The New York State Department of Health Climate and Health Profile

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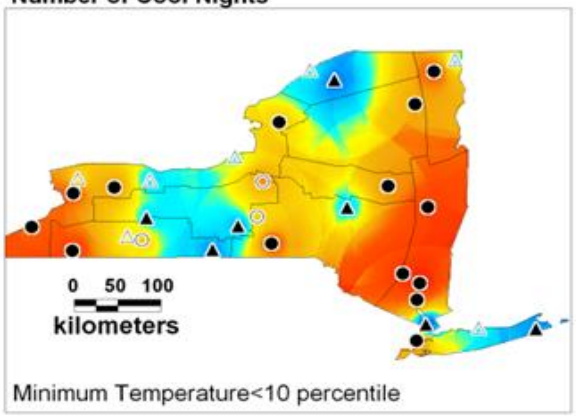
Climate and Health Profile Report

- Important outcome to address BRACE Step 2 to project disease burden
- Summary of the public health impacts related to the changing climate
- Identification of vulnerable populations
- Outline collaboration efforts
- Determine next steps

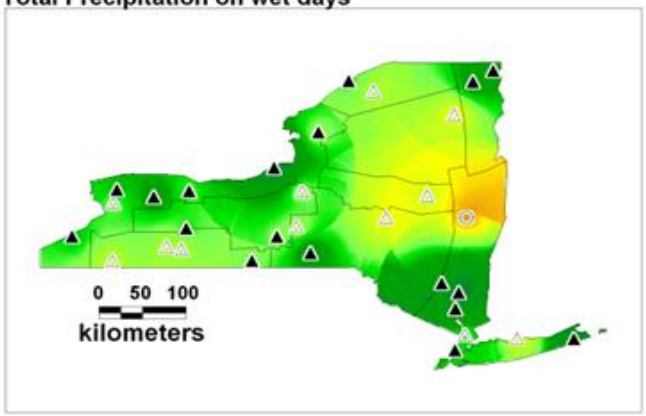
Evidence of Increasing Warming and Wetness in New York State, 1948-2008

