photo-editing program (software download required) gives you the power to generate “after” pictures illustrating possible futures. Use it to show how sea level rise might change a familiar scene, or to help stakeholders develop a shared vision of the end state of a building project.

[*ClimateData.us*](#)

U.S. Climate Resilience Toolkit

This website allows the user to zoom to any location in the contiguous United States and move a slider across the map to compare projected changes in temperature and precipitation. It also allows the user to compare conditions by decade under a mitigation scenario (reduced emissions) and a high-emissions scenario.

[*Climate Outlooks*](#)

U.S. Climate Resilience Toolkit

This website allows the user to access outlook maps showing experts’ judgments regarding changes for above-, below-, or near-average temperature and precipitation, as well as potential hazards and drought conditions, with timescales ranging from weeks to years.

[*Coastal Change Analysis Program \(C-CAP\) Land Cover Atlas*](#)

U.S. Climate Resilience Toolkit

This online data viewer provides user-friendly access to regional land cover and land cover change information developed through the National Oceanic and Atmospheric Administration (NOAA) Coastal Change Analysis Program (C-CAP). The Land Cover Atlas eliminates the need for desktop geographic information system software, or advanced technical expertise, by processing C-CAP data for the user and providing easy access to that distilled information. The tool summarizes general change trends (such as forest losses or new development) and can highlight specific changes of interest (salt marsh losses to open water, or evergreen forest losses to development, for instance).

[*Coastal Flood Exposure Mapper*](#)

National Oceanic and Atmospheric Administration

This website allows the user to overlay risk maps and produce a unified image. It provides local maps to stimulate discussions about the people, places, and natural resources exposed to coastal flooding. Users create a collection of maps showing risk from various hazards.

[*FEMA Flood Map Center*](#)

Federal Emergency Management Agency (FEMA)

On this website, users can find, view, analyze, and print flood hazard maps from FEMA for a specific facility or larger community to identify threats and risks. It provides user-friendly flood risk mapping for a specific location or facility.

[Hazus](#)

U.S. Climate Resilience Toolkit

This website allows planners and emergency managers to access Federal Emergency Management Agency (FEMA) models that estimate potential losses from earthquakes, floods, and hurricanes, and also evaluate costs and benefits of mitigation options. It requires software download. These FEMA models in Hazus can estimate physical, economic, and social impacts of disasters.

[U.S. Drought Portal](#)

U.S. Climate Resilience Toolkit

This website allows users to access a range of information and services related to drought including early warnings, climate data, and decision support services. It offers a simplified view of drought risks and projections.

STEP 2: Community Vulnerabilities and Preparedness

[Assessing Health Vulnerability to Climate Change: A Guide for Health Departments](#)

U.S. Climate Resilience Toolkit

This document helps health departments assess local vulnerabilities to the health hazards associated with climate change. By conducting a climate and health vulnerability assessment, a health department can better identify which people and places in their jurisdiction are more vulnerable to particular human health effects that can result from climate change. Such an assessment can then be used to implement targeted public health interventions to reduce negative public health impacts.

[Climate Change](#)

U.S. Environmental Protection Agency (EPA)

Learn more about how the U.S. climate is changing. EPA's updated "[**Climate Change Indicators in the United States, 2014**](#)" report presents evidence that climate change is already affecting our atmosphere, weather, oceans, ecosystems, and society. The accompanying website includes a suite of tools and resources, searchable by region or climate issue.

[Dialysis Facility Comparison](#)

U.S. Climate Resilience Toolkit

Extreme weather events can damage or otherwise incapacitate dialysis facilities, endangering the individuals who rely on that treatment. The dialysis facility comparison tool allows users to search a list of all dialysis facilities registered with Medicare. Users can search by city, zip code, state, or facility name, and results include the addresses and phone numbers of the facilities. The tool also provides information about the services and quality of care provided by each facility.

[Equity in Building Resilience in Adaptation Planning](#)

National Association for the Advancement of Colored People

This document addresses strengthening resilience through equitable adaptation planning as well as how we assess the context comprehensively so that effective adaptation methods are designed. To be able to declare that community resilience has been achieved, we must develop systems that address the needs and provide protection for the most vulnerable and marginalized.

