



Connecticut Department of Public Health
Keeping Connecticut Healthy



Statewide Healthcare and Public Health Hazard Vulnerability Analysis



Winter Storm Quinn March 17, 2018

**Prepared by Yale New Haven Health
Center for Emergency Preparedness and Disaster Response
March 7, 2019**

Contents

I. Introduction	3
Purpose.....	3
Scope	4
Planning Assumptions and Limitations	4
Methodology	5
II. Regional and Statewide Hazard Vulnerability Analysis Survey Results	7
Summary of 2018 HVA Results by Region	7
Regional HVA Results	9
III. Connecticut Climate and Growing Risks	15
IV. Connecticut’s Disasters	17
V. Social Vulnerability in Connecticut	18
Social Vulnerability Index	18
Asset Limited, Income Constrained, and Employed (ALICE) Project.....	28
Implications of Geographic and Social Vulnerabilities for EM Planning in CT	29
Appendix A – Connecticut Hazard Vulnerability Analysis Tool	31

I. Introduction

Purpose

In 2018 and for the second consecutive year, the Connecticut Department of Public Health (CT DPH) engaged Yale New Haven Health's Center for Emergency Preparedness and Disaster Response to compile and analyze the outcomes of a statewide public health/healthcare system Hazard Vulnerability Analysis (HVA) conducted in each of the five Department of Emergency Services and Public Protection – Division of Emergency Management and Homeland Security (DEMHS) regions¹.

This public health/healthcare system HVA takes a systematic approach to identifying hazards or risks most likely to impact the demand for Connecticut's public health services, or the health care delivery system's ability to provide medical services. Hazards have been measured by their likelihood and their consequences. The overarching goal of this HVA is to determine what future events are most likely to impact regional public health and healthcare capabilities in each of the five Connecticut DEMHS regions and in the state as-a-whole. To answer this question, administrators from acute care hospitals, public health departments, both municipal and district, along with some additional health care agencies, were asked to complete an organization-specific HVA (blank form located in Appendix A). The HVA required respondents to identify the following:

- Hazards with the highest likelihood for occurrence
- hazards with the highest likelihood for requiring a regional public health and healthcare response
- hazards with the potential to have the highest impact on regional public health and healthcare services

The HVA, based on the Colorado Children's Hospital Community Hazard Vulnerability Analysis, has been modified to meet the needs of this engagement. This tool was selected due to its comprehensive look at a variety of hazards and because it encompasses both community and hospital-specific hazards making it applicable to public health and healthcare entities in the state. The Colorado Children's Hospital Community HVA was modified by removing items from the hazards list that are less likely to affect Connecticut and replacing them with those more likely to impact the state. The final HVA form includes 101 hazards under the following categories:

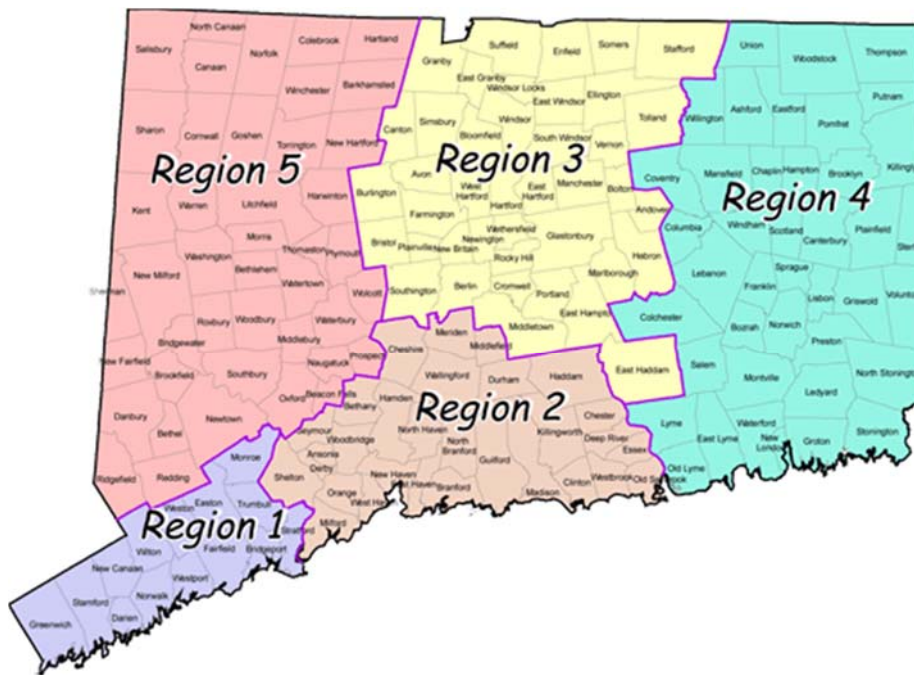
- National Planning Scenarios
- Naturally Occurring Events
- Human Related Events
- Hazardous Materials Events
- Technologic Events
- Utility Events
- Geographic Events
- Other Events

¹ When used in this report, "regions" refer specifically and only to these five DEMHS emergency preparedness regions.

Scope

Connecticut's five healthcare coalitions (HCCs) are organized by the geographical boundaries of the five DEMHS regions and follow the same planning regions identified through the DEMHS REPT ESF-8 approach. The HCCs are funded by the Office of the Assistant Secretary for Preparedness and Response (ASPR) in the U.S. Department of Health and Human Services, with the grants administered by the Connecticut Department of Public Health. HCC core membership is a minimum of two acute care hospitals, local health, EMS, and emergency management. The HCCs provided a structured approach to data collection and reporting for the completion of the HVA. Map 1 illustrates the regional boundaries and regional designation for each Connecticut town.

Map 1 – Five DEMHS Regions



Planning Assumptions and Limitations

- Although there is overlap, the regional HCC HVA process is distinct from the HVA processes undertaken by individual agencies and the Threat and Hazard Identification and Risk Assessment (THIRA) process completed by the State of Connecticut. As such, the regional HCC HVA is not a replacement for the agency-specific HVA or the CT THIRA.
- The individuals completing the HVAs have varying levels of emergency management and public health preparedness experience and training. The individual agency HVA reports generated by this process are also subject to the accuracy and content of information provided by each agency.

- Further, the data herein is based only on the submitted responses from particular HCC member organizations and therefore is not an exhaustive assessment of all HCC partners.
- Although the HVA incorporates a wide range of hazards, some of which are the purview of emergency management and/or public health agencies, the primary focus of this HVA is to identify the hazards, risks, threats, and vulnerabilities that can impact the delivery of healthcare services to the regional communities they serve.

Methodology

This project asked healthcare provider and municipal/district health department respondents in each regional HCC to complete the HVA, which was prepared as a SurveyMonkeytm instrument and delivered via hyperlink to designated staff, via email. Tables 1 and 2 list the organizations that completed the survey.

YNHHS aggregated the data by region and used Microsoft Excel to calculate an average response for each data point on the HVA. The averages were used to generate each regional HVA. Once the five region-wide HCC HVAs were reviewed, validated and finalized by each HCC, the regional data averages were used to develop one statewide HVA. To prepare this report, YNHHS also collected, analyzed and incorporated data and other findings from several additional sources including the National Oceanic and Atmospheric Administration, the Federal Emergency Management Agency, the Connecticut State Data Center and The Agency for Toxic Substances & Disease Registry.

Table 1 – Completed Health Department HVA

Region 1	Region 2	Region 3	Region 4	Region 5
Bridgeport	Chesprocott	Central CT	Eastern Highlands	Bethel
Darien	CT River Area Health	Chatham	Ledge Light	Brookfield
Fairfield	Durham	Farmington Valley	Mohegan Tribe	Naugatuck Valley
Fairfield Police	East Shore	Glastonbury	Northeast	New Fairfield
Greenwich	Essex	Hartford	Uncas	New Milford
Monroe	Guilford	Killingworth		Newtown
Norwalk	Madison	Manchester		Ridgefield
Stamford	Meriden	Middletown		Torrington
Stratford	Milford	New Britain		Waterbury
Trumbull	New Haven	North Central District		
Westport	Quinnipiac Valley	West Hartford-Bloomfield		
Wilton	Wallingford	Windsor		
	West Haven			
	Westbrook			

Table 2 – Completed Health Care Organization HVA

Region 1	Region 2	Region 3	Region 4	Region 5
Bridgeport Hospital	Community Health Center, Inc.	Bradley Airport Fire Department	American Ambulance Service, Inc.	Charlotte Hungerford Hospital
Caring Hospice Services	Cornell Scott-Hill Health Center	Bristol Hospital and Healthcare Group	Backus Hospital	Community Health and Wellness of Greater Torrington
Family Centers Health Care	Fair Haven Community Health Care	Charter Oak Health Center, Inc.	Day Kimball Hospital	Danbury/New Milford Hospital/WCHN
Greenwich Hospital	Gaylord Specialty Healthcare	Granby Ambulance Association	Eastern Highlands Health District	Greater Danbury Community Health Center
Norwalk Hospital/WCHN	Hospital of Central Connecticut	Hartford HealthCare	Generations Family Health Center	St. Mary's Hospital
Optimus Health Care, Inc.	Masonicare	Home Care VNA, LLC	InterCommunity, Inc.	Waterbury Hospital
Southwest Community Health Center, Inc.	Midstate Medical Center	Hospice for Special Care	Lawrence + Memorial Hospital	
St. Vincents Medical Center	Milford Hospital	Manchester Fire-Rescue-EMS	United Community and Family Services	
Stratford VNA	The Connecticut Hospice, Inc.	Middlesex Hospital	Windham Hospital	
	Yale New Haven Hospital	Somers Fire Department		
		UConn John Dempsey Hospital		
		Wheeler Clinic		

II. Regional and Statewide Hazard Vulnerability Analysis Survey Results

Summary of 2018 HVA Results by Region

Region 1 HCC

- Respondents identified naturally occurring events such as **hurricanes and winter storms** as the highest risks of occurrence.
- Respondents expressed concerns about potential **epidemic/pandemic incidents**.

Region 2 HCC

- Respondents identified naturally occurring events such as **hurricanes and blizzards** as high risks for the region.
- Respondents also rated **pandemic flu as a** high risk.
- **Cyber Attack** is the number five hazard for the Region 2 HCC.

Region 3 HCC

- Respondents identified naturally occurring events such as **hurricanes, winter storms and ice storms** in the top five of the HVA for risk occurrence.
- Additional risks that rated higher include **pandemic flu and mass casualty**.