Red = warming
Blue = cooling

Number of Cool Nights

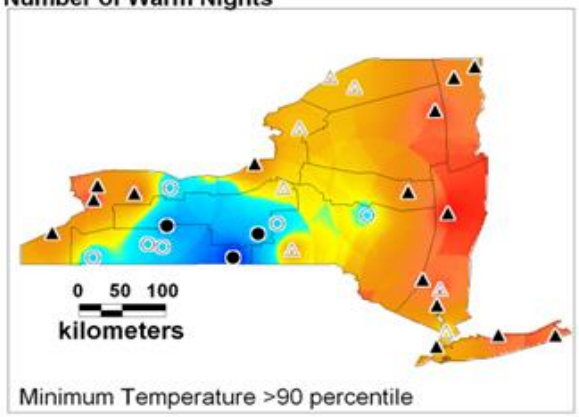


Total Precipitation on wet days

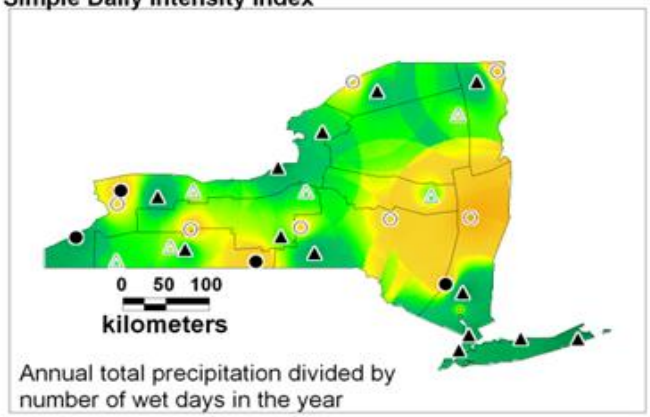


Green = wetter
Red = dryer

Number of Warm Nights



Simple Daily Intensity Index



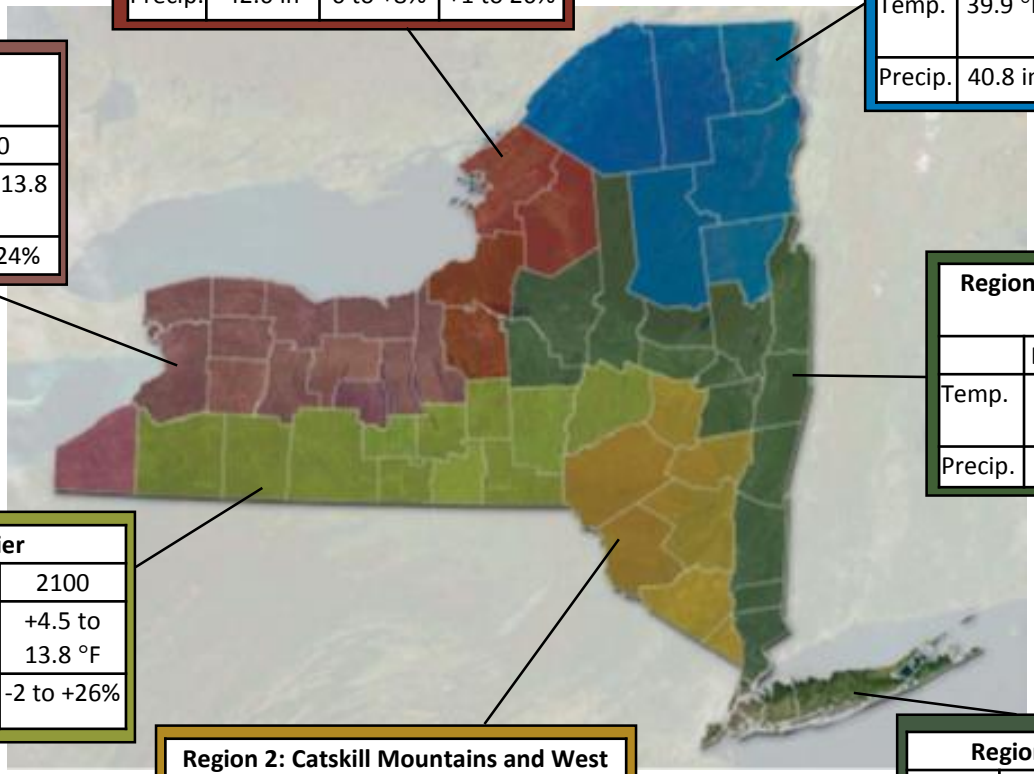
▲ Significant Increase △ Non Significant Increase ○ Non Significant Decrease ● Significant Decrease

NYS Temperature and Precipitation Projections (NYS ClimAID, 2014)

Region 6: Tug Hill Plateau			
	Baseline	2020s	2100
Temp.	45.4 °F	+1.9 to 3.9 °F	+4.5 to 13.9 °F
Precip.	42.6 in	0 to +8%	+1 to 26%

Region 7: Adirondack Mountains			
	Baseline	2020s	2100
Temp.	39.9 °F	+1.8 to 3.8 °F	+4.4 to 13.9 °F
Precip.	40.8 in	0 to +9%	-2 to +26%

Region 1: Western New York Great Lakes Plain			
	Baseline	2020s	2100
Temp.	47.7 °F	+1.8 to 4.0 °F	+4.6 to 13.8 °F
Precip.	34.0 in	0 to +8%	-3 to +24%



Region 5: East Hudson and Mohawk River Valleys			
	Baseline	2020s	2100
Temp.	47.6 °F	+1.7 to 3.7 °F	+4.4 to 13.6 °F
Precip.	38.6 in	-1 to +10%	-1 to +26%

Region 3: Southern Tier			
	Baseline	2020s	2100
Temp.	47.5 °F	+1.8 to 3.8 °F	+4.5 to 13.8 °F
Precip.	35.0 in	-4 to +9%	-2 to +26%