[Metadata Access Tool for Climate and Health \(MATCH\)](#)

U.S. Climate Resilience Toolkit

The Metadata Access Tool for Climate and Health, known as MATCH, is a searchable clearinghouse of publicly available federal metadata—or data about data. It provides links to datasets on both climate and health that are relevant to understanding the effects of climate change on human health. Resources available through MATCH include geospatial datasets ranging from local to global scales, early warning systems, and tools for characterizing the health effects of climate change.

[Social Vulnerability Index](#)

U.S. Climate Resilience Toolkit

Social vulnerability is a term describing how resilient a community is when confronted by external stresses on human health. These stresses can range from natural or human-caused disasters to disease outbreaks. By reducing social vulnerability, we can decrease both human suffering and economic losses.

The Social Vulnerability Index (SVI) employs U.S. Census Bureau variables to help users identify communities that may need support in preparing for hazards or recovering from disasters. The SVI tool is particularly useful for emergency response planners and public health officials, as it can identify and map the communities that are most likely to need support before, during, and after a hazardous event.

[Under the Weather: Environmental Extremes and Health Care Delivery](#)

American Meteorological Society Policy Program (October 2010)

This report spotlights severe weather vulnerabilities (i.e., storms) to hospitals and to healthcare continuity. It discusses the three main policy problems that are barriers to preparedness for hospitals and the continuity of healthcare delivery: 1) there is a general lack of awareness of environmental vulnerabilities on the part of local decision makers, 2) the absence of coordination and communication across federal agencies, and 3) a paucity of financial resources or incentives that could encourage needed structural mitigation or adaptation for current and projected weather risks.

[Winter Storms: The Deceptive Killers. A Preparedness Guide](#)

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, and National Weather Service (2008)

This preparedness guide explains the dangers of winter weather and suggests life-saving action you can take. With this information, you can recognize winter weather threats, develop an action plan, and be ready when severe weather threatens.

STEPS 3 & 4: Risk and Vulnerability Analysis

[American Society for Healthcare Engineering](#)

Two tools that can be used to help hospitals assess and weigh potential hazards and their effects are now available for American Society of Healthcare Engineering (ASHE) members. The new Hazard Vulnerability Analysis (HVA) and Community Hazard Vulnerability Analysis (CHVA) tools available to ASHE members are Excel spreadsheets that can be used to evaluate potential hazards and guide risk mitigation efforts. You can ***access the tools*** and determine whether one of them is a good fit for your facility's emergency planning efforts.

[Kaiser Permanente Hazard Vulnerability Analysis Tool](#)

Hospitals are required to conduct and annually review their Hazard Vulnerability Analysis (HVA). The HVA provides a systematic approach to recognizing hazards that may affect demand for the hospital's services or its ability to provide those services. The risks associated with each hazard are analyzed to prioritize planning, mitigation, response, and recovery activities. The HVA serves as a needs assessment for the Emergency Management program. This process should involve community partners and be communicated to community emergency response agencies. This downloadable tool, developed by Kaiser Permanente, is a sample format for preparing an HVA.

This resource guide is one component of a five element framework and toolkit for improving healthcare facility climate resilience. The full set of checklists, companion resources and case studies are available at [toolkit.climate.gov](https://www.toolkit.climate.gov). This document is provided to the public for informational purposes and voluntary use. It does not represent official HHS policy.

STEP 1: Land Use, Siting and Landscape

[*The Sustainable Sites Initiative: Guidelines and Performance Benchmarks*](#)

American Society of Landscape Architects, Lady Bird Johnson Wildflower Center at the University of Texas at Austin, United States Botanic Garden (2009)

The Sustainable Sites Initiative is dedicated to fostering a transformation in land development and management practices that will bring the essential importance of ecosystem services to the forefront. For purposes of the Initiative, land practices are defined as sustainable if they enable natural and built systems to work together to “meet the needs of the present without compromising the ability of future generations to meet their own needs.”

STEP 2: Transportation and Access

[*Climate Impacts on Transportation*](#)

U.S. Environmental Protection Agency

This web-based resource includes both climate impacts on transportation as well as case studies of transportation adaptation. In the United States, transportation systems are designed to withstand local weather and climate. Transportation engineers typically refer to historical records of climate, especially extreme weather events, when designing transportation systems. However, due to climate change, historical climate is no longer a reliable predictor of future impacts.