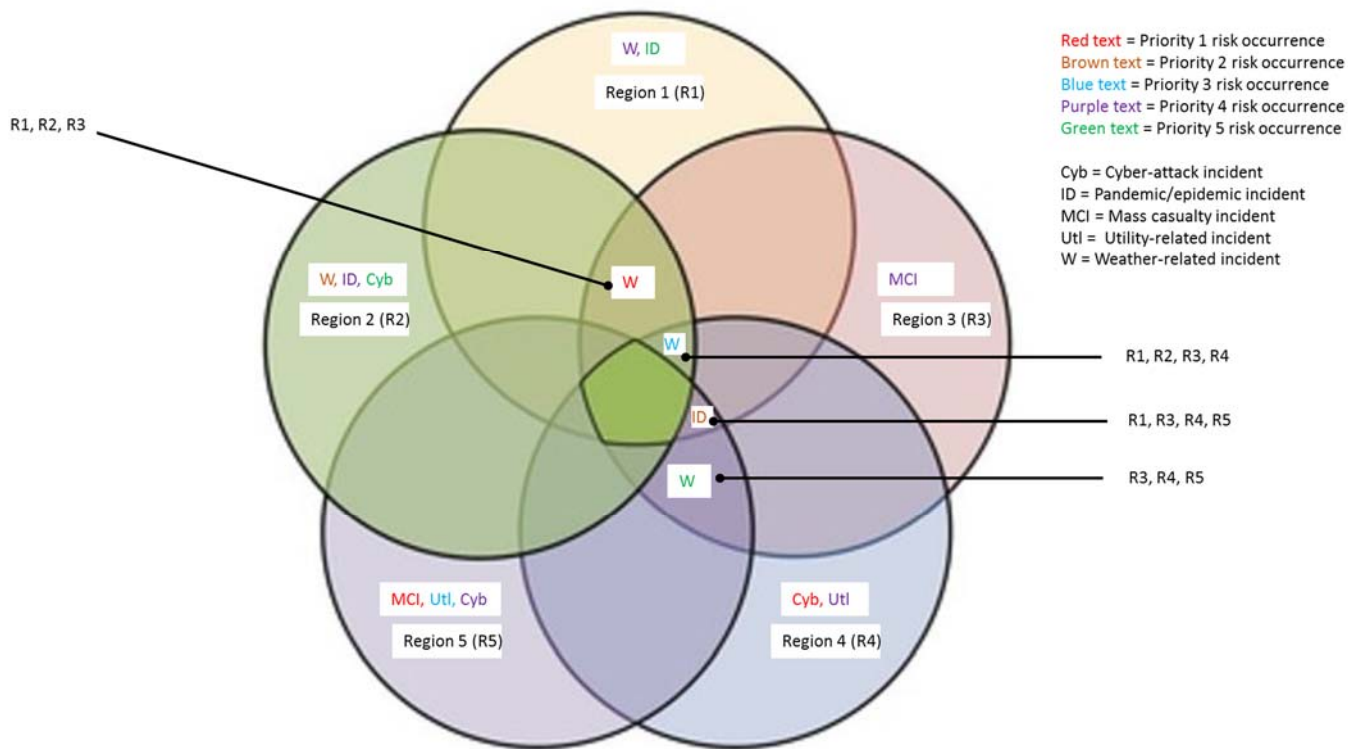
Region 4 HCC

- Respondents identified naturally occurring events such as **hurricanes** in the top five of the HVA for risk occurrence.
- Additional hazards of concern include **electrical failure and cyber-attack**.

Region 5 HCC

- **Mass casualty** incident (MCI) was identified as the highest risk on the HVA.
- Additional hazards of concern include **electrical failure and cyber-attack**.
- Respondents also identified **hurricanes** as areas of risk concern.

Venn diagram summarizing the top five risk occurrence priorities across the five DEMHS regions in Connecticut



HCC Region (R) 1, 2, and 3 identify weather-related events, i.e. hurricane, severe blizzard/snow fall, and ice storms (W), as risk(s) with the highest likelihood of occurrence (priority 1, abbreviations denoted in red), whereas, R4 and R5 identify cyber-attacks (Cyb) and mass casualty incidents (MCI), respectively, as risks with the highest likelihood of occurrence. Infectious disease (ID) incidents (i.e. epidemics/pandemics) are identified as risks with the second highest likelihood of occurrence (priority 2, abbreviations denoted in brown) in R1, R3, R4 and R5, while weather-related events are risks with the second highest likelihood of occurrence in R2. The third-ranked risks for likelihood of occurrence (priority 3, abbreviations denoted in blue) in R1, R2, R3, and R4 are weather-related events; the third-ranked risk in R5 is a utility (Utl) failure (i.e. electrical/power outage). R1, R2, R3, R4 and R5 identified weather-related incidents, ID incidents, MCIs, utility failures, and cyber-attacks, respectively, as fourth most likely occurrences (priority 4, abbreviations denoted in purple). R3, R4, R5 ranked weather-related incidents as the fifth highest likelihood of occurrence, whereas R1 and R2 identified ID incidents and cyber-attack incidents, respectively, the fifth highest likelihood of occurrence (priority 5, abbreviations denoted in green).

Regional HCC HVA Results

Region 1 HCC HVA Top 20

Risk Occurrence ²			Risk Response		
1	Natural Disaster – Major Hurricane	68%	1	Radiological Attack – Radiological Dispersal	74%
2	Biological Disease Outbreak – Pandemic flu	59%	2	Biological Disease Outbreak – Pandemic flu	73%
3	Hurricane	56%	3	Epidemic/Pandemic	71%
4	Severe Blizzard/Snow Fall	56%	4	Biological Attack – Aerosol Anthrax	69%
5	Epidemic/Pandemic	55%	5	Natural Disaster – Major Hurricane	66%
6	Ice Storm	49%	6	Biological Attack – Plague	64%
7	Cyber Attack	46%	7	Nuclear Detonation – Improvised Device	53%
8	Mass Casualty (Trauma)	42%	8	Hurricane	52%
9	Electrical Failure / Power Outage	40%	9	Mass Casualty (Trauma)	51%
10	Temperature Extreme (Hot)	40%	10	Chemical Attack – Blister Agent	48%
11	Temperature Extreme (Cold)	38%	11	Chemical Attack – Nerve Agent	46%
12	High Winds	34%	12	Biological Attack – Food Contamination	44%
13	Severe Thunderstorm	32%	13	Chemical Attack – Toxic Industrial Chemicals	43%
14	Flood (External)	32%	14	Ice Storm	42%
15	Proximity to local schools and universities	30%	15	Chemical Attack – Chlorine Tank Explosion	42%
16	Communications Failure	30%	16	Explosives Attack – Improvised Explosive	39%
17	Proximity to train stations	28%	17	Severe Blizzard/Snow Fall	39%
18	Evacuation	28%	18	Evacuation	39%
19	Chemical Attack – Toxic Industrial Chemicals	28%	19	Natural Disaster – Major Earthquake	38%
20	Explosives Attack – Improvised Explosive	27%	20	Cyber Attack	35%

² Risk Occurrence=Measure of certainty an event will occur. Risk Response=Measure of certainty agency(ies) in question will need to respond.

Region 2 HCC HVA Top 20

Risk Occurrence			Risk Response		
1	Natural Disaster – Major Hurricane	57%	1	Natural Disaster – Major Hurricane	66%
2	Severe Blizzard/Snow Fall	55%	2	Biological Disease Outbreak –	63%
3	Hurricane	55%	3	Outbreak – Pandemic flu	61%
4	Biological Disease Outbreak –		4	Epidemic/Pandemic	
4	Pandemic flu	53%	4	Nuclear Detonation –	
5	Cyber Attack	48%	5	Improvised Device	57%
6	Ice Storm	47%	5	Mass Casualty (Trauma)	57%
7	Epidemic/Pandemic	44%	6	Biological Attack – Plague	54%
8	Electrical Failure / Power Outage	39%	6	Biological Attack – Aerosol	
9	Active Shooter	37%	7	Anthrax	52%
9	Proximity to local schools and		8	Evacuation	52%
10	universities	37%	9	Biological Attack – Food	
10			9	Contamination	50%
10			10	Hurricane	49%
11	High Winds	36%	11	Radiological Attack –	
12	Proximity to major trans. routes and		11	Radiological Dispersal	49%
12	airports	36%	12	Natural Disaster – Major	
13	Information Systems Failure	36%	12	Earthquake	48%
14	Mass Casualty (Trauma)	35%	13	Chemical Attack – Nerve	
15	Communications Failure	34%	13	Agent	46%
16	IT Network Failure	33%	14	Chemical Attack – Toxic	
17	Proximity to train stations	33%	14	Industrial Chemicals	44%
18	Flood (External)	32%	15	Explosives Attack –	
19	Severe Thunderstorm	32%	15	Improvised Explosive	44%
20	Evacuation	31%	16	Chemical Attack – Blister	
			16	Agent	42%
				Chemical Attack – Chlorine	
			17	Tank Explosion	42%
			18	Active Shooter	42%
			19	Cyber Attack	41%
			20	Airplane Crash	40%

Region 3 HCC HVA Top 20

Risk Occurrence			Risk Response		
1	Severe Blizzard/Snow Fall Biological Disease Outbreak –	60%	1	Chemical Attack – Nerve Agent Biological Disease Outbreak –	75%
2	Pandemic flu	57%	2	Pandemic flu	71%
3	Ice Storm	56%	3	Biological Attack – Plague	69%
4	Mass Casualty (Trauma) Natural Disaster – Major	54%	4	Epidemic/Pandemic Radiological Attack –	66%
5	Hurricane	54%	5	Radiological Dispersal	66%
6	Epidemic/Pandemic	51%	6	Mass Casualty (Trauma) Natural Disaster – Major	65%
7	Cyber Attack	51%	7	Hurricane Nuclear Detonation –	64%
8	Hurricane	47%	8	Improvised Device Natural Disaster – Major	63%
9	Temperature Extreme (Hot)	44%	9	Earthquake Biological Attack – Aerosol	62%
10	Temperature Extreme (Cold)	41%	10	Anthrax	62%
11	Active Shooter	41%	11	Active Shooter	60%
12	Violence in the ED	41%	12	Chemical Attack – Blister Agent Chemical Attack – Toxic	60%
13	Information Systems Failure Electrical Failure / Power	40%	13	Industrial Chemicals	57%
14	Outage	40%	14	Evacuation Biological Attack – Food	56%
15	Staffing Shortage	37%	15	Contamination	54%
16	Proximity to local schools and universities	37%	16	Explosives Attack – Improvised Explosive Chemical Attack – Chlorine Tank	52%
17	Communications Failure	37%	17	Explosion	51%
18	High Winds Chemical Attack – Toxic	36%	18	Hurricane	47%
19	Industrial Chemicals	34%	19	Radiological Incident (External)	45%
20	Broken Water Main (External)	34%	20	Tornado	44%