Region 2: Catskill Mountains and West Hudson River Valley			
	Baseline	2020s	2100
Temp.	50.0 °F	+1.6 to 3.5 °F	+4.3 to 12.6 °F
Precip.	46.0 in	-1 to +10%	-6 to +24%

Region 4: NYC and Long Island			
	Baseline	2020s	2100
Temp.	54.6 °F	+1.5 to 3.2 °F	+4.2 to 12.1 °F
Precip.	49.7 in	-1 to +10%	-6 to +25%

Sources of Information on Climate Projections

- Geographic scope
  - Weather regions, climate divisions, ozone regions
- Indicators
  - Multiple lists, use singly or in composite index
- Emissions/global climate models
  - Applied to respiratory disease hospitalizations

Public Health Consequences (Priorities in NYS)

- Health impacts from precipitation extremes
- Increase in heat-related morbidity/mortality
- Increase in adverse health outcomes associated with air pollution (*e.g.*, asthma, COPD)
- Allergies
- Vector-, water-, and food-borne disease
- Food security

Vulnerable Populations

- May experience a greater severity of impact
- Less able to engage in adaptive behaviors to minimize exposures
- Less ability to recover from climate related events

Older Adults

- 14.4% of New Yorkers are 65+
- ↑ risk from heat waves and other extreme weather events, poor air quality, infectious diseases
- ↑ sensitivity due to disease prevalence, limited mobility, social isolation, and income loss
- ↑ risk of heart failure
- ↑ susceptibility to effects of air pollution
- ↓ ability to regulate their own body temperature
- ↑ vulnerability to food- and water-borne disease, ↑chance of developing more severe outcomes
- More likely to be taking medications that ↑ risk

Cardiovascular Disease (CVD)

- CVD is the leading cause of death in NYS, representing 29% of the deaths
- NYS age-adjusted prevalence estimates indicate 7.6% of adults have some form of CVD
- Extreme weather events → CVD mortality, including stress-induced myocardial infarction, and delays in accessing medical care for chronic CVD
- Those with CVD have ↑ sensitivity to extreme heat and extreme cold
- ↑ airborne particulate matter → CVD hospitalization, mortality
- Heat ↑ negative impacts of particulates

Pregnancy

- Extreme weather can interrupt breastfeeding practices
- Weather disasters → exposure to toxins, limited access to safe drinking water, disruption in health care services, and psychological distress
- ↑ risk of vector-borne diseases such as malaria
- ↑ risk for enteric viruses and transmission during birth or shortly afterwards
- Extreme heat → lower birth weight, some association with birth defects

Living in Flood Plains

Year	NYC Residents at Risk
1983	218,000
2013	400,000 + 270,000 workers
Mid-Century	800,000

- ↑ frequency and intensity of heavy downpours in Northeast–an indication that northern areas will be getting wetter
- ↑ extreme precipitation, total precipitation → flooding
- Hurricane Irene's heavy rains were part of larger pattern of wet weather that predisposed the region to flooding
- ↑ frequency, intensity of rain events → overwhelming of water treatment systems, ↑ disease outbreaks

Migrant, Seasonal Farmworkers

- Estimated 24,000 migrant and seasonal farmworkers in NYS
- Longer, hotter summers, variability in precipitation → longer growing season and longer work hours
- ↑ insect pests, weeds → more exposure to herbicides and pesticides
- Extreme weather, precipitation can worsen housing conditions (structural damage, mold, rodents, poor sanitation) and ↑ infectious diseases
- ↓ resilience from climate events due to confounding factors: ↓ SES, English proficiency, access to social networks and resources