[*Climate Adaptation and Transportation: Identifying Information and Assistance Needs*](#)

Center for Clean Air Policy, Environmental and Energy Study Institute (May 2012)

This report identifies the critical support needs of surface transportation professionals as they adapt their practices to climate change and shifting trends in extreme weather. It focuses on assessing the operational needs of transportation practitioners for evaluating and implementing adaptation measures.

[*U.S. Department of Transportation Climate Adaptation Plan: Ensuring Transportation Infrastructure and System Resilience*](#)

U.S. Department of Transportation (DOT) (2012)

Transportation both contributes to and will be impacted by climate change. This plan addresses adaptation work only. This plan reflects FY12 and FY13 commitments as well as other DOT accomplishments. It incorporates DOT's earlier report on vulnerabilities to climate variability and change.

STEPS 3 & 4: Building Inventory & Construction

[American Society of Civil Engineers ASCE 24-05: Flood Resistant Design and Construction](#)

American Society of Civil Engineers (ASCE)

ASCE 24 is a referenced standard in the International Building Code® (IBC). Any building or structure that falls within the scope of the IBC that is proposed in a flood hazard area is to be designed in accordance with ASCE 24. This document is available for purchase.

[Building Resilience In Boston: “Best Practices” for Climate Change Adaptation and Resilience for Existing Buildings](#)

Boston Green Ribbon Commission (2013)

A Boston Society of Architects-initiated report for the Boston Green Ribbon Commission and the city recommending safeguards for Boston in the face of climate change. This report provides a better understanding of the strategies and measures that property owners can use to reduce their vulnerability to climate change.

[FEMA Mitigation Assessment Team Reports](#)

Federal Emergency Management Agency (FEMA)

Mitigation Assessment Team (MAT) reports document observations made during field visits conducted by each MAT following extreme weather events, specifically deployed to evaluate key building damages. Each report presents the conclusions and recommendations derived from the field observations regarding key engineering concepts, codes and standards, mitigation measures and considerations that can be used in the planning and recovery process to help minimize future damage to structures and their related utility systems.

[Fortified for Safer Business Standards for Businesses](#)

Insurance Institute for Business and Home Safety (IBHS)

FORTIFIED for Safer Business™ is a code-plus new construction program that offers a package of improvements that greatly increase a new light commercial building's durability and resilience to natural hazards. Recommended for medical office buildings and ambulatory settings. IBHS' FORTIFIED for Safer Business™ program is now referenced and exemplified in the National Institute of Building Sciences [Whole Building Design Guide](#).

[Green Building and Climate Resilience: Understanding impacts and preparing for changing conditions](#)

University of Michigan and U.S. Green Building Council (2011)

The body of this report summarizes the most recent research on the likely impacts of climate change at various scales: regional, neighborhood, and site or building. The report includes predicted climate changes by region, and whenever possible, presents a range of predicted future characteristics in the categories of temperature, precipitation, coastlines, air quality, pests, and fires. It explores how climate change mitigation and adaptation efforts at all scales interact synergistically, with a focus on how green building professionals can approach adaptation in the built environment.

[Mitigation Assessment Team Report Spring 2011 Tornadoes: April 25-28 and May 22: Building Performance Observations, Recommendations, and Technical Guidance](#)

Federal Emergency Management Agency (FEMA) (2012)

The Southeastern and Midwestern portions of the United States experienced historic tornado activity in the spring of 2011. The Federal Insurance and Mitigation Administration of the U.S. Department of Homeland Security is responsible for investigating the effect of such events on the built environment. In response to a request for technical support from the FEMA Regional offices in the impacted states, FEMA deployed a Mitigation Assessment Team (MAT) to investigate the damage and provide technical assistance to the affected communities through their Joint Field Offices established in response to the events.

