



5.4.6 Disease Outbreak

This section provides a hazard profile and vulnerability assessment of the disease outbreak hazard for the Cayuga County Hazard Mitigation Plan (HMP).

5.4.6.1 Hazard Profile

This section presents information regarding the description, extent, location, previous occurrences and losses, and probability of future occurrences for the disease outbreak hazard.

Description

A disease outbreak is when the number of cases exceeds the normal expectancy. Outbreaks can occur within a single community, a geographical area, or several countries. They usually are caused by an infection, transmitted through person-to-person contact; however, disease outbreaks can also be caused by the environment or another source (e.g. chemical exposure) (World Health Organization [WHO] 2020). Some outbreaks are expected to occur each year, such as influenza. If a disease is rare or has serious health concerns, a single case of a disease could be considered an outbreak (Association for Professionals in Infection Control and Epidemiology [APIC] 2020). When a disease spreads rapidly to people, it is considered an epidemic. A pandemic is when a disease outbreak occurs globally.

How does a pandemic differ from an outbreak or epidemic?

- Affects a wider geographical area, often worldwide.
- Infects a greater number of people than an epidemic.
- Is often caused by a new virus or a strain of virus that has not circulated among people for a long time. Humans usually have little to no immunity against it. The virus spreads quickly from person-to-person worldwide.
- Causes much higher numbers of deaths than epidemics.
- Often creates social disruption, economic loss, and general hardship (APIC 2020).

For the purpose of this HMP update, the following diseases will be discussed in further detail: Coronavirus Disease 2019 (COVID-19); Influenza; mosquito-borne diseases (West Nile Virus and Eastern Equine Encephalitis); and tick-borne diseases (Lyme disease and others).

Coronavirus

COVID-19 is an infectious disease first identified in 2019. The virus rapidly spread into a global pandemic by spring of 2020. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (WHO 2020). With the virus being relatively new, information regarding transmission and symptoms of the virus is still new. The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. Reported illnesses have ranged from mild symptoms to severe illness and death. Reported symptoms include trouble breathing, persistent pain or pressure in the chest, new confusion or inability to arouse, and bluish lips or face. Symptoms may appear 2-14 days after exposure to the virus (based on the incubation period of MERS-CoV viruses) (CDC 2020)

In an effort to slow the spread of the virus, the federal government and states have urged the public to avoid touching of the face, properly wash hands often, and use various social distancing measures. At the time of this plan update, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments (WHO 2020). As of November 2020, there are a number of drug companies that have announced that potential vaccinations can be available as early as mid-December 2020. A number of drug companies including AstraZeneca with the University of Oxford announced that experiments show that the vaccinations can be anywhere between 62 and 90 percent effective depending on dosage (New York Times, November 2020). Due to limited production capacity, the vaccines will be distributed to high risk



individuals including elderly and medical workers. Vaccines could be distributed among all individuals as early as spring of 2021 based on current projections (WHO, 2020)

Influenza

The risk of a global influenza pandemic has increased over the last several years. This disease is capable of claiming thousands of lives and adversely affecting critical infrastructure and key resources. An influenza pandemic has the ability to reduce the health, safety, and welfare of the essential services workforce; immobilize core infrastructure; and induce fiscal instability.

Pandemic influenza is different from seasonal influenza (or "the flu") because outbreaks of seasonal flu are caused by viruses that are already among people. Pandemic influenza is caused by an influenza virus that is new to people and is likely to affect many more people than seasonal influenza. In addition, seasonal flu occurs every year, usually during the winter season, while the timing of an influenza pandemic is difficult to predict. Pandemic influenza is likely to affect more people than the seasonal flu, including young adults. A severe pandemic could change daily life for a time, including limitations on travel and public gatherings (Barry-Eaton District Health Department 2013).

At the national level, the CDC's Influenza Division has a long history of supporting the World Health Organization (WHO) and its global network of National Influenza Centers (NIC). With limited resources, most international assistance provided in the early years was through hands-on laboratory training of in-country staff, the annual provision of WHO reagent kits (produced and distributed by CDC), and technical consultations for vaccine strain selections. The Influenza Division also conducts epidemiologic research including vaccine studies and serologic assays and provided international outbreak investigation assistance (CDC 2010).

Mosquito-Borne Diseases

Mosquito-borne diseases are diseases that are spread through the bite of an infected female mosquito. Two of the most common mosquito-borne diseases recently impacting Cayuga County are: West Nile Virus (WNV) and Eastern equine encephalitis (EEE) virus. These diseases rely on mosquitos to spread. They become infected by feeding on birds carrying the virus; and then spread to humans and other animals when the mosquito bites them (NYS Department of Health 2017).

West Nile Virus

West Nile Virus (WNV) encephalitis is a mosquito-borne viral disease, which can cause an inflammation of the brain. WNV is commonly found in Africa, West Asia, the Middle East and Europe. West Nile virus was first found in New York State in 1999. Since 2000, 490 human cases and 37 deaths of WNV have been reported statewide (NYS Department of Health 2019). In a small number of cases, WNV has been spread by blood transfusion, which has resulted in the screening of blood donations for the virus in the US, and by organ transplantation. WNV was also found to be spread from mother to baby during pregnancy, delivery, or breast-feeding in a small number of cases. The symptoms of severe infection (West Nile encephalitis or meningitis) can include headache, high fever, neck stiffness, muscle weakness, stupor, disorientation, tremors, seizures, paralysis, and coma. WNV can cause serious illness, and in some cases, death. Usually, symptoms occur from 3 to 14 days after being bitten by an infected mosquito (NYS Department of Health 2017).

Eastern Equine Encephalitis

Eastern equine encephalitis (EEE) is a virus disease of wild birds that is transmitted to horses and humans by mosquitoes. It is a rare but serious viral infection. EEE is a rare but serious and often fatal infection that causes encephalitis or inflammation of the brain (NYS Department of Health 2016). EEE is most common in the eastern half of the U.S. and is spread by the bite of an infected mosquito. EEE can affect humans, horses, and some birds. The risk of getting EEE is highest from late July through September. People at the greatest risk of



developing severe disease are those over 50 years of age and younger than 15 years of age (NYS Department of Health 2019).

Tick-Borne Diseases

Tick-borne diseases are bacterial illnesses that spread to humans through infected ticks. These types of diseases rely on bites by ticks for transmission. Ticks become infected by micro-organisms when feeding on small infected mammals (mice and voles). Different tick-borne diseases are caused by different micro-organisms, and it is possible to be infected with more than one tick-borne disease at a time. Anyone who is bitten by an infected tick may get a tick-borne disease. People who spend a lot of time outdoors have a greater risk of becoming infected. The three types of ticks in New York that may carry disease-causing micro-organisms are the Blacklegged Tick (*Ixodes scapularis*) (also known as Deer Tick), Lone Star Tick (*Amblyomma americanum*), and the American dog tick (*Dermacentor variabilis*) (NYS Department of Health 2019). Blacklegged Ticks typically transmit Lyme disease, babesiosis, anaplasmosis, *Borrelia miyamotoi* disease and Powassan virus. Over 50,000 cases of Lyme disease have been reported to the New York State Health Department since Lyme disease first became a reportable disease in 1986 (Cayuga Health Department, 2020). Lone Star Ticks typically transmit ehrlichiosis, tularemia and Southern Tick Associated Rash Illness (STARI). Bites from lone star ticks can cause alpha-gal meat allergy which is an allergic reaction associated with consumption of red (mammalian) meat. Most ticks reside in moist and shady areas close to the ground, usually in areas with vegetation between 18 to 24 inches high.

Not all tick-borne diseases are arboviruses. Lyme Disease is a bacterial infection and Babesiosis is a parasitic infection (NYS Department of Health 2020).

A laboratory agreement between SUNY Upstate and ESF will test ticks for people who submit them. They should not be used as a diagnostic tool for personal health (Cayuga County Health Department, 2020). To find out more, refer to the Upstate Medical University website (<https://thangamani-lab.com/free-tick-testing>).

Lyme Disease

Lyme disease is an illness caused by infection with the bacterium *Borrelia burgdorferi*, which is carried by ticks. The infection can cause a variety of symptoms and, if left untreated, can be severe. Lyme disease is spread to people by the bite of an infected tick. In New York, the commonly infected tick is the deer tick. Immature ticks become infected by feeding on infected white-footed mice and other small mammals. Deer ticks can also spread other tick-borne diseases. Anyone who is bitten by a tick carrying the bacteria can become infected (NYS Department of Health 2017).

Extent and Location

The extent and location of disease outbreaks depends on the preferred habitat of the species, as well as the species' ease of movement and establishment. The magnitude of disease outbreaks species ranges from nuisance to widespread. The threat is typically intensified when the ecosystem or host species is already stressed, such as periods of drought. The already weakened state of the ecosystem causes it to more easily be impacted to an infestation. The presence of disease-carrying mosquitoes and ticks has been reported throughout most of New York and Cayuga County.

New York State and Cayuga County's geographic and demographic characteristics make it particularly vulnerable to importation and spread of infectious diseases. In terms of pandemic influenza, all counties may experience pandemic influenza outbreak caused by factors such as population density and the nature of public meeting areas. Densely populated areas in the county will likely spread diseases quicker than less densely populated areas. Cayuga County's population density is relatively low and exhibits small population centers and



distributed settlements among large tracts of forest and farmland. Forest stands, lakes, and wetlands in the county provides ideal habitats for ticks and mosquitos, rendering the county vulnerable to diseases from those vectors.

Coronavirus (COVID-19) and Influenza

As noted above, the exact size and extent of an infected population depends on how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in more densely populated areas. The transmission rate of infectious diseases will depend on the mode of transmission of a given illness. The severity and length of the next pandemic cannot be predicted; however, experts expect that its effect on the United States could be severe.

In 1999, the WHO Secretariat published guidance for pandemic influenza and defined the six phases of a pandemic. Updated guidance was published in 2005 to redefine these phases. This schema is designed to provide guidance to the international community and to national governments on preparedness and response for pandemic threats and pandemic disease. Compared with the 1999 phases, the new definitions place more emphasis on pre-pandemic phases when pandemic threats may exist in animals or when new influenza virus subtypes infect people but do not spread efficiently. Because recognizing that distinctions between the two interpandemic phases and the three pandemic alert phases may be unclear, the WHO Secretariat proposes that classifications be determined by assessing risk based on a range of scientific and epidemiological data (WHO 2009). The WHO pandemic phases are outlined in Table 5.4.6-1.

Table 5.4.6-1. WHO Global Pandemic Phases

Phase	Description
Preparedness	
Phase 1	No viruses circulating among animals have been reported to cause infections in humans.
Phase 2	An animal influenza virus circulating among domesticated or wild animals is known to have caused infection in humans and is therefore considered a potential pandemic threat.
Phase 3	An animal or human-animal influenza reassortant virus has caused sporadic cases or small clusters of disease in people but has not resulted in human-to-human transmission sufficient to sustain community-level outbreaks. Limited human-to-human transmission may occur under some circumstances, for example, when there is close contact between an infected person and an unprotected caregiver. However, limited transmission under such restricted circumstances does not indicate that the virus has gained the level of transmissibility among humans necessary to cause a pandemic.
Response and Mitigation Efforts	
Phase 4	Human infection(s) are reported with a new subtype, but no human-to-human spread or at most rare instances of spread to a close contact.
Phase 5	Is characterized by human-to-human spread of the virus into at least two countries in one WHO region. While most countries will not be affected at this stage, the declaration of Phase 5 is a strong signal that a pandemic is imminent and that the time to finalize the organization, communication, and implementation of the planned mitigation measures is short.
Phase 6	The pandemic phase is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. Designation of this phase will indicate that a global pandemic is under way.

Source: WHO 2009

In New York, activities to be undertaken by pandemic period, use the World Health Organization’s classification system. The Pandemic Influenza Plan describes activities which are designated as to whether they are the role of the state health department, local health department and/or providers and public health partners (NYS Department of Health 2006).





Mosquito-Borne Diseases

West Nile Virus

Since it was discovered in the western hemisphere, WNV has spread rapidly across North America, affecting thousands of birds, horses and humans. WNV spread from the New York City region in 1999 to almost all of the continental U.S., seven Canadian provinces and throughout Mexico and parts of the Caribbean by 2004. Reported cases of WNV in Cayuga County have been minimal. There have been no reported cases between 2015 and 2020 (CDC 2020).

Eastern Equine Encephalitis

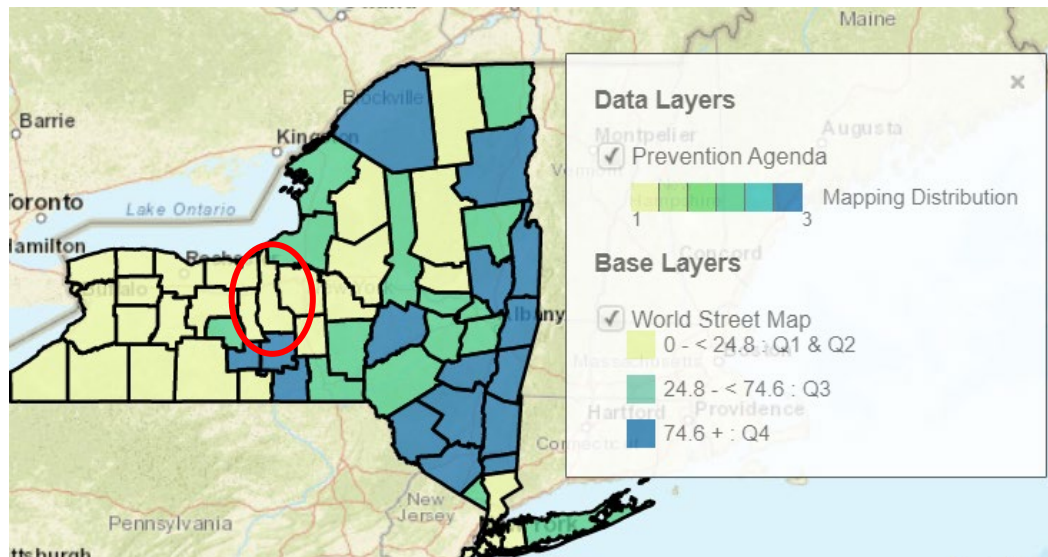
In the State of New York, between 2010 and 2019, there were seven reported human cases of EEE (CDC 2019). Between 2015 and 2020, EEE was not reported in any humans in Cayuga County (CDC 2020).

Tick-Borne Diseases

Lyme Disease

Lyme disease is the most commonly reported vector borne illness in the U.S. Between 2014 and 2018, there were 52 confirmed cases of Lyme disease in Cayuga County (NYS Department of Health 2019). Figure 5.4.6-1 shows Lyme diseases incidence rate per 100,000 people in New York State. The figure indicates that Cayuga County has lower rates of the disease, with a rate of 10.6 persons per 100,000 people between 2012-2014. Western New York saw lower incidences of Lyme Disease than the eastern and Southern portions of the State during this time period. The CDC Division of Vector Borne Diseases (DVBD) indicated in 2018 that New York was the state with the third-highest number of confirmed Lyme disease cases, totaling approximately 2,886 cases (CDC 2019).

Figure 5.4.6-1. Lyme Disease Incidence Rate per 100,000 People



Source: Health Data NY

Note: The red circle indicates the approximate location of Cayuga County.

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with disease outbreak events throughout Cayuga County and New York. With many sources reviewed for the purpose of this



HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

FEMA Major Disasters and Emergency Declarations

Between 1954 and 2020, the State of New York was included in two disease outbreak-related emergency (EM) declarations; one for West Nile Virus and one for the coronavirus pandemic. Additionally, the State was also included in a disaster (DR) declaration for the coronavirus pandemic. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Cayuga County was included in both of these declarations (FEMA 2020).

Table 5.4.6-2. Disease Outbreak-Related FEMA Declarations for Cayuga County, 1954 to August 2020

Date(s) of Event	Disease Type	FEMA Declaration Number (if applicable)	Cayuga County Designated?
May 22-November 11, 2000	West Nile Virus	EM-3155	Yes
January 20, 2020- Present	COVID-19 Pandemic	DR-4480 EM-3434	Yes

Source: FEMA 2020

USDA Declarations

The United States Department of Agriculture has a separate disaster declaration process that is in regard to the effects of natural disasters on agricultural losses. According to USDA records, Cayuga County has not had any disease-related declarations made between the years of 2014 and November 2020.

Previous Events

For this 2020 HMP update, known disease outbreak events that have impacted Cayuga County between 2014 and 2020 are identified in Table 5.4.6-3 and Table 5.4.6-4.

Table 5.4.6-4 provides an overview of the different communicable diseases that have occurred between the years of 2014 and 2018. Available records from the New York State Department of Health through 2018 are not reported as no records are available for 2019 and 2020. While diseases noted in the table are not described in detail in this HMP, the data in the table provide a comprehensive overview of the types of diseases that have occurred in Cayuga County in recent years. In general, most reported communicable diseases are Chlamydia, Gonorrhea, Hepatitis C Chronic, and Influenza. When comparing this data with other counties, Cayuga County does not stand out for any communicable diseases. In fact the numbers that are reported in Cayuga County are modest compared to other counties in New York State (NYSDOH 2020). This is likely due to the relatively rural and sparsely populated characteristics of the county.



Table 5.4.6-3. Major Disease Outbreaks in Cayuga County, NY

Date(s) of Event	Disease Type	FEMA Declaration Number (if applicable)	Cayuga County Designated?	Description
January 2018	Influenza	None	No	The 2017-2018 flu season was particularly severe in Cayuga County, with 1,009 cases reported in 2018.
January 20, 2020-Present	COVID-19 Pandemic	DR-4480/EM-3434	Yes	A novel strain of coronavirus (COVID-19) first identified in Wuhan, Hubei Province, China spread throughout the world and was designated as a pandemic by the World Health Organization in March 2020. The virus caused severe impacts in the Tri-State area, with New York City commonly identified as the epicenter to the regional outbreak. The highly contagious virus particularly impacts human’s respiratory system. Between March and December 11, 2020, there have been 1,324 reported cases of COVID-19 in Cayuga County. Out of those 1,324 cases, 11 deaths were reported.
May 22, 2000 - November 1, 2000	West Nile Virus	EM-3155-NY	Yes	West Nile virus, a mosquito-borne infection, was first found in New York State in 1999. While the chances of anyone becoming ill from the virus are small, persons over the age of 50 infected with the virus are at higher risk for serious illness. According to NYSDOH, no one was affected by the virus between the months of 2012 and 2018 in Cayuga County.

Source: Cayuga County Department of Health; FEMA; New York State Department of Health

Table 5.4.6-4. History of Recordable Diseases in Cayuga County, 2014 to 2018

	AIDS	AMEBIASIS	ANAPLASMOSIS	CAMPYLOBACTERIOSIS	CHLAMYDIA	CRYPTOSPORIS	CYCLOSPORIAS	E.COLISHIGA-TOXIN	ENCEPHALITIS (NON-WNV)	GIARDIASIS	GONORRHEA	HAEMOPHILUSINFLUENZAE	HEPATITIS B ACUTE	HEPATITIS B CHRONIC	HEPATITIS C ACUTE	HEPATITIS C CHRONIC	HERPES INF	HIV	LABORATORY CONFIRMED INFLUENZA	LEGIONELLOSIS	LISTERIOSIS	LYME
2014	1	1	0	19	241	5	0	0	0	10	17	1	1	4	1	59	0	3	208	10	0	7
2015	2	0	0	19	242	3	0	0	0	6	24	2	0	4	0	49	0	3	414	11	0	11
2016	1	0	1	7	208	2	1	2	0	2	21	2	0	4	2	54	1	3	219	10	1	7
2017	0	0	0	21	255	5	0	3	0	9	22	2	0	4	0	54	1	0	655	4	1	20
2018	0	0	0	20	260	7	0	7	1	5	109	2	2	6	4	66	0	0	1009	2	1	7





SECTION 5.4.6: RISK ASSESSMENT – HARMFUL ALGAL BLOOM

	MENINGITIS ASEPTIC	MUMPS	PERTUSSIS	Q FEVER	RMSF	SALMONELLAS	SHIGELLOSIS	STREP GROUP A INVASIVE	STREP GROUP B INVASIVE	STREP PNEUMO INVASIVE	SYPHILIS EARLY	TUBERCULOSIS	VIBRIOSIS	YERSINIOSIS
2014	3	0	2	0	1	8	0	4	9	152	0	2	0	0
2015	4	0	0	0	1	6	1	3	5	8	1	4	2	0
2016	4	0	3	1	0	9	2	3	10	9	1	1	0	0
2017	1	1	14	0	0	6	3	1	10	8	1	1	0	0
2018	3	0	0	0	0	5	2	2	9	8	0	2	0	1

Source: New York Department of Health 2020; FEMA 2020, WHO 2020

N/A Not Available

With disease outbreak documentation for New York and Cayuga County being extensive, not all sources have been identified or researched. Therefore, Table 5.4.6-3 and Table 5.4.6-4 may not include all events that have occurred in the county. 2019 and 2020 statistics were not available at the time of the plan update. Statistics from the 2020 Coronavirus pandemic were subject to change day to day.





Climate Change Impacts

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue growing. Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Cayuga County is located in Region 1, which includes the counties bordering Lakes Erie and Ontario. In Region 1, it is estimated that temperatures will increase by 3.7°F to 7.3°F by the 2050s and 4.2°F to 12.0°F by the 2080s (baseline of 47.7°F). Precipitation totals will increase between two and twelve percent by the 2050s and one to seventeen percent by the 2080s (baseline of 34 inches). Increased rainfall and heavy rainfalls increase the chances of standing water where mosquitos breed.

The relationship between climate change and increase in infectious diseases is difficult to predict with certainty, there are scientific linkages between the two. As warm habitats that host insects such as mosquitoes increase, more of the population becomes exposed to potential virus threats (The Washington Post, 2017). The notion that rising temperatures will increase the number of mosquitoes that can transmit diseases such as WNV and Zika among humans (rather than just shift their range) has been the subject of debate over the past decade. Some believe that climate change may affect the spread of disease, while others are not convinced. However, many researchers point out that climate is not the only force at work in increasing the spread of infectious diseases into the future (NJOEM 2019).

Probability of Future Occurrences

It is difficult to predict when the next disease outbreak will occur and how severe it will be because viruses are always changing. The United States and other countries are constantly preparing to respond to pandemic. The Department of Health and Human Services and others are developing supplies of vaccines and medicines. In addition, the United States has been working with the WHO and other countries to strengthen detection of disease and response to outbreaks. Preparedness efforts are ongoing at the national, State, and local level (NJOEM 2019).

In Cayuga County, the probability for a future disease outbreak event is dependent on several factors. One factor that influences the spread of disease is population density. Populations that live close to one another are more likely to spread diseases. As population density increases in the county, so too will the probability of a disease outbreak event occurring.

All of the critical components necessary to sustain the threat of mosquito-borne disease in Cayuga County have been clearly documented. Instances of the WNV have been generally decreasing throughout the Northeast because of aggressive planning and eradication efforts, but some scientists suggest that as global temperatures rise and extreme weather conditions emerge from climate change, the range of the virus in the United States will grow. Therefore, based on all available information and available data regarding mosquito populations, it is anticipated that mosquito-borne diseases will continue to be a threat to Cayuga County.

Disease-carrying ticks will continue to inhabit the northeast, including Cayuga County, creating an increase in Lyme disease and other types of infections amongst the county population if not controlled or prevented. Ecological conditions favorable to Lyme disease, the steady increase in the number of cases, and the challenge of prevention predict that Lyme disease will be a continuing public health concern. Personal protection measures, including protective clothing, repellents or acaricides, tick checks, and landscape modifications in or near residential areas, may be helpful. However, these measures are difficult to perform regularly throughout the summer. Attempts to control the infection on a larger scale by the eradication of deer or widespread use of acaricides, which may be effective, have had limited public acceptance. New methods of tick control, including host-targeted acaricides against rodents and deer, are being developed and may provide help in the future (Steere, Coburn, and Glickstein 2004).



Currently and in the future, control of Lyme disease will depend primarily on public and physician education about personal protection measures, signs and symptoms of the disease, and appropriate antibiotic therapy. Based on available information and the ongoing trends of disease-carrying tick populations, it is anticipated that Lyme disease infections and other tick-borne diseases will continue to be a threat to Cayuga County.

In Section 5.3, the identified hazards of concern for Cayuga County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Steering and Planning Committees, the probability of occurrence for disease outbreaks in the county is considered ‘occasional’ (hazard has between a 10 and 100% chance of occurring in any given year).

5.4.6.2 Vulnerability Assessment

To understand risk, a community must evaluate what assets are exposed or vulnerable to the identified hazard. The following discusses Cayuga County’s vulnerability, in a qualitative nature, to the disease outbreak hazard.

Impact on Life, Health and Safety

The entire population of Cayuga County is vulnerable to the disease outbreak hazard. Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and the potential impacts associated with this hazard. Healthcare providers and first responders have an increased risk of exposure due to their frequent contact with infected populations. Areas with a higher population density also have an increased risk of exposure or transmission of disease to do the closer proximity of population to potentially infected people.

Most recently with COVID-19, the Centers for Disease Control and Prevention have indicated that persons over 65 years and older, persons living in a nursing home or long-term care facility, and persons with underlying medical conditions such as diabetes, severe obesity, serious heart conditions, etc. are at a higher risk of getting severely ill (CDC 2020). Population data from the 2018 5-year American Community Survey indicates that there are 15,043 persons over 65 years old in Cayuga County. This age group would be considered at risk for getting severely ill from the COVID-19 virus. While the statistics of this virus are subject to change during the publication of this HMP, the New York Department of Health dashboard shows that there is a higher percent of illnesses within the mentioned age group and that Cayuga County is among the harder hit Counties in the State in terms of total COVID-19 cases (New York State DOH 2020).

Impact on General Building Stock

No structures are anticipated to be directly affected by disease outbreaks.

Impact on Critical Facilities

No critical facilities are anticipated to be affected by disease outbreaks. Hospitals and medical facilities will likely see an increase in patients, but it is unlikely that there will be damages or interruption of services. However, large rates of infection may result in an increase in the rate of hospitalization which may overwhelm hospitals and medical facilities and lead to decreased services for those seeking medical attention. The COVID-19 has led to overwhelmed hospitals in numerous hotspots. Cayuga County only has one major hospital in the county and could become overwhelmed as the number of cases continue.

Impact on Economy

The impact disease outbreaks have on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with the activities and programs implemented to conduct surveillance and address disease outbreaks have not been quantified in available documentation. Instead, activities and programs



implemented by the county to address this hazard are described below, all of which could impact the local economy.

The COVID-19 outbreak in 2020 resulted in significant negative impacts to economic activity in the county, State, and country owing to the identified need to enforce social distancing and quarantine conditions until the disease spread was lessened. Decreased economic activity caused large-scale unemployment throughout the State as well as more than 100,000 businesses to close as of May 2020. During the height of the COVID outbreak, all non-essential businesses were forced to close. The virus outbreak has also had a deleterious impact on government finances owing to tax delinquency and loss of user fees. Decreased revenues can lead to service cuts and prevent the county and community from procuring necessary supplies to weather the outbreak. Though the full scale of the economic fallout is yet to be quantified, the economic impact from disease outbreak was clearly felt in Cayuga County.

Smaller-scale disease outbreaks can also cause negative economic impacts, though the extent of impact is variable. For example, an outbreak in mosquito or tick-borne diseases can impact Cayuga County's local economies associated with agriculture and recreation.

Impact on Environment

Disease outbreaks may have an impact on the environment if the outbreaks are caused by invasive species. Invasive species tend to be competitive with native species and their habitat and can be the major transmitters of disease like Zika, dengue, and yellow fever (Placer Mosquito and Vector Control District 2019). Secondary impacts from mitigating disease outbreaks could also have an impact on the environment. Pesticides used to control disease carrying insects like mosquitos have been reviewed by the EPA and the New York Department of Environmental Conservation. If these sprays are applied in large concentrations, they could potentially leach into waterways and harm nearby terrestrial species. As a result, pesticides must be registered before they can be sold, distributed, or used in the state (New York Department of Environmental Conservation 2020).

Cascading Impacts on Other Hazards

There are no known cascading impacts that disease outbreaks can cause to other hazards of concern for Cayuga County.

Future Changes that May Impact Vulnerability

Understanding future changes that may impact vulnerability in the county can assist in planning for future development and ensuring that appropriate mitigation, planning, and preparedness measures are in place. The county considered the following factors that may affect hazard vulnerability:

- Potential or projected development.
- Projected changes in population.
- Other identified conditions as relevant and appropriate, including the impacts of climate change.

Projected Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the county. Any areas of growth could be potentially impacted by the disease outbreak hazard because the entire planning area is exposed and vulnerable. Additional development of structures in close proximity to waterbodies or areas with high population density are at an increased risk. Please refer to the