Ten Essential Services of Public Health

Service	Climate Change Example
Monitor health status to identify and solve community health problems	Tracking of diseases and trends related to climate change
Diagnose and investigate health problems and health hazards in the community	Investigation of infectious water-, food-, and vector-borne disease outbreaks
Inform, educate, and empower people about health issues	Informing the public and policymakers about health impacts of climate change
Mobilize community partnerships and action to identify and solve health problems	Public health partnerships with industry, other professional groups, faith community, and others, to craft and implement solutions
Develop policies and plans that support individual and community health efforts	Municipal heat-wave preparedness plans
Enforce laws and regulations that protect health and ensure safety	(Little role for public health)
Link people to needed personal health services and ensure the provision of health care when otherwise unavailable	Health care service provision following disasters
Ensure competent public and personal health care workforce	Training of health care providers on health aspects of climate change
Evaluate effectiveness, accessibility, and quality of personal and population-based health services	Program assessment of preparedness efforts such as heat-wave plans
Research for new insights and innovative solutions to health problems	Research on health effects of climate change, including innovative techniques such as modeling, and research on optimal adaptation strategies

Source: Frumkin H, Hess J, Luber G, Malilay J, McGeehin M. Climate change: The public health response. *Am J Pub Health.* 2008;98(3):435-45.

New York State Priorities

	Leaders	LHDs	Stakeholders
Monitoring and Surveillance	1	4	1
Policy Development and Planning	3	2	2
Education and Awareness	4	1	3

Note: A ranking of "1" is highest priority ranking. Note that the top External Stakeholder categories were all within the top 4 rankings for DOH Leadership and for LHDs.

Assessing Vulnerability

- Evaluating exposures
- Prioritizing climate impacts for health risk assessment
  - Heat, extreme weather, vector-borne, food-borne, and water-borne diseases
- Quantitative Analysis
  - Case-crossover, generalized additive model (GAM), case-control

Assessing Vulnerability to Heat

- Population factors: gender, race/ethnicity, age, residential area, income, insurance type, air conditioning
- Social factors: living alone, ↑ number of residents, chronic diseases, disability, ↓ education, poverty, smoking, substance use, older homes, non-English speaking
- Environmental factors: average temperature, land coverage, built environment, air pollution, traffic, public transport, flood risk, density of housing, population, hospitals, and factories

Assessing Vulnerability-NASA project

- DOH has been recently granted funding from NASA to assess population vulnerability to heat stress using NASA satellite data.

- The project deliverables include sub-county maps of heat stress vulnerability and climate indicators.

- Project staff will collaborate with BRACE staff in all three sites to integrate their results with ongoing climate assessments.

Assessing Extreme Weather Vulnerability

- Psychological Simple Triage and Rapid Treatment (PsySTART) system
- NYSDOH Bureau of Water Supply Protection
  - Tracking of public water systems during floods
  - Issuance of boil water notices
- Special studies, e.g., Hurricane Sandy

Assessing Vector-borne Disease Vulnerability

- Twice yearly statewide surveys of host-seeking ticks
- Hunter-killed white-tailed deer survey
- Mosquito surveillance
- Human case reporting of tick-borne diseases
- Human case reporting of mosquito-borne diseases

Challenges and Opportunities

- Choice of climate regions for analysis
- Need to expand data sets for assessing health outcomes, including case reports, not just hospitalizations
- Appropriate selection and use of climate models
- Assessing vulnerability is a necessary, but not sufficient step. We must pilot test and evaluate adaptations while we continue assessing vulnerability.

NYS Interagency Climate Adaptation Initiatives

- Purpose: to provide decision-makers with information on NYS vulnerability, develop climate projections and promote adaptation
  - Climate Action Council
  - ClimAID
  - Sea Level Rise Task Force
  - Interagency Adaptation Workgroup
  - Climate Smart Communities Program

Partnership Benefits

- Broad range of expertise
- A measure of existing networks and activities
- Unfiltered input on current climate impacts
- Access to decision makers, networks, membership, populations represented
- Eyes and ears “on the ground”
- Knowledge gap clarification
- “Real-time” qualitative data
- Opportunities for project collaboration
- Input fuels health department prioritization of issues
- Outside perspectives from powerful policy-movers
- Mutual awareness of roadblocks
- Diverse connections to health

Stakeholder Input

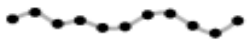
"What ideas do you have for how your organization could collaborate with NYSDOH for reducing the impacts of climate change on the publics health?"