[Mitigation Assessment Team Report Midwest Floods of 2008 in Iowa and Wisconsin: Building Performance Observations, Recommendations, and Technical Guidance](#)

Federal Emergency Management Agency (FEMA) (2009)

In response to the 2008 Midwest floods, FEMA deployed a Mitigation Assessment Team (MAT) to evaluate and assess the damages caused by the riverine flooding in Iowa and southern Wisconsin. This report documents the MAT's observations, conclusions, and recommendations on the performance of buildings and other structures impacted by the flooding.

[Mitigation Assessment Team Report Hurricane Sandy in New Jersey and New York: Building Performance Observations, Recommendations, and Technical Guidance](#)

Federal Emergency Management Agency (FEMA) (2013)

In response to Hurricane Sandy, FEMA deployed a Mitigation Assessment Team (MAT) to evaluate damage from Hurricane Sandy, document observations, and based on these, offer conclusions and recommendations on the performance of buildings and other structures affected by flood and wind forces. The MAT's conclusions and recommendations in this report are intended to provide decision makers, designers, contractors, planners, code officials, industry groups, government officials, academia, homeowners, and business owners and operators with information and technical guidance that can be used to reduce future hurricane damage.

[Recommended Physical Plant Improvements to Existing Nursing Homes for Disaster Preparedness](#)

Florida Agency for Health Care Administration (1999)

Following the devastation caused by Hurricane Andrew in 1992, new research and study were given to the subject of improving hurricane protection strategies for the built environment. This report recommends construction improvements and standards to protect the physical plant or structural capability of the facility for nursing homes in case of disaster.

[Risk Management Series: Design Guide for Improving Hospital Safety in Earthquakes, Floods, and High Winds \(FEMA 577\)](#)

Federal Emergency Management Agency (FEMA) (2007)

The intent of the Design Guide is to provide its audience with state-of-the-art knowledge on the variety of vulnerabilities faced by hospitals exposed to earthquakes, flooding, and high-winds risks, as well as the best ways to mitigate the risk of damage and disruption of hospital operations caused by these events. The information presented in this publication provides an exhaustive review of mitigation measures and design solutions that can improve the safety of hospitals in natural hazard events.

[Safe Rooms for Tornadoes and Hurricanes: Guidance for Community and Residential Safe Rooms \(FEMA P-361\)](#)

Federal Emergency Management Agency (FEMA) (2015)

This publication presents design, construction, and operation criteria for both residential and community safe rooms that will provide near-absolute life safety protection during tornado and hurricane events. It provides guidance for architects, engineers, building officials, local officials, and emergency managers, and prospective safe room owners and operators about the design, construction, and operation of community safe rooms in extreme-wind events.

[Understanding Your Risks: Identifying Hazards and Estimating Losses—State and Local Mitigation Planning How-To Guide #2 \(FEMA 386-2\)](#)

Federal Emergency Management Agency (FEMA) (August 2001)

This FEMA mitigation planning guide provides step-by-step guidance on how to perform a risk assessment for use by State, Tribal, and local planning teams in the natural hazard mitigation planning process. This risk assessment process focuses attention on areas most in need by evaluating which populations and facilities are most vulnerable to natural hazards.

[Whole Building Design Guide, a program of the National Institute of Building Sciences](#)

National Institute of Building Sciences

The Whole Building Design Guide is the only web-based portal providing government and industry practitioners with one-stop access to up-to-date information on a wide range of building-related guidance, criteria, and technology from a “whole buildings” perspective. It is currently organized into eight major categories: Design Guidance, Project Management, Operations & Maintenance, Documents and References, Tools, Continuing Education, Building Information Modeling and Applied Research. The “whole building” concept is an integrated design approach to achieve high-performance buildings.

STEP 5: Passive Survivability

[*ASHRAE 169-2013: Climatic Data for Building Design Standards*](#)

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) (2013)

This standard was created to provide a comprehensive set of climate data for those engaged in building design. The standard includes a variety of climatic information used primarily in the design, planning, and sizing of building energy systems and equipment. ASHRAE anticipates that the information within will represent a valuable resource for referencing in building design standards.

[*Baby It's Cold Inside*](#)

Urban Green Council (2014)

Without electricity, buildings are dependent on whatever protection is provided by their walls, windows, and roof. In today's buildings, that protection is modest at best. Only some buildings are constructed well enough to maintain their indoor temperatures without power. This website and report argue that resilient, high-performing buildings must become the new normal.

[*Environmental Building News Calls for "Passive Survivability"*](#)

Building Green (2005)

In an age of increasing concern about natural disasters, terrorism, blackouts, heat waves, and fuel supply interruptions, all houses and school buildings should incorporate "passive survivability" features. The term passive survivability is used to describe a building's ability to maintain critical life-support conditions in the event of extended loss of power, heating fuel, or water, or in the event of extraordinary heat spells.

[*Passive Survivability: A New Design Criterion for Buildings*](#)

Building Green (2006)

In December 2005 an editorial in Environmental Building News (EBN) introduced the concept of "passive survivability," or a building's ability to maintain critical life-support conditions if services such as power, heating fuel, or water are lost, and suggested that it should become a standard design criterion for houses, apartment buildings, schools, and certain other building types (EBN Vol. 14, No. 12). In this article, EBN examines the concept of passive survivability in greater detail and addresses some specific strategies that can be employed in adopting this design criterion for buildings.

ELEMENT 3 RESOURCES

INFRASTRUCTURE PROTECTION AND RESILIENCE PLANNING

STEP 1: Energy and Utility Installations

[CHP Deployment](#)

U.S. Department of Energy

Combined heat and power (CHP) provides a cost-effective, near-term opportunity to improve our nation's energy, environmental, and economic future. CHP is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. The CHP Deployment Program provides stakeholders with the resources necessary to identify CHP market opportunities and support implementation of CHP systems.

[Combined Heat and Power: Enabling Resilient Energy Infrastructure for Critical Facilities](#)

ICF International (2013)

This report provides information on the design and use of combined heat and power (CHP) for reliability purposes, as well as state and local policies designed to promote CHP in critical infrastructure applications.

[Distributed Energy Resources: Whole Building Design Guide](#)

Whole Building Design Guide, a program of the National Institute of Building Sciences

This section of the Whole Building Design Guide focuses on distributed energy system and renewable energy options. Increased demands on the nation's electrical power systems and incidences of electricity shortages, power quality problems, rolling blackouts, and electricity price spikes have caused many utility customers to seek other sources of high-quality, reliable electricity. Distributed Energy Resources (DER), small-scale power generation sources located close to where electricity is used (e.g., a home or business), provide an alternative to or an enhancement of the traditional electric power grid.

[Guide to Using Combined Heat and Power for Enhancing Reliability and Resiliency in Buildings](#)

U.S. Department of Energy, U.S. Department of Housing and Urban Development, and U.S. Environmental Protection Agency (2013)

During and after Hurricane Sandy, combined heat and power (CHP) enabled a number of critical infrastructure and other facilities to continue their operations when the electric grid went down. Time and again, CHP has proved its value as an alternative source of power and thermal energy (heating and cooling) during emergencies, and demonstrated how it can be a sound choice in making energy infrastructure more resilient in the face of extreme weather events. This report provides practical guidance on CHP and steps involved in a typical CHP project development process.

[Powering the Future of Health Care: Financial and Operational Resilience – A Combined Heat and Power Guide for Massachusetts Hospital Decision Makers](#)

Health Care Without Harm (2013)

Combined Heat and Power (CHP) generation is a well-established technology for producing both electricity and thermal energy directly on-site instead of relying on power from the electricity grid. A well-designed CHP system can significantly lower greenhouse gas emissions, reduce energy costs, and improve the passive survivability of health care facilities during emergencies. These important benefits have led to an increased interest in CHP amongst hospitals, state and federal regulators as well as utilities.

[Protecting Building Utilities from Flood Damage: Principles and Practices for the Design and Construction of Flood Resistant Building Utility Systems](#)

Federal Emergency Management Agency (1999)

Floodplains are home to nearly 10 million households. Floods result in killing on average 150 per year and causing over \$3 billion in property damage. This report provides principles and practices for the design and construction of flood resistant building utility systems.

STEP 2: Energy Conservation and Renewable Energy

[*ASHRAE Advanced Energy Design Guide for Large Hospitals*](#)

[*ASHRAE Advanced Energy Design Guide for Small Hospitals and Healthcare Facilities \(30%\)*](#)

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

This series provides a sensible approach to easily achieve advanced levels of energy savings without having to resort to detailed calculations or analysis. The Guides offer contractors and designers the tools, including recommendations for practical products and off-the-shelf technology, needed for achieving a 50% energy savings compared to buildings that meet the minimum requirements of ANSI/ASHRAE/IESNA Standard 90.1-2004. The energy savings target of 50% is the first step in the process toward achieving a net-zero energy building, which is defined as a building that, on an annual basis, draws from outside resources equal or less energy than it provides using on-site renewable energy sources.

[*Disaster Resiliency and Recovery*](#)

National Renewable Energy Laboratory (NREL)

This fact sheet describes NREL's capabilities in the areas of disaster planning, response, and rebuilding.

[*Disaster Resilience and Recovery*](#)

National Renewable Energy Laboratory (NREL)

NREL's energy disaster recovery program offers a broad range of services, including whole-community energy planning, on-site technical assistance, energy-efficient design and rebuilding strategies, and clear information for decision makers. Their website has a range of success stories and publications, including their work with Greensburg, KS.

[*Energy Star Portfolio Manager*](#)

Energy Star

ENERGY STAR Portfolio Manager® is an online tool you can use to measure and track energy and water consumption, as well as greenhouse gas emissions. Use it to benchmark the performance of one building or a whole portfolio of buildings, all in a secure online environment.

[*Federal Green Challenge*](#)

U.S. Environmental Protection Agency

The Federal Green Challenge is a national effort under U.S. EPA's ***Sustainable Materials Management Program***, challenging EPA and other federal agencies throughout the country to lead by example in reducing the Federal Government's environmental impact. Federal offices or facilities can select six target areas: waste, electronics, purchasing, energy, water, or transportation.

[*Federal Green Challenge – Energy*](#)

U.S. Environmental Protection Agency

The goals of this challenge are to reduce electricity, natural gas, and/or fuel oil used per year and to increase renewable energy use.

[*National Renewable Energy Lab Renewable Energy Atlas*](#)

National Renewable Energy Laboratory

Maps renewable energy resources in the United States and illustrates the geographic distribution of wind, solar, geothermal, and biomass resources, as well as other pertinent information.

[*Realizing a Clean Energy Future: Highlights of NREL Analysis*](#)

National Renewable Energy Laboratory (NREL) (2013)

This article discusses the movement from a carbon-centric, inefficient energy system to one that emphasizes efficiency and draws from diverse energy sources – including the sun. It summarizes how NREL's analyses will help reach a clean energy future.

[*Renewables Make a Powerful Case as Hospital Energy Source*](#)

U.S. Department of Energy

Rapidly rising energy costs and tightening regulations on carbon emissions are making renewable energy, or “renewables,” increasingly compelling to hospitals. Renewables were once viewed as niche technologies, but improved funding, incentives, and technology have positioned renewable energy to enter the mainstream.

[*Targeting 100! Envisioning the High Performance Hospital: Implications for a New, Low Energy, High Performance Prototype*](#)

University of Washington Integrated Design Lab (2010)

This research provides a conceptual framework and decision-making structure at a schematic design level of precision for hospital owners, architects, and engineers. It offers access to design strategies and the cost implications of those strategies for new hospitals to utilize 60% less energy.

STEP 3 & 4: Water Supply and Usage

[Best Practices in Water Conservation](#)

Practice Greenhealth

This website explains the steps to establish a water conservation program as well as where to look for water conservation opportunities.

[Disaster Preparedness: Before an Event](#)

Centers for Disease Control and Prevention (CDC)

In this website, CDC outlines steps we should take to prepare ourselves for future disastrous events. This includes drinking water, water use, hygiene and sanitation, water security, and water-related diseases and illnesses.

[Drinking Water Advisory Communication Toolbox](#)

Centers for Disease Control and Prevention, U.S. Environmental Protection Agency, American Water Works Association (2013)

This toolbox, which is available as a comprehensive website and a PDF document, provides information on how to plan for, develop, implement, and evaluate drinking water advisories. It includes instructions on how to prepare before an event, what to do during an event, templates and tools to use, and recommendations for follow-up actions and assessments after an event to enable water systems to communicate effectively with partners and the public in order to protect public health.

[Emergency Water Supply Planning Guide for Hospitals and Health Care Facilities](#)

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, and American Water Works Association (2012)

In order to maintain daily operations and patient care services, health care facilities need to develop an Emergency Water Supply Plan (EWSP) to prepare for, respond to, and recover from a total or partial interruption of the facilities' normal water supply. Because water supplies can and do fail, it is imperative to understand and address how patient safety, quality of care, and the operations of your facility will be impacted.

[Federal Green Challenge – Water](#)

U.S. Environmental Protection Agency

This website discusses water goals to reduce the amount of water consumed as well as ways to protect water resources. It also discusses how to reduce the amount of stormwater runoff from existing sites.

[How Healthcare Uses Water](#)

Practice Greenhealth

This website explains how healthcare facilities use water. Healthcare facilities fall within the top ten consumers of water in the community.

[Planning for an Emergency Drinking Water Supply](#)

U.S. EPA National Homeland Security Research Center (June 2011)

Five workshops were convened with about 60 technical experts to review alternative means of providing drinking water in the event of destruction, impairment, or contamination of the public water supply.

[Planning for Water Supply Interruptions: A Guide for Hospitals and Healthcare Facilities](#)

Healthcare & Public Health Sector Coordinating Councils

This 2-page primer highlights tools and resources for assisting hospitals and health facilities in preparing for water supply interruptions. Water is necessary not only for drinking and sanitation, but also heating and cooling, patient care, and emergency response efforts.

[Water: Sustainable Infrastructure](#)

U.S. Environmental Protection Agency

This website addresses our water infrastructure needs and how to select the right solutions to meet each need. It gives examples of alternatives that should be considered and links to resources with more information on the possibilities.

[When Every Drop Counts: Protecting Public Health During Drought Conditions: A Guide for Public Health Professionals](#)

Centers for Disease Control and Prevention (CDC), U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration, and American Water Works Association (2010)

CDC's National Center for Environmental Health (NCEH) developed this guide to assist public health officials, practitioners, and other stakeholders in their efforts first to understand and then to prepare for drought in their communities. It provides information about how drought affects public health, recommends steps to help mitigate the health effects of drought, identifies future needs for research and other drought-related activities, and provides a list of helpful resources and tools.

STEP 5: Sewage and Wastewater

American Water Works Association

American Water Works Association (AWWA) website includes a range of resources on backflow prevention, emergency preparedness and sewage/wastewater systems, and storage options. This AWWA Resource Community is intended to keep the water industry informed about resources, tools, issues, and developments related to collection systems.

Cross-Connection Control: A Best Practices Guide

U.S. Environmental Protection Agency

This Guide discusses the importance of controlling cross-connections and preventing backflow occurrences from unprotected cross connections in the water system.

ELEMENT 4 RESOURCES

ESSENTIAL CLINICAL CARE SERVICE DELIVERY PLANNING

STEP 1: Determine Critical Care Needs

Managing Mass Fatalities: A Toolkit for Planning

Santa Clara County Advanced Practice Center

This comprehensive toolkit evolved from recognition of the need for communities to increase their preparedness for managing mass fatalities. Its focus—the care and management of the dead—is one of the most difficult aspects of disaster response and recovery operations.

STEPS 2-4: Personnel, Clinical Care, Space and Patient Surge

Hospital Surge Capacity Toolkit

Santa Clara County Advanced Practice Center

This toolkit is intended to assist healthcare facilities in thinking through critical issues related to healthcare surge, and to create comprehensive plans to address these needs, including: providing medical surge capacity, patient tracking within the hospital and during patient forwarding activities, status reporting, requesting resources, and establishing alternate care sites. All documents are available for download in a zip file.

Surge Hospitals: Providing Safe Care in Emergencies

Joint Commission on Accreditation of Healthcare Organizations

It is crucial that health care organizations understand what surge hospitals are and how they can plan for and establish them, including whom they should work with to do so. Where outside of its own walls does a health care organization go to expand its surge capacity? Who should be involved in planning, establishing, and operating surge hospitals? This paper provides the answers to these questions and offers real-life examples of how surge hospitals were established on the Gulf Coast.

ELEMENT 5 RESOURCES

ENVIRONMENTAL PROTECTION AND ECOSYSTEM ADAPTATIONS

STEP 1: Water as a Resource

[*Stormwater Management Best Practices*](#)

U.S. Environmental Protection Agency (EPA)

These web-based resources are based upon Integrated Management Practices for design, construction, and management of stormwater systems. EPA's stormwater management efforts continue in accordance with the new paradigms and requirements set out in [*Executive Order \(EO\) 13514*](#), signed in October 2009, the [*Energy Independence and Security Act of 2007 \(EISA\)*](#), and [*EO 13423*](#).

[*Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*](#)

U.S. Environmental Protection Agency (EPA) (2009)

EPA's Office of Water coordinated the development of these federal guidelines and issued *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* on December 4, 2009.

[*Wet Weather Flow Management Guidelines*](#)

City of Toronto (2006)

The Wet Weather Flow Management Policy provides direction on how to manage wet weather flow on a watershed basis and in a manner that recognizes rainwater and snowmelt as a resource. The primary goal of the Wet Weather Flow Management Policy is to reduce the quantity, and to improve the quality of stormwater runoff, consistent with overall objectives and principles of Toronto's Wet Weather Flow Master Plan.

STEPS 2 & 3: Value Soils, Preserve Vegetative Cover and Open Spaces

[*Climate Resiliency Infographic*](#)

U.S. Environmental Protection Agency (EPA)

Climate change is impacting urban areas in many ways, from exacerbating the urban heat island effect to elevating flood risk. This EPA website provides information about building green infrastructure to help improve community resilience.

[*Green Infrastructure for Climate Resiliency*](#)

U.S. Environmental Protection Agency (EPA)

This website has a range of tools and resources to assist property owners in managing floodwaters, preparing for drought, reducing urban heat island impacts, reducing energy and potable water demands, and protecting the coastlines. It also features case studies organized by region, and material on the cost/benefit of low impact development (LID) approaches.

[*Green Infrastructure for Climate Resiliency*](#)

U.S. Environmental Protection Agency (EPA) (2014)

EPA's graphic and informative fact sheet can assist healthcare organizations in educating staff about the importance of green infrastructure approaches. It addresses: 1) climate change effects on cities, 2) manage local flooding, 3) build resilience to drought, 4) protect the coast, 5) use less energy managing water, and 6) reduce urban heat island effect.

[*Healthy Food in Health Care: A Menu of Options*](#)

Health Care Without Harm

A variety of health care institutions across the U.S. have begun to adopt programs, practices, and policies to support a healthy food system. Following their model, your facility can choose one, a few, or all of the recommendations in this menu to improve the quality of your food choices.

[Healthier Food](#)

Healthier Hospitals Initiative

This set of web-based downloadable resources provides healthcare organizations with the background information and step-by-step guidance needed to purchase more environmentally sustainable foods and serve healthier meals and beverages to patients, employees, visitors, and the communities they serve

[New York City Green Infrastructure Plan](#)

NYC Department of Environmental Protection (2013)

In September 2010, New York City released the NYC Green Infrastructure Plan that presents an alternative approach to improving water quality that integrates “green infrastructure,” such as Right-of-way Bioswales and green roofs, with investments to optimize the existing system and to build targeted, cost-effective “grey” or traditional infrastructure.

[The Case for Sustainable Landscapes](#)

Sustainable Sites Initiative (2009)

Any landscape, whether the site of a large subdivision, a shopping mall, a park, an abandoned rail yard, or a single home, holds the potential both to improve and to regenerate the natural benefits and services provided by ecosystems in their undeveloped state. This presents the case for developing landscapes that enhance ecosystem services.

STEP 4: Reduce Waste

[Less Waste](#)

Healthier Hospitals Initiative (2012)

This set of web-based downloadable resources provides healthcare organizations with the background information and step-by-step guidance needed to reduce, reuse, recycle, and segregate waste more effectively, and become better environmental stewards.

[Medical Waste Publications](#)

U.S. Environmental Protection Agency (EPA)

In this website, EPA has compiled an extensive list of documents, factsheets, and other resources related to medical waste management, including both general guidance documents and information on medical waste treatment technologies.