Region 4 HCC HVA Top 20

Risk Occurrence			Risk Response		
1	Cyber Attack	55%	1	Epidemic/Pandemic	67%
2	Biological Disease Outbreak – Pandemic flu	51%	2	Biological Disease Outbreak – Pandemic flu	64%
3	Hurricane	50%	3	Biological Attack – Plague	59%
4	Electrical Failure / Power Outage	50%	4	Nuclear Detonation – Improvised Device	54%
5	Natural Disaster – Major Hurricane	48%	5	Natural Disaster – Major Hurricane	53%
6	Severe Blizzard/Snow Fall	48%	6	Radiological Attack – Radiological Dispersal	50%
7	Epidemic/Pandemic	45%	7	Chemical Attack – Nerve Agent	50%
8	Ice Storm	44%	8	Natural Disaster – Major Earthquake	47%
9	Temperature Extreme (Hot)	42%	9	Mass Casualty (Trauma)	46%
10	Information Systems Failure	39%	10	Chemical Attack – Blister Agent	46%
11	Staffing Shortage	38%	11	Biological Attack – Aerosol Anthrax	43%
12	Proximity to local schools and universities	37%	12	Chemical Attack – Toxic Industrial Chemicals	43%
13	Proximity to nuclear power plants	36%	13	Biological Attack – Food Contamination	40%
14	Broken Water Main (External)	35%	14	Chemical Attack – Chlorine Tank Explosion	40%
15	Mass Casualty (Trauma)	34%	15	Radiological Incident (External)	39%
16	Communications Failure	34%	16	Hurricane	35%
17	High Winds	33%	17	Cyber Attack	34%
18	Proximity to companies that produce, store, use, or transport hazardous materials	33%	18	Active Shooter	33%
19	Active Shooter	32%	19	Explosives Attack – Improvised Explosive	32%
20	Broken Water Main (Internal)	31%	20	Biological Attack – Foreign Animal Disease	31%

Region 5 HCC HVA Top 20

Risk Occurrence			Risk Response		
1	Mass Casualty (Trauma)	53%	1	Natural Disaster – Major Earthquake	78%
2	Biological Disease Outbreak – Pandemic flu	52%	2	Radiological Attack – Radiological Dispersal	76%
3	Electrical Failure / Power Outage	52%	3	Epidemic/Pandemic	75%
4	Cyber Attack	49%	4	Biological Attack – Plague	73%
5	Natural Disaster – Major Hurricane	49%	5	Biological Disease Outbreak – Pandemic flu	73%
6	Epidemic/Pandemic	47%	6	Nuclear Detonation – Improvised Device	71%
7	Ice Storm	46%	7	Biological Attack – Aerosol Anthrax	67%
8	Severe Blizzard/Snow Fall	45%	8	Chemical Attack – Nerve Agent	67%
9	Severe Thunderstorm	42%	9	Natural Disaster – Major Hurricane	65%
10	Hurricane	42%	10	Biological Attack – Food Contamination	64%
11	Information Systems Failure	42%	11	Mass Casualty (Trauma)	61%
12	Tornado	41%	12	Chemical Attack – Toxic Industrial Chemicals	57%
13	IT Network Failure	39%	13	Active Shooter	54%
14	HAZMAT Spill (External)	37%	14	Biological Attack – Foreign Animal Disease	53%
15	Violence in the ED	35%	15	Explosives Attack – Improvised Explosive	52%
16	High Winds	35%	16	Radiological Incident (External)	51%
17	Communications Failure	34%	17	Chemical Attack – Blister Agent	51%
18	Supply Shortage	34%	18	Chemical Attack – Chlorine Tank Explosion	50%
19	Proximity to local schools and universities	33%	19	Earthquake	48%
20	Temperature Extreme (Hot)	33%	20	Hurricane	44%

Statewide HCC HVA Top 20

Risk Occurrence			Risk Response		
1	Natural Disaster – Major Hurricane	55%	1	Biological Disease Outbreak – Pandemic flu	69%
2	Biological Disease Outbreak – Pandemic flu	54%	2	Epidemic/Pandemic	68%
3	Severe Blizzard/Snow Fall	54%	3	Biological Attack – Plague	64%
4	Hurricane	51%	4	Natural Disaster – Major Hurricane	63%
5	Cyber Attack	50%	5	Radiological Attack – Radiological Dispersal	63%
6	Ice Storm	49%	6	Nuclear Detonation – Improvised Device	60%
7	Epidemic/Pandemic	48%	7	Biological Attack – Aerosol Anthrax	58%
8	Electrical Failure / Power Outage	44%	8	Chemical Attack – Nerve Agent	57%
9	Mass Casualty (Trauma)	43%	9	Mass Casualty (Trauma)	57%
10	Temperature Extreme (Hot)	38%	10	Natural Disaster – Major Earthquake	54%
11	Information Systems Failure	36%	11	Chemical Attack – Blister Agent	50%
12	Proximity to local schools and universities	35%	12	Biological Attack – Food Contamination	50%
13	High Winds	35%	13	Chemical Attack – Toxic Industrial Chemicals	49%
14	Temperature Extreme (Cold)	35%	14	Hurricane	46%
15	Communications Failure	34%	15	Chemical Attack – Chlorine Tank Explosion	46%
16	Severe Thunderstorm	33%	16	Explosives Attack – Improvised Explosive	44%
17	IT Network Failure	33%	17	Active Shooter	43%
18	Tornado	32%	18	Evacuation	42%
19	Active Shooter	32%	19	Radiological Incident (External)	40%
20	Flood (External)	31%	20	Cyber Attack	38%

III. Connecticut Climate and Growing Risks

According to the Fourth National Climate Assessment released in November 2018,³

The recent dominant trend in precipitation throughout the Northeast has been towards increases in rainfall intensity, with increases in intensity exceeding those in other regions of the contiguous United States. Further increases in rainfall intensity are expected, with increases in total precipitation expected during the winter and spring. . . Sea level rise has amplified storm impacts in the Northeast, contributing to higher surges that extend farther inland, as demonstrated in New York City in the aftermath of Superstorm Sandy in 2012. . . Sea level rise (see Key Message 2) under higher scenarios will likely increase property losses from hurricanes and other coastal storms for the region by \$6–\$9 billion per year by 2100, while changes in hurricane activity could raise these estimates to \$11–\$17 billion per year.

Service and resource supply infrastructure in the Northeast are at increasing risk of disruption, resulting in lower quality of life, economic declines, and increased social inequality. . .

[Further] heat-related illness and death remain significant public health problems in the Northeast. . . These projected increases in temperature are expected to lead to substantially more premature deaths, hospital admissions, and emergency department visits across the Northeast.

NOAA's prediction is that when this meteorological year ends in April 2019, high tide flooding will be 60 percent higher than it was 20 years ago and double what it was 30 years ago (<https://ctmirror.org/2018/11/27/connecticuts-vanishing-shoreline-one-storm-away-disaster/>).

The University of Connecticut's Institute for Resilience and Climate Adaptation assessed sea level rise and coastal flood risk in a report published in September 2017⁴. As Figure One illustrates, sea levels are rising at a dramatic pace in CT. The author also points out that:

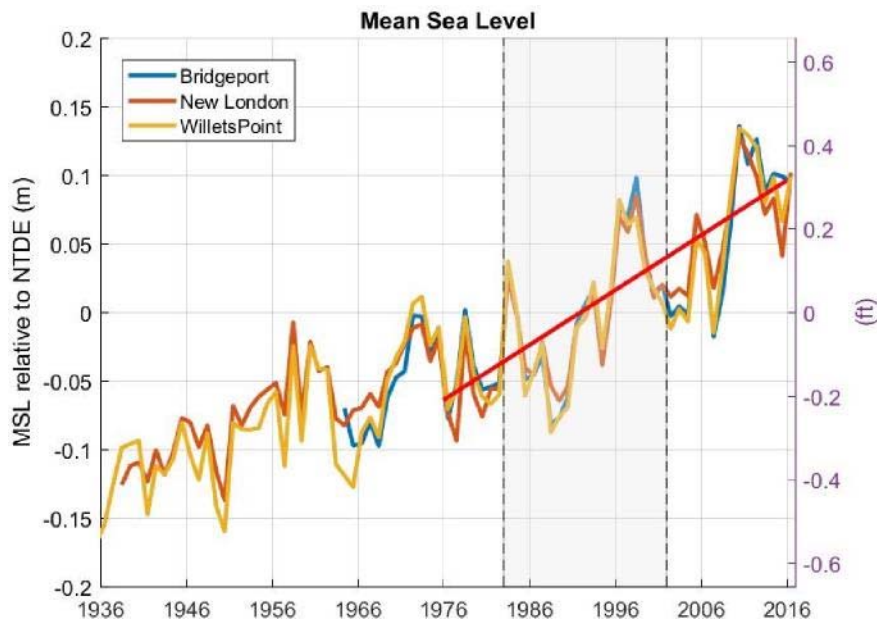
The prospect of a substantial increase in population density at the coasts makes planning for the consequences of increased sea levels that are expected to accompany global warming (Parris et al, 2012; Church et al., 2013; Vermeer and Rahmstorf, 2009) a high priority. (Ibid., page 1)

³ Fourth National Climate Assessment Vol 1 + 11, Chapter 18, Retrieved from: <https://www.globalchange.gov/nca4>. USGCRP, 2018: Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, 1515 pp. doi: 10.7930/NCA4.2018

⁴ Sea Level Rise in Connecticut Final Report Summary. James O'Donnell, Department of Marine Sciences and Connecticut Institute for Resilience and Climate Adaptation, University of Connecticut, September 2017. Retrieved from <https://circa.uconn.edu/sea-level-rise/>.

Figure One

The annual average sea level observed at Bridgeport, New London, and Willets Point between 1936 and 2016. The grey strip defined the National Tidal Datum Epoch (NTDE) and the average of the observations at each station in this interval is set to zero to define the datum. The red line shows the trend of 4 mm/year since 1976.



Amtrak NEC Climate Change Vulnerability Assessment

As reported in Bloomberg Businessweek in December 2018, a multi-year climate study undertaken with, first, Booz Allen Hamilton Inc. and then, Stantec Inc. concluded large parts of Amtrak’s northeast corridor route are at serious risk. “Flooding, rising seas, and storm surge threaten to erode the track bed and knock out the signals that direct train traffic. The poles that provide electricity for trains are at risk of collapse, even as power substations succumb to floodwaters.” (<https://www.bloomberg.com/graphics/2018-amtrak-sea-level/>). It is worth noting CT HCC Regions 1 and 2 rated proximity to train stations in their list of top twenty hazards to their community.

IV. Connecticut's Disasters

In the past 65 years, Connecticut has experienced 21 major natural, federally-designated disasters and 11 emergency declarations⁵. The FEMA website provided the following list:

- Hurricane Carol – 1954
- Hurricanes Connie and Diane – 1955
- Blizzard – 1978
- Tornado – 1979
- Severe Storm – 1982
- Severe Storm – 1984
- Hurricane Gloria – 1985
- Severe Storm/Tornado – 1989
- Hurricane Bob – 1991
- Coastal Flooding/Winter Storm – 1992
- Blizzard – 1993
- Blizzard – 1996
- Tropical Storm Floyd – 1999
- Snowstorm – 2003
- Snowstorm – 2004
- Snowstorm – 2005
- Hurricane Katrina – 2005
- Severe Storm – 2005
- Snowstorm – 2006
- Severe Storm – 2007
- Severe Storm – 2010
- Snowstorm – 2011
- Tropical Storm Irene – 2011
- Severe Storm – 2011
- Hurricane Sandy – 2012
- Winter Storm – 2013
- Winter Storm/Snow Storm – 2015
- Severe Storm – 2018
- Severe Storm and Flooding – 2018

Notable is that as many declared disasters/emergencies (16) have occurred in the last 18 years (2000 - 2018) as have occurred in the previous 45 years (1954 – 1999). Correspondingly, in comparison to the earlier period of years, between 2000 and 2018, the frequency of declared weather-related incidents has increased approximately 2.5-fold. This reality is reflected by current HCC HVA results in which weather-related hazards are importunately recognized as one of the top five risk priorities across the five regions.

⁵ Some events received both a major disaster and emergency declaration designation.

V. Social Vulnerability in Connecticut

Social vulnerability can be used to identify those communities that are more susceptible to the damaging effects of a hazard. Variables such as poverty, health, education and disability status impact an individual’s ability to adapt, resist hazard consequences and recover from emergencies.⁶ Disadvantaged social groups, including children, are likely to suffer disproportionately from hazards because they struggle to cope (short term) and adapt (long term).⁷ In other words, they are less resilient. The HCC HVA uses these variables to identify areas of Connecticut with high social vulnerability indices. As this report shows, these areas are present in all five regions. Where possible, data is presented in the form of maps, which can be used to support localized risk communication and inform spatial planning.

Social Vulnerability Index

The Agency for Toxic Substances & Disease Registry (ATSDR) developed what they refer to as the Social Vulnerability Index (SVI) which was specifically developed to help local officials identify communities that may need support in preparing for hazards or recovering from disasters. The ATSDR’s SVI uses 15 U.S. census variables at the tract level to generate its SVI ratings (Table 3).

Table 3: US Census Variables used to determine SVI

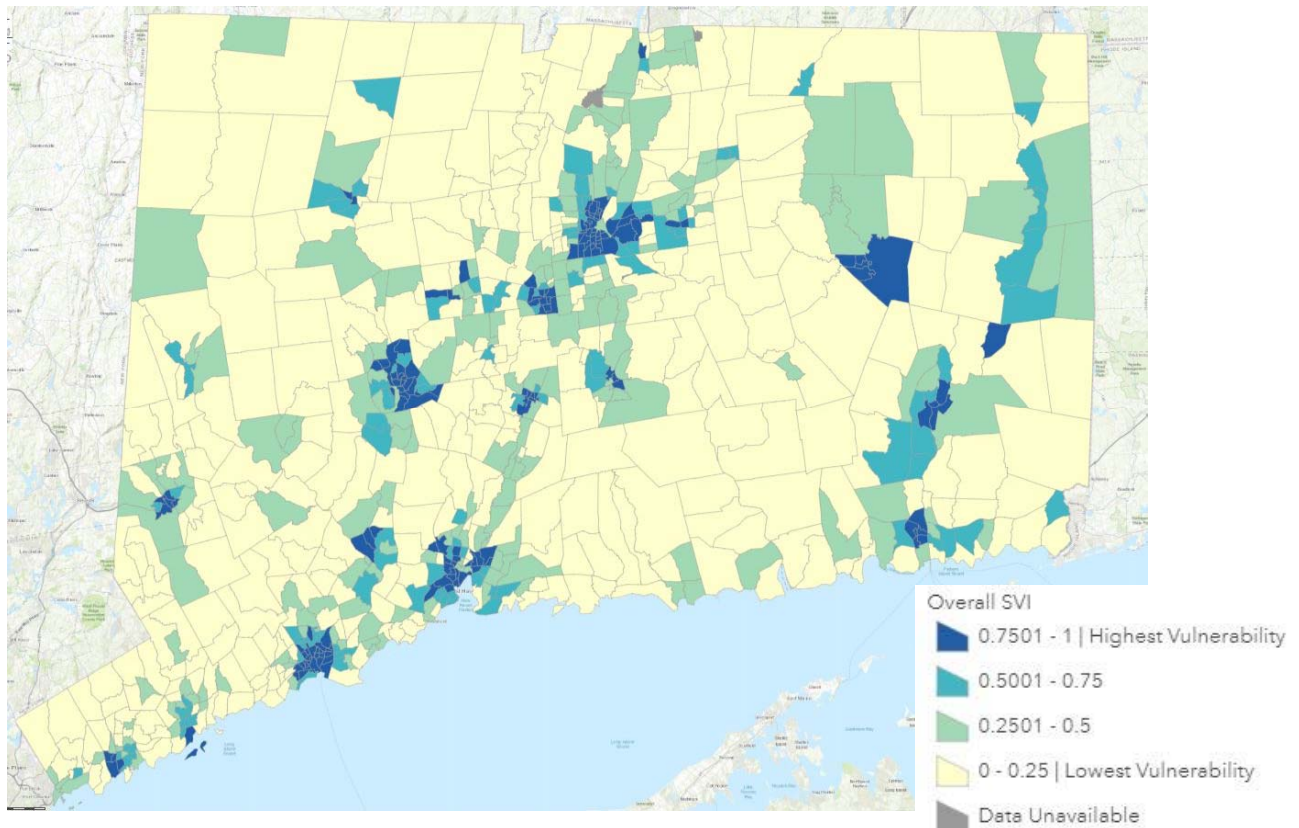
Socioeconomic Status	Household composition and Disability	Minority Status and Language	Housing and Transportation
Below Poverty	Aged 65 or Older	Minority	Multi-Unit Structures
Unemployed	Aged 17 or Younger	Speak English “Less than Well”	Mobile Homes
Income	Older than Age 5 with a Disability		Crowding
No High School Diploma	Single-Parent Households		No Vehicle
			Group Quarters

⁶ Morrow BH. (1999). Identifying and Mapping Community Vulnerability. *Disasters* 23(1): 1-18.

⁷ Bergstrand et al. (2015). Assessing the Relationship Between Social Vulnerability and Community Resilience to Hazards. *Social Indicators Research* 122(2): 391–409 (doi:10.1007/s11205-014-0698-3)

The Connecticut Map-2 below uses an overall SVI measure (an aggregation of the 15 variables listed above) to highlight (in medium and dark blue) the location of relatively high SVI clusters. Each of the five DEMHS HCC regions has several high SVI density areas. These include portions of the following towns (starting from the northwest corner of the state and moving clockwise): Torrington, Hartford, East Hartford, Willimantic, South Windham, Jewett City, Norwich, New London, Middletown, New Britain, Meriden, Bristol, New Haven, Waterbury, Ansonia, Bridgeport, Norwalk, Stamford and Danbury.

Map 2 – Social Vulnerability Index in Connecticut⁸



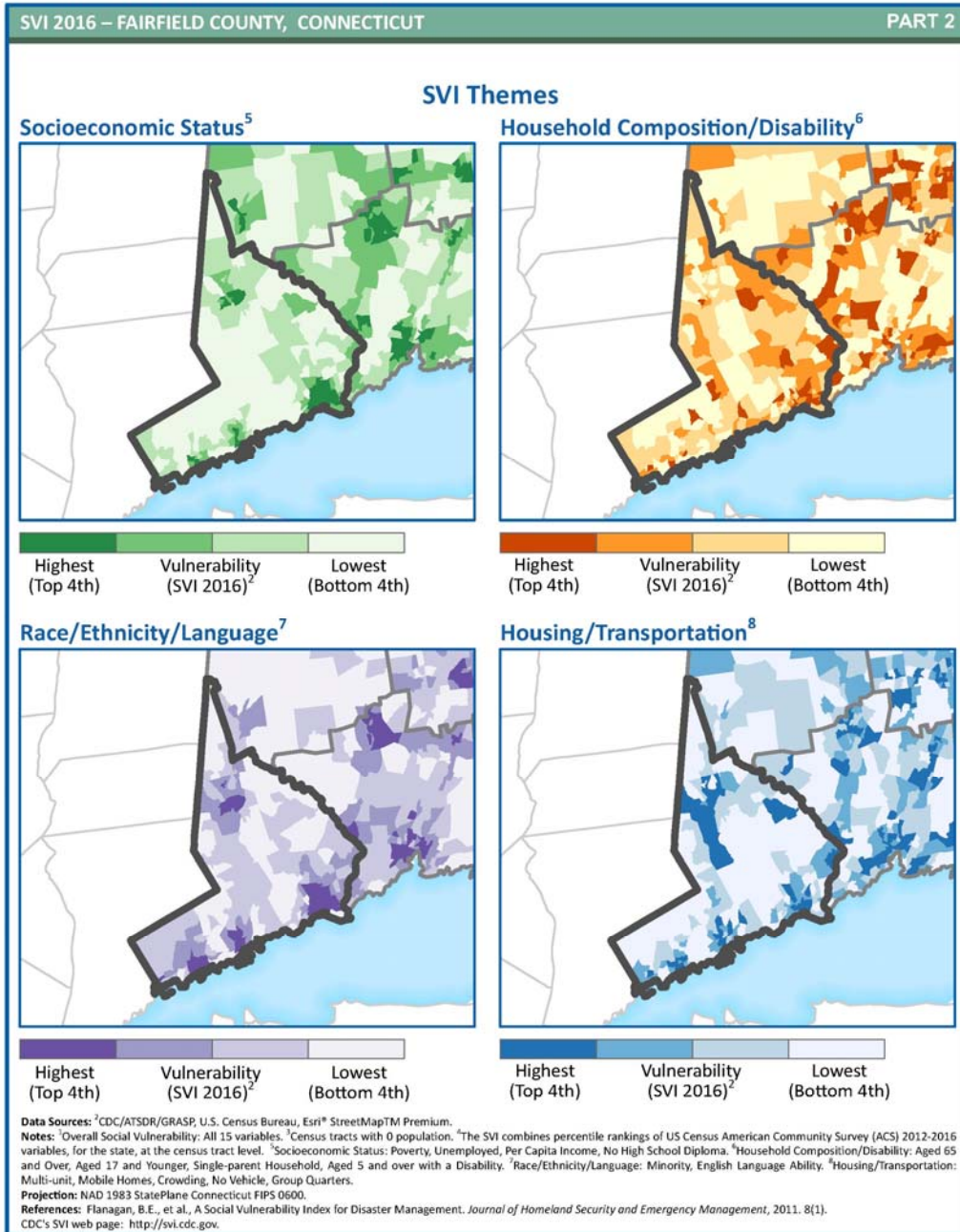
The ATSDR SVI maps⁹ below (Pictures 1-8) display county level data and the distinction between county and DEMHS region border lines is acknowledged. The illustrative value of this dataset was determined to outweigh the challenge of applying county-specific characteristics to the differently-sized regions. For the purposes of this HVA report, the following has been assumed: Litchfield = Region 5, Fairfield = Region 1, New Haven = Region 2, Tolland = Region 3, Hartford = Region 3, New London = Region 4, Middlesex = Region 2, Windham = Region 3.

⁸ Retrieved from: <https://www.arcgis.com/home/webmap/viewer.html?layers=62b3e305b730423782c64b9696242c5e>

⁹ Retrieved from: <https://svi.cdc.gov/prepared-county-maps.html>

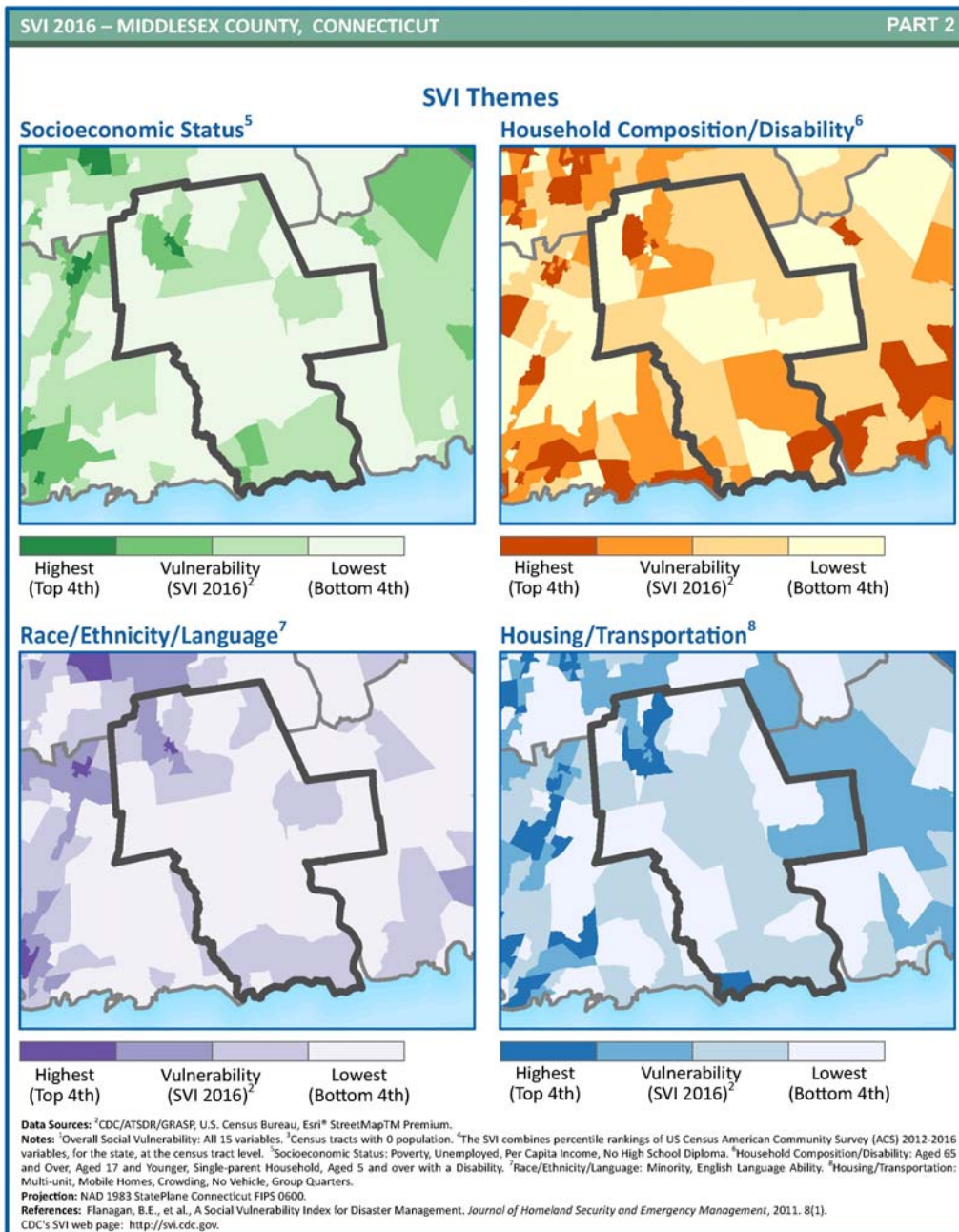
Areas of increased vulnerability in Fairfield County include Danbury, Monrow, Shelton, Bridgeport and small pockets in Fairfield, Norwalk, and Stamford.

Picture 1 – Fairfield (HCC Region 1) SVI



High SVI clusters in Middlesex County are located in Middletown and a small pocket in Clinton. Old Saybrook has a relatively high number of residents with vulnerabilities associated with age, disabilities and single-parent households.

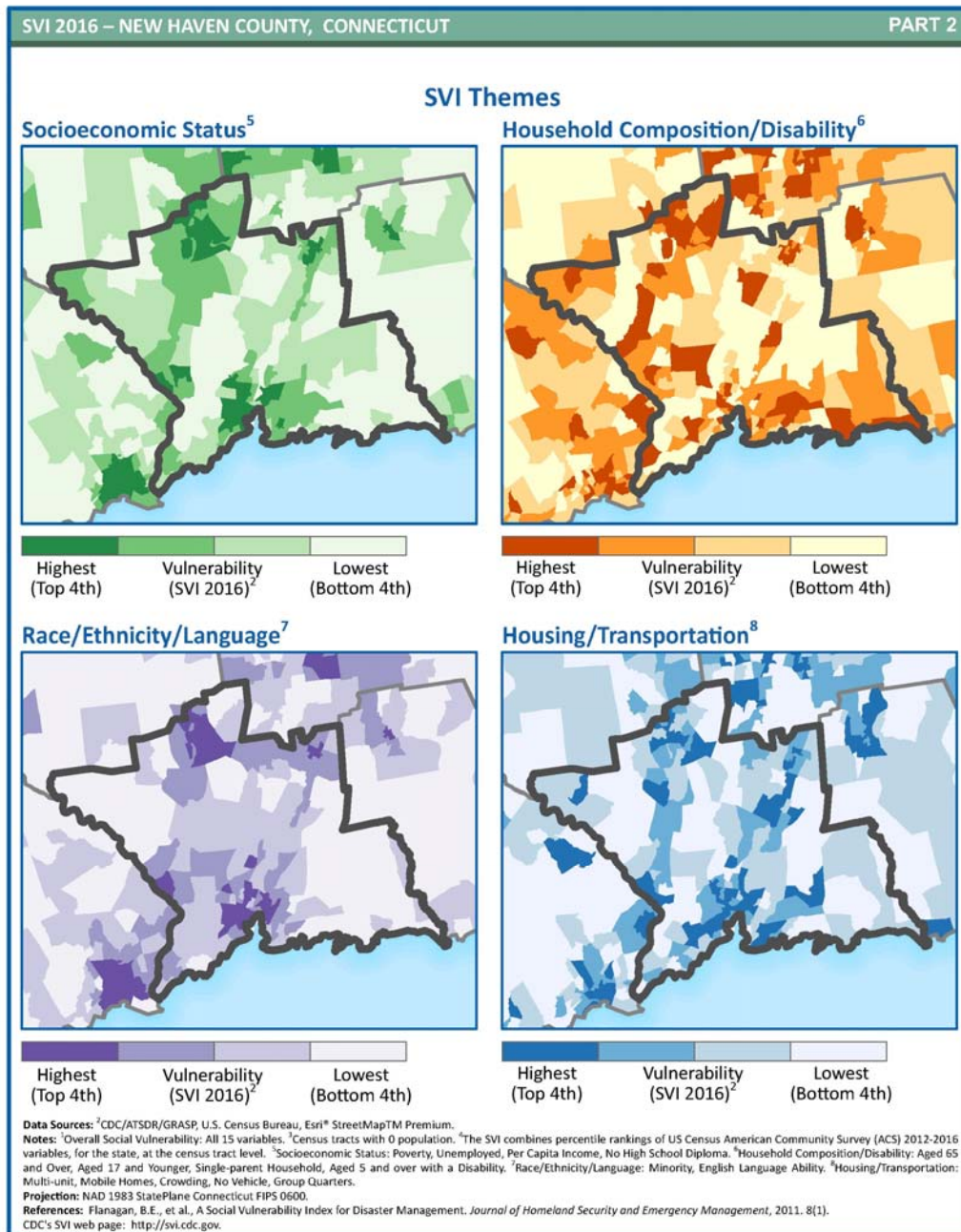
Picture 2 – Middlesex (HCC Region 2) SVI



FINAL - FOR EXTERNAL USE

New Haven County has several high SVI clusters (associated with all four SVI themes) located in Waterbury, Naugatuck, New Haven and parts of Ansonia, Orange, West Haven, East Haven Hamden and Meriden.

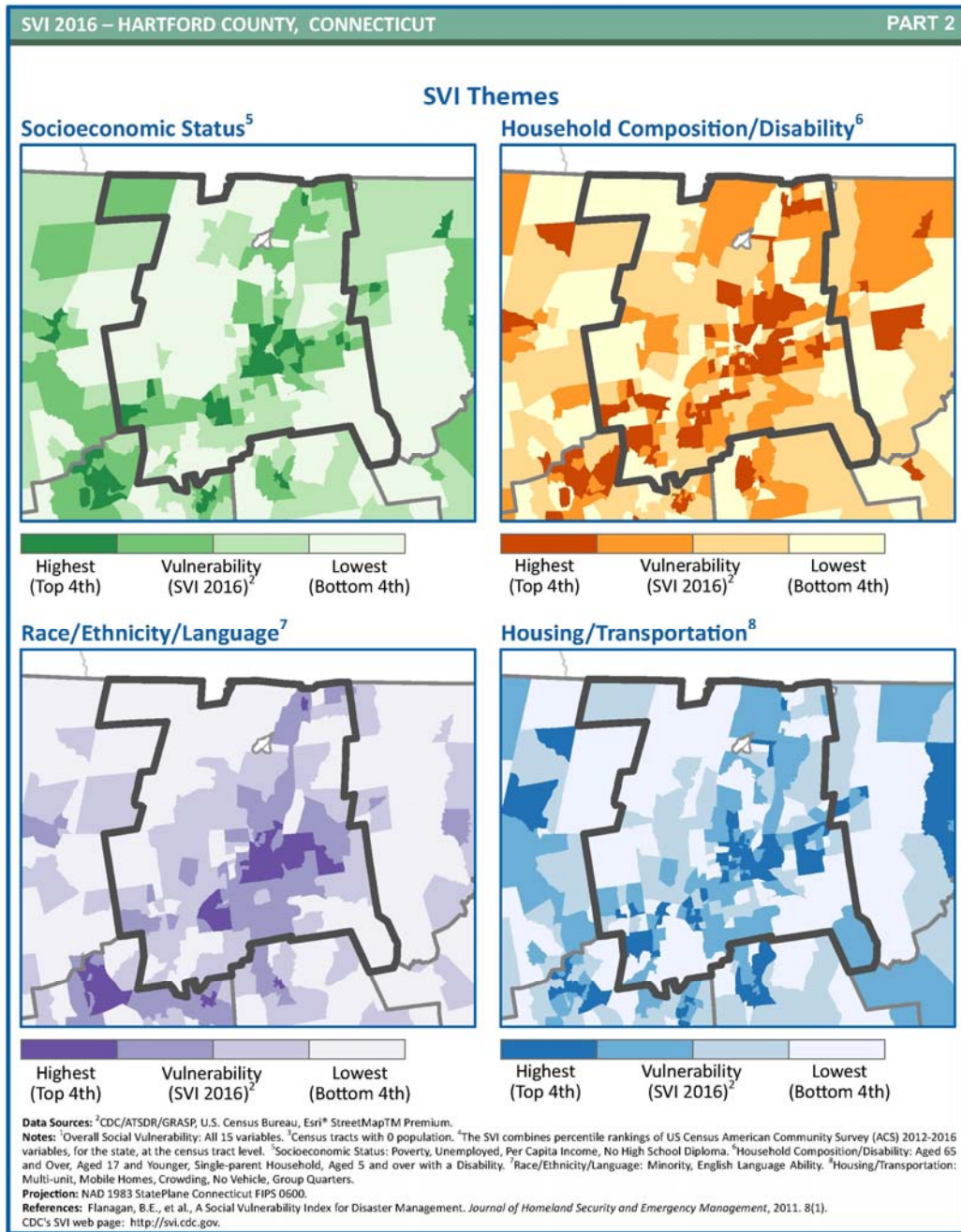
Picture 3 – New Haven (HCC Region 2) SVI



FINAL - FOR EXTERNAL USE

The residents of the city of Hartford are among the most disadvantaged in the state. Additional areas of concern include East Hartford, New Britain and parts of Bristol, Plainville, Suffield and Manchester.

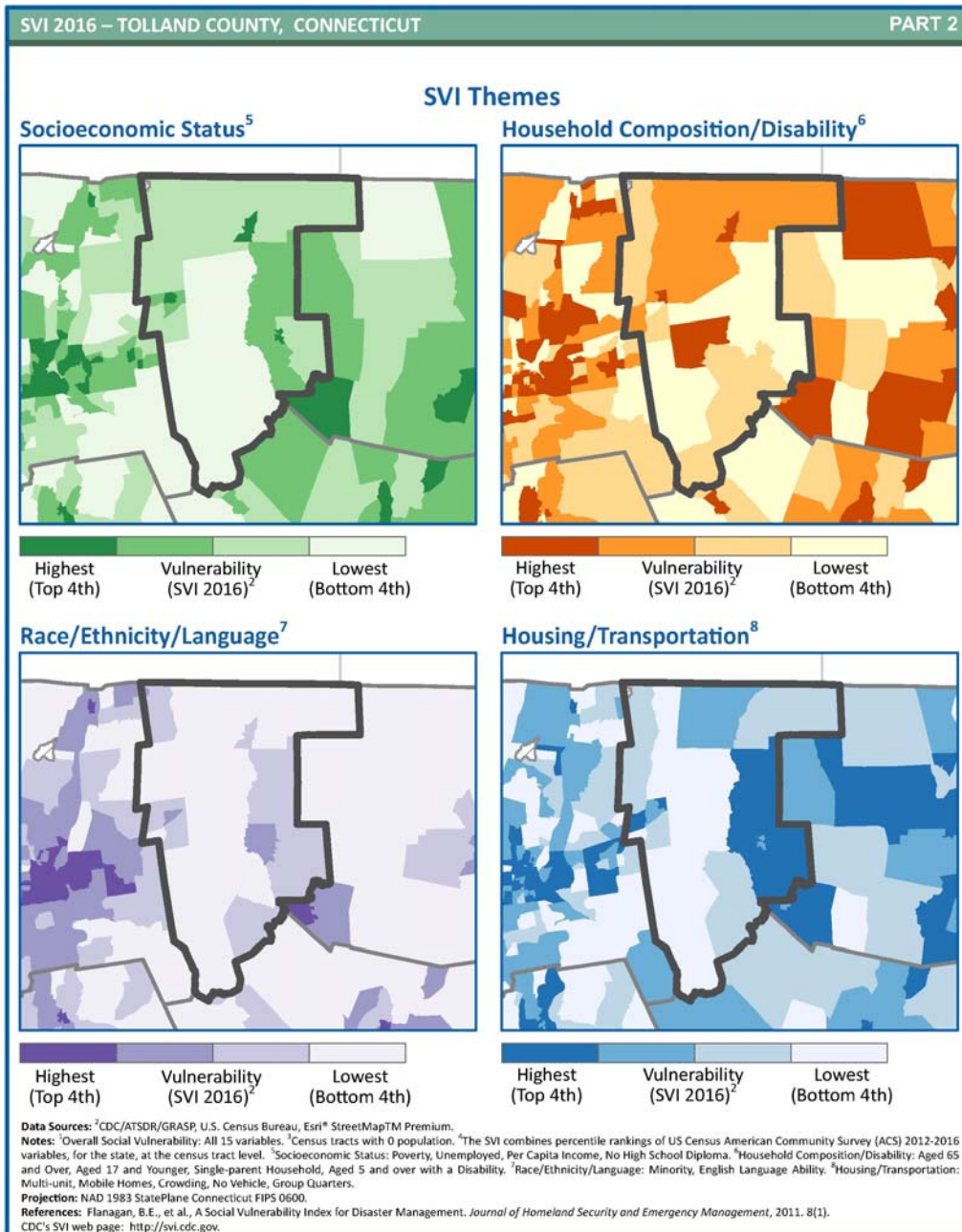
Picture 4 – Hartford (HCC Region 3) SVI



FINAL - FOR EXTERNAL USE

Areas of risk in Tolland include Coventry (household composition), Willington and Mansfield (housing/transportation) and part of Stafford (SES and household composition).

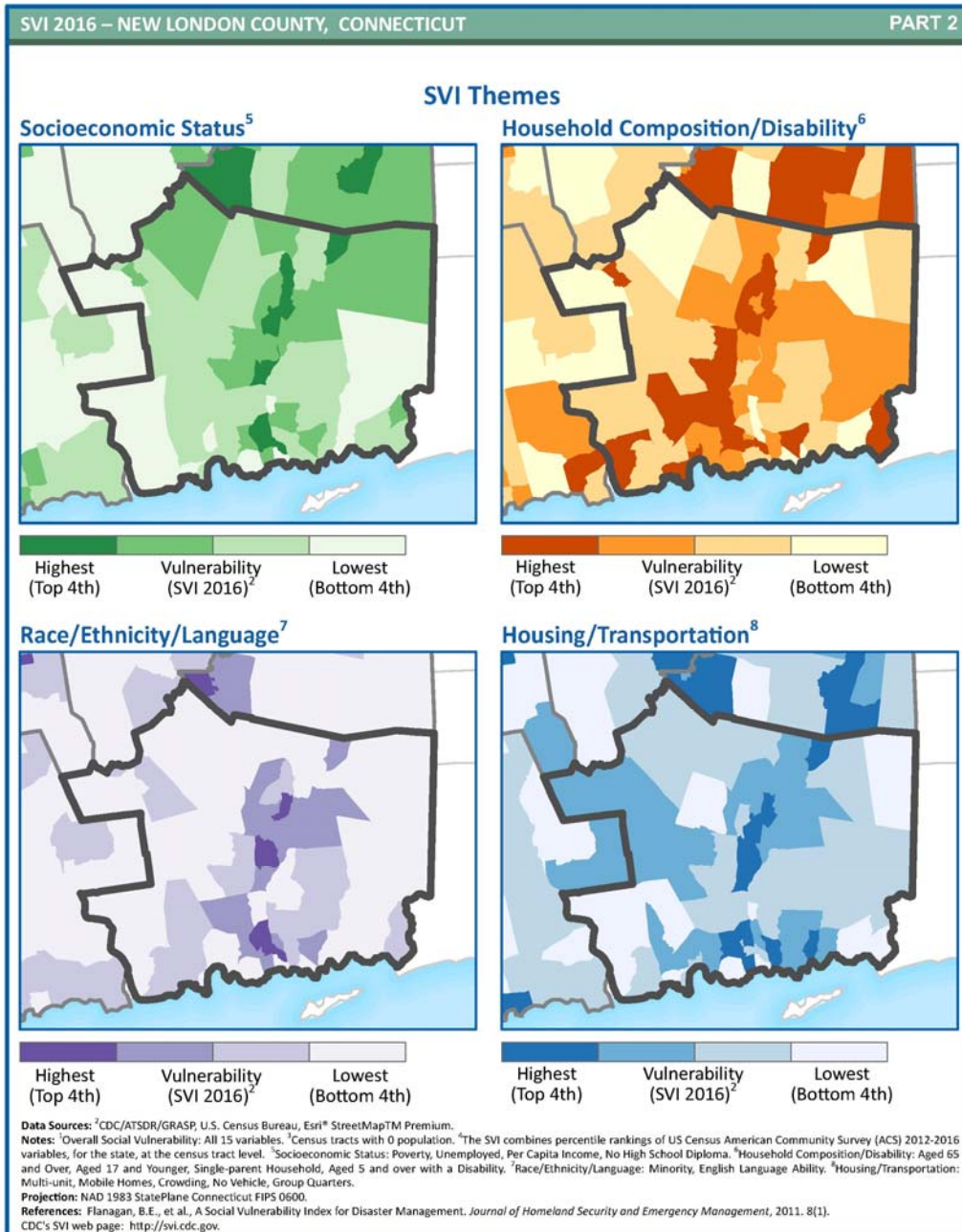
Picture 5 – Tolland (HCC Region 3) SVI



FINAL - FOR EXTERNAL USE

In addition to the city of New London, there are concentrations of highly socially vulnerable residents in Lisbon, Norwich and parts of Groton and Colchester.

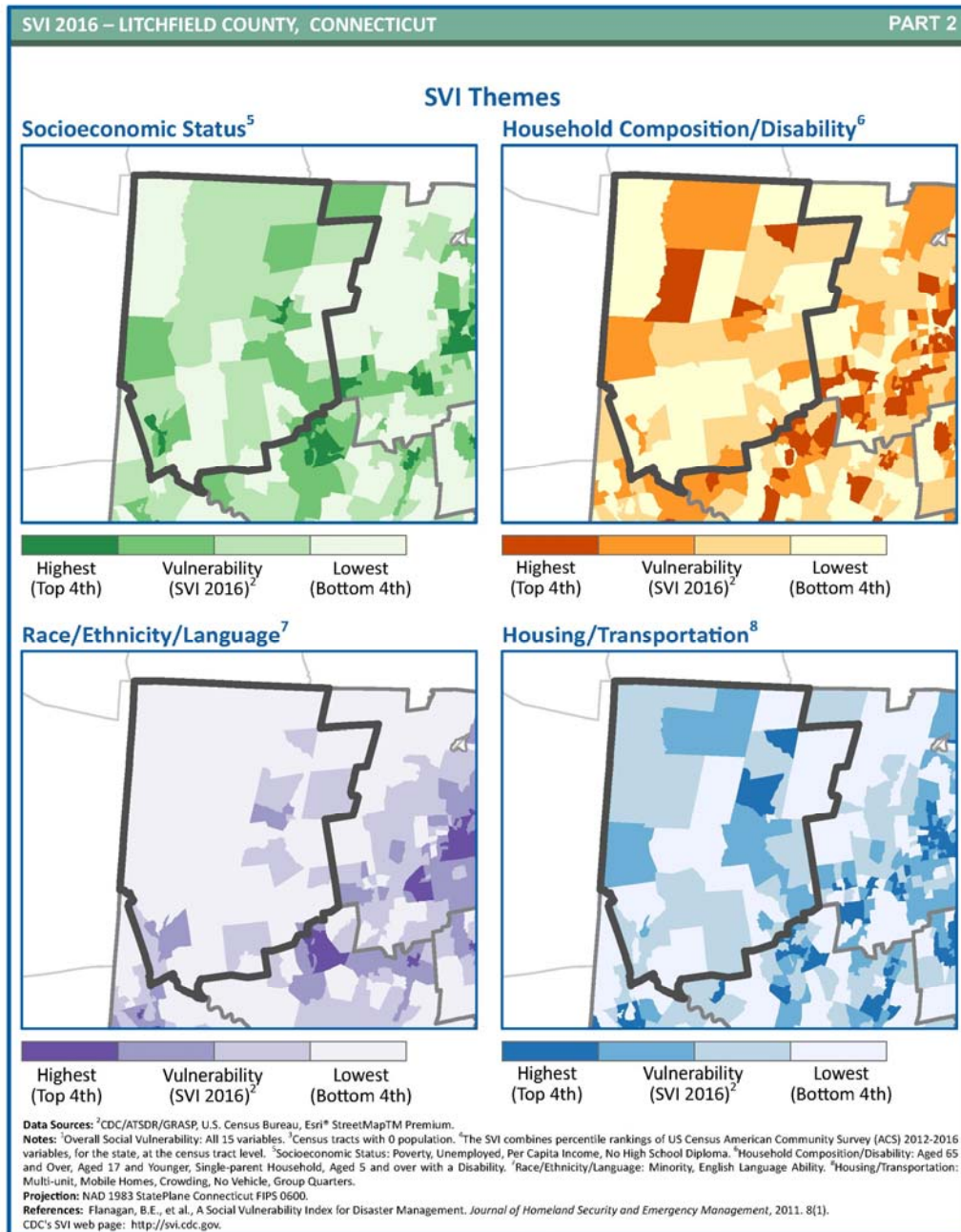
Picture 6 – New London (HCC Region 4) SVI



FINAL - FOR EXTERNAL USE

Areas of increased vulnerability in Litchfield include Torrington, Winchester, parts of New Milford (due to depressed SES) and Cornwall (due to residents' age).

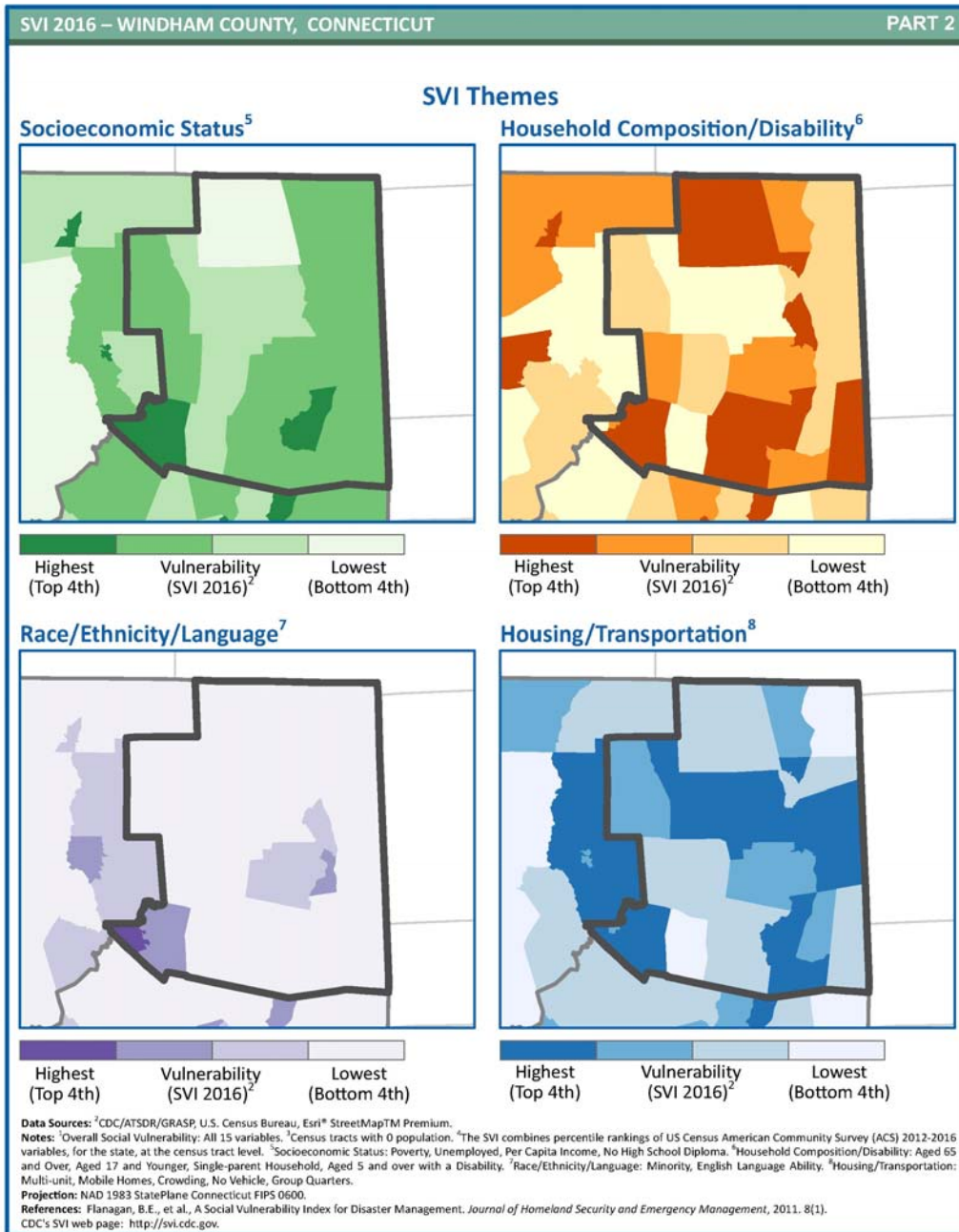
Picture 7 – Litchfield (HCC Region 5) SVI



FINAL - FOR EXTERNAL USE

Windham County has high SVI clusters in the towns of Windham, Willimantic and parts of Putnam. In terms of age and disability-related vulnerabilities, areas of concern include Woodstock (age and disability measures), and Eastford, Pomfret, Killingly and parts of Plainfield (housing and transportation indices).

Picture 8 – Windham (HCC Region 4) SVI



FINAL - FOR EXTERNAL USE

Asset Limited, Income Constrained, and Employed (ALICE) Project

The five-year-old and ongoing United Way sponsored ALICE Project provides additional insight into Connecticut’s socially vulnerable residents. In 2018, this nationwide project worked with 18 states to measure the population of households that cannot afford basic necessities. In short, ALICE households earn above the Federal Poverty Level (FPL), but not enough to afford a bare-bones household budget of housing, child care, food, transportation, health care, and necessary technology. Using 2016 American Community Survey data, CT’s ALICE researchers determined 30% of CT’s 1,357,269 households (n=134,494) earn less than the basic cost of living for the state (i.e., the ALICE threshold)¹⁰. These findings (% of population designated at or below FPL or ALICE) are broken down by county in the figure below. Emergency managers should consider all ALICE households (similarly to those reflecting a high SVI) to be susceptible to damages following a disaster.

Table 4: % ALICE & Poverty by County

Connecticut Counties, 2016		
COUNTY	TOTAL HOUSEHOLDS	% ALICE & POVERTY
Fairfield	335,318	39%
Hartford	350,369	40%
Litchfield	74,105	33%
Middlesex	66,002	32%
New Haven	327,560	44%
New London	105,113	39%
Tolland	54,068	33%
Windham	44,734	38%

Sources: Point-in-Time Data: American Community Survey, 2016. ALICE Demographics: American Community Survey and the ALICE Threshold, 2016. Wages: Bureau of Labor Statistics, 2016. Budget: U.S. Department of Housing and Urban Development; U.S. Department of Agriculture; Bureau of Labor Statistics; Internal Revenue Service; Tax Foundation; and Connecticut 2-1-1 Child Care, 2016.

This same study noted “the increase in the number of ALICE households in Connecticut is driven by older households, both seniors and those 45 to 64 years old. . . households headed by 45- to 64- year olds grew only 1 percent, yet the number of these households with income below the ALICE threshold increased by 21 percent, a surprising drop in wealth for those in their prime earning years (American Community Survey, 2010 and 2016) (ibid, page 1).

¹⁰ ALICE: A Study of Financial Hardship in Connecticut 2018 Report. Retrieved from <https://alice.ctunitedway.org/> on January 15, 2019.

Recommendations of Geographic and Social Vulnerabilities for EM Planning in CT

Geography

- Densely populated (with people and infrastructure) coastline communities are vulnerable to storms, wind and flooding.
- The CT regional HCCs should work with their REPT emergency management planners on land-use planning, hazard mitigation planning, emergency response, evacuation and recovery planning should anticipate congestion and limited escape routes.
- The CT regional HCCs should work with their REPT emergency management planners who develop geographically-specific and financially-aware mass-transit and alternate transportation plans.

Socioeconomic Status

- All five CT HCC regions have substantial populations of residents who possess fewer resources. The CT regional HCCs should work with their REPT emergency management planners who develop response plans that can accommodate displacement and food insecurity for socially vulnerable populations.
- HCC regional response plans (RRP) must incorporate strategies which facilitate access to healthcare and medical services, public transportation, communication and infrastructure such as water and sanitation.
- Community-wide disaster recovery plans should assume low income populations will need financial support to regain losses and avoid further/increased poverty after a disaster.
- When low income residents do not receive needed assistance and/or response efforts are poorly handled, they are at increased risk for feelings of anger, betrayal, hopelessness and isolation leading to or exacerbating behavioral health concerns.
- Low income populations often struggle with access to behavioral health services. In the recovery phase of a disaster, it is essential for the regional HCCs plans to integrate behavioral services and other community services that increase access to care. Services should include Federally Qualified Health Centers (FQHC), which are excellent resources for long-term mental health support after a disaster. They all provide some outpatient mental health services and cannot turn away clients due to inability to pay. They are critical community resources and service providers due to their locations in the community, particularly in low SES communities.

Population Density (includes coastal communities and urban cores), Disabled Density, No Vehicle

- Regional community-wide evacuation plans should assume many of CTs citizens reside in high population density cities and towns and are likely to rely on public transportation to evacuate.
- This risk to public transportation systems can impact staffing for many of CTs acute care hospitals, as large numbers of staff use public transportation for travel to, and from work.

- Regional HCCs should continue to include community-based organizations and caregivers for individuals with a disability when conducting regional preparedness planning.
- Regional HCC planning should consider continuity of operations/services (utilities, medical services, medical care) and use the ASPR Healthcare Coalition Recovery Plan Template to complete their plans.
- The CT regional HCCs should work with their REPT emergency management planners to ensure that regional HCC planning includes disabled populations (physical, mental, sensory and self-care).
- The CT regional HCCs should work with their REPT emergency management planners to ensure communities work with local public transit systems to develop, test and refine preparedness, mitigation, response and recovery plans. Consider that reconstruction time of transportation infrastructure tends to be relatively slow.
- If possible, regional planners need to consider how to increase resilience by identifying transportation alternatives such as new routes, terminals or suppliers.

Elderly Density

- Elderly subpopulations will experience the impact of disasters differently.
- The CT regional HCCs should work with their REPT emergency management planners to encourage elderly living independently to participate in community-wide disaster preparedness.
- The CT regional HCCs should work with their REPT emergency management planners and community-based/faith-based organizations to help identify elderly living alone.
- Regional HCC planners working with their REPT emergency management planner partners should assume many elderly will also fall under disabled and no-vehicle categories.
- Regional HCC planners working with their REPT emergency management planner partners should also assume many elderly depend upon services such as meals-on-wheels for their daily needs.
- HCCs should work with other REPT emergency management and local/regional social service agencies to promote pre-disaster programs that identify training/planning opportunities for the elderly.
- It is also worth noting that, although healthy and ambulatory elderly may be emotionally resilient to ill effects following a disaster, infirm elderly may be at higher risk for behavioral health issues.

Pediatric Density

- During all phases of a disaster (including pre-event and post-event/recovery phases), HCC leadership must consider the needs of the pediatric population by working with CTs two pediatric hospitals and other pediatric-focused organizations.
- HCC planners should examine the availability of pediatric specialty healthcare resources within the region/state.
- Regional HCC planners working with their REPT emergency management planner partners should include an assessment of local community assets such as schools, child care facilities, camps and playgrounds.

- Staff caring for children in congregate settings would benefit from training opportunities preparing them to better provide for the unique emotional needs of children in their care during/following disasters.
- Regional HCC planners working with their REPT emergency management planner partners should include the ability to track children including methods to account for and identify them in congregate setting and to reunite them with primary caregivers.

Appendix A – Connecticut Hazard Vulnerability Analysis Tool

2019 Connecticut Healthcare Coalition Community Hazard Vulnerability Assessment (HCC CHVA)

2019 Connecticut HCC CHVA

The 2019 Connecticut Healthcare Coalition Community Hazard Vulnerability Assessment (HCC CHVA) aims to provide an assessment of regional and statewide hazard vulnerabilities and risks for healthcare coalition planning and response. Additionally the aggregated assessment of the five HCC results will inform the health component (ESF8) of the Statewide Jurisdictional Risk Assessment. The HCC CHVA is a joint ASPR Healthcare Preparedness Program and CDC Public Health Emergency Preparedness program deliverable.

As a key contributor to your region's emergency response, your organization has been identified as a key stakeholder to CT DPH's annual CHVA process. Through this survey, we are seeking your input on a regional healthcare CHVA to identify and rank the most important regional hazards that we face, as well as the impact they could have on our regional healthcare system.

Once ranked, the hazards will be aggregated into the Community Hazard Vulnerability Assessment tool, which is a modified version of the Colorado Children's Hospital HVA and used in the 2018 CT DPH Healthcare HVA.

Your Role:

We are inviting your participation to rank all hazards and provide your opinion of the potential impact of each hazard to healthcare services. The survey should take approximately 25 minutes to complete.

The regional assessment will be completed and shared with HCC members and partners in early spring 2019. The outcome will assist organizations and facilities in creating site-specific HVAs and inform HCC plan trainings and exercises over the next five years to address top hazards and identify gaps in the system to address these hazards.

If you have any questions, please contact Noelle Frye at noelle.gallant@ynhh.org

Please complete the survey by Friday, November 30, 2018.

1. Please provide your information.

Name

Title

Organization

2. My agency/organization is located in Region:

3. This HVA represents the following Region(s) (check all that apply):

- 1
- 2
- 3
- 4
- 5

2019 Connecticut Healthcare Coalition Community Hazard Vulnerability Assessment (HCC CHVA)

Please refer to the following terms for the ranking below:

Occurrence: Likelihood of the incident to occur

0 = Rare or N/A

1 = Low (Every 10-50 years)

2 = Moderate (Every 1-10 years)

3 = High (Annually)

Response: Likelihood there would be a regional response

0 = No regional response expected

1 = Low

2 = Moderate

3 = High

Healthcare Impact: Possibility of impact to regional healthcare services

0 = No impact expected

1 = Low (causes minimal disruption; managed at daily level)

2 = Moderate (causes disruption outside of normal means but does not threaten regional healthcare service delivery)

3 = High (causes significant disruption and threatens regional service delivery)

Note: When considering the impact ranking, remember to think beyond your individual facility or organization and assess how the hazard may impact the regional healthcare system as a whole.

4. National Planning Scenarios

	Occurrence	Response	Healthcare Impact
Biological Attack - Aerosol Anthrax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Attack - Food Contamination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Attack – Foreign Animal Disease	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Attack – Plague	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological Disease Outbreak – Pandemic flu	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Attack – Blister Agent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Attack – Chlorine Tank Explosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Attack – Nerve Agent	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chemical Attack – Toxic Industrial Chemicals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cyber Attack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Explosives Attack – Improvised Explosive	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Disaster – Major Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Disaster – Major Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nuclear Detonation – Improvised Device	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radiological Attack – Radiological Dispersal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments about National Scenario incidents?

5. Naturally Occurring Events

	Occurrence	Response	Healthcare Impact
Dam Inundation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Epidemic/Pandemic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood (External)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High Winds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ice Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Insect Infestation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Blizzard/Snow Fall	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Thunderstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature Extreme (Cold)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Temperature Extreme (Hot)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments about naturally occurring events?

6. Human Related Events

	Occurrence	Response	Healthcare Impact
Active Shooter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bomb Threat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Civil Disturbance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forensic Admission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hostage Situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infant Abduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Labor Action	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mass Casualty (Trauma)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Missing Adult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Missing Child	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Staffing Shortage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Violence in the ED	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VIP Situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Workplace Violence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments about human related events?

7. Hazardous Materials Events

	Occurrence	Response	Healthcare Impact
Decontamination	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
HAZMAT Spill (Internal)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
HAZMAT Spill (External)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Indoor Air Quality Issues	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Large Internal Spill	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Radiologic Exposure (Internal)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Radiological Incident (External)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Small-Medium Sized Internal Spill	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>

Do you have any comments about hazardous materials events?

8. Technologic Events

	Occurrence	Response	Healthcare Impact
Communications Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Infant Security Alarm Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Information Systems Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Magnetic Resonance Imaging (MRI) Incident	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
IT Network Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Pharmacy Medication Dispenser Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Security Card Access Failure	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>

Do you have any comments about technologic events?

9. Utility Events

	Occurrence	Response	Healthcare Impact
Broken Water Main (Internal)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Broken Water Main (External)	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>

	Occurrence	Response	Healthcare Impact
Compressed Gas Cylinder Leak/Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electrical Failure / Power Outage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Elevator Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire (Internal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire Detection/Alarm Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire Suppression Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood (Internal)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fuel Shortage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generator Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HVAC Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of Bulk Oxygen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical Gas Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical Vacuum Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Gas Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Natural Gas Leak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxygen Leak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Potable Water Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Process Water Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sewer Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Steam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Structural Damage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tube System Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments about utility events?

10. Geographic Events

	Occurrence	Response	Healthcare Impact
Proximity to nuclear power plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to Bridges	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to bus terminals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to Civic/Sports Events	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to companies that produce, store, use, or transport hazardous materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to Federal buildings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to Festivals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to flood plains, faults, and dams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to local schools and universities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to major trans. routes and airports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to Parks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proximity to train stations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any comments about geographic events?

11. Other Events

	Occurrence	Response	Healthcare Impact
Airplane Crash	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Evacuation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helicopter Incident	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Isolation Capacity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Loss of Key Supplier	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Supply Shortage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Did you have any comments about these other events?

Vulnerable Populations

The ASPR 2017-2022 Healthcare Preparedness and Response Capabilities asks regions to consider those individuals who might require additional help in an emergency, such as children; pregnant women; seniors; individuals with access and functional needs, including people with disabilities; and others with unique needs.

Please consider the following questions related to vulnerable populations. This is intended to help inform the larger context of regional healthcare coalition planning, training, and exercises.

12. How do the hazards included in this survey affect individuals who might require additional help, such as children; pregnant women; seniors; individuals with access and functional needs, including people with disabilities; and others with unique needs? Are there particular hazards that are more impactful?

13. Please provide any reflections you have on mitigation, preparedness, response, and recovery for individuals who might require additional help.

14. Any additional thoughts or feedback regarding vulnerable populations in emergencies as it relates to the hazard vulnerability assessment?