"Moving climate from an environmental issue to a public health issue I think is absolutely key…"

Translation into Practice: EPHT

Climate and Health in Lower Manhattan

Extreme heat, coastal storms, flooding and episodes of elevated ozone are climate-related hazards that may increase with climate change and have important public health impacts in New York City. Extreme weather can cause power outages, which also threaten public health. This report provides neighborhood indicators of climate-related hazards, vulnerability and health impacts.

Vulnerability - Population Characteristics	Lower Manhattan	Manhattan	NYC	Lower Manhattan: Compared with other NYC neighborhoods*	Lower Manhattan: Trend over time
People living below federal poverty level (percent), 2008-2012	12.4	17.5	19.9	Better	Not Available
Adults aged 65 years and older living alone (percent), 2008-2012	46.5	42.3	31.3	Worse	Not Available
Adults aged 18 and older with independent living difficulty (percent), 2008-2012	3.4	4.5	5.4	Better	Not Available
Adults aged 18 years and older who are obese (percent), 2013	13.2	16.4	23.5	Better	 2003-2013
Adults aged 18 years and older reporting serious psychological distress (percent), 2012	6.8**	5	5.5	Worse	Not Available

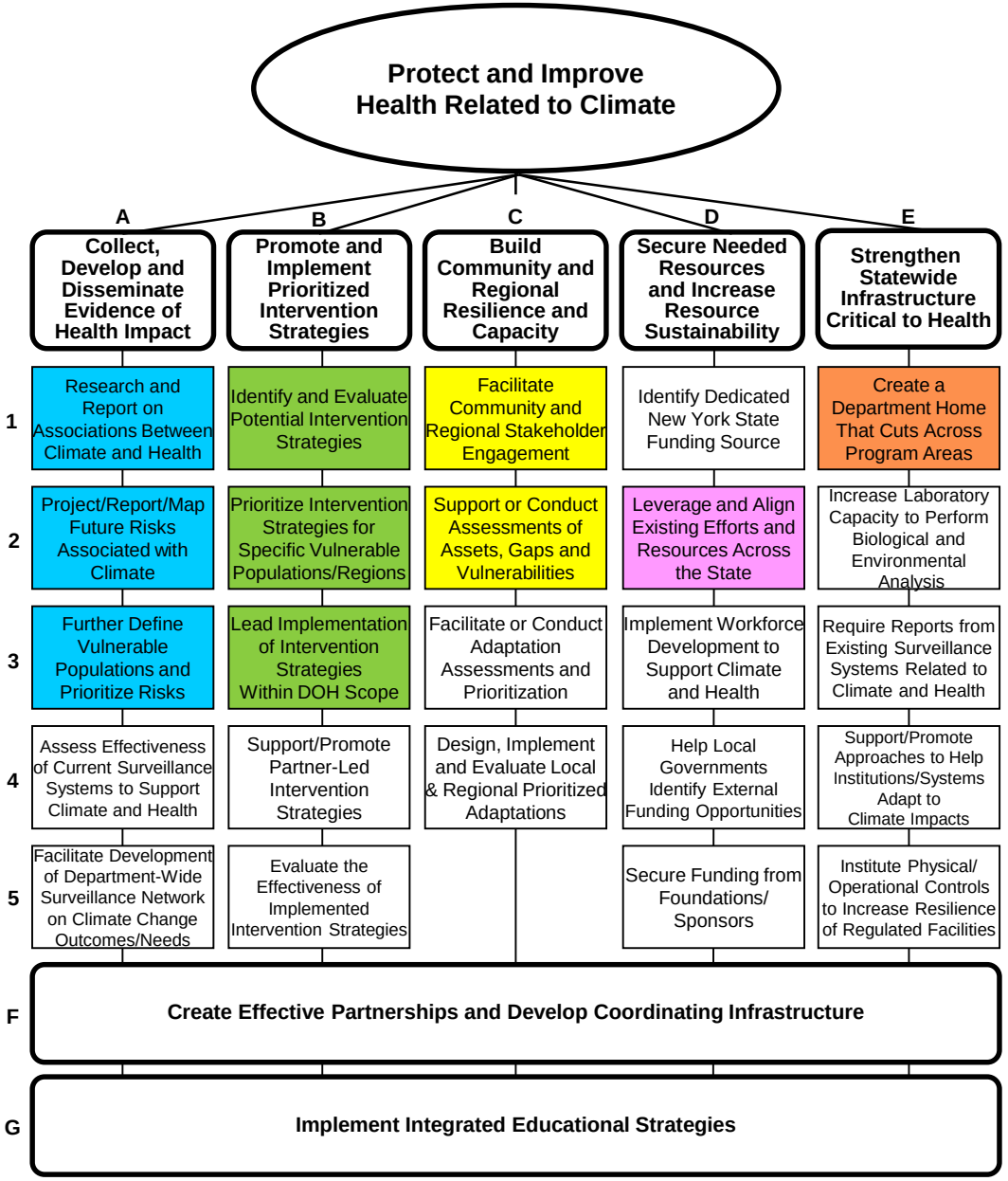
Public Health Adaptation Recommendations, ClimAID

Operations, Management, and Infrastructure Strategies Extend surveillance of climate and health indicators, including data monitoring of airborne pollen and mold. Evaluate extreme heat response plans, focusing particularly on expanding access to cooling services during heat events. Build on this knowledge to develop similar systems for other climate health risks. Target strategies and messages for the most vulnerable populations. Plant low-pollen trees in cities to reduce heat without increasing allergenic pollen.
Larger-scale Strategies Further integrate environment and health initiatives to address both human and ecosystem health and avoid the divide that often exists between them.
Co-benefits Prioritize adaptation strategies that maximize co-benefits (e.g., cleaner air, improved nutrition, or increased physical activity). Invest in structural adaptations to reduce heat vulnerability (e.g., tree planting, green roofs, high-reflectivity building materials) to reduce energy demand and expense while reducing heat-related risks.

Public Health Adaptation Recommendations from NYS Climate Action Council

Recommendation 1. Improve or establish robust public health mechanisms to reduce the potential for heat-related morbidity and mortality in New York State.
Recommendation 2. Educate, empower, and engage all New Yorkers to foster a better understanding of the public health consequences of climate change and take actions to reduce or eliminate those consequences.
Recommendation 3. Assess and improve the capacity of existing public health preparedness, response, and recovery programs to respond to climate-related impacts and direct resources where needed.
Recommendation 4. Build community resilience and integrated public health capacity to reduce human health impacts of climate change.
Recommendation 5. Evaluate and enhance, as necessary, the capacity of existing surveillance programs for vector-, food-, and water-borne diseases and disease-causing agents to monitor and respond to the anticipated climate change-related increase in such public health threats.
Recommendation 6. Assess and prepare for the significant public health risks associated with hazards related to sea level rise.
Recommendation 7. Conduct and support research on the public health consequences of climate change and their effective incorporation into adaptation strategies.

New York State Health Department
Climate and Health
Strategic Map: 2013-2015



Next Steps

- Identify gaps; cross-reference with CSTE indicators
- Determine best ways to provide vulnerability projections at local level through EPHT
- Pilot adaptations at the local level (BRACE Step 3)
- Use findings to update Department-wide strategic plan (BRACE Step 4)
- Evaluate vulnerability assessments and initial adaptations (BRACE Step 5)

NYS Resources

- **NYS Climate, Weather & Health**
  http://www.health.ny.gov/environmental/weather/index.htm
- **NYS Climate Action Plan**
  http://www.nyclimatechange.us/InterimReport.cfm
- **NYSERDA's ClimAID Project**
  http://www.nyserda.org/programs/environment/emep/clim-aid-synthesis-draft.pdf
- **NYS DEC Office of Climate Change**
  http://www.dec.ny.gov/about/43166.html
- **NYS Sea Level Rise Task Force**
  http://www.dec.ny.gov/energy/45202.html

Presenter Disclosures

Asante Shipp Hilts, MPH

(1) following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No Relationships to Disclose

Thank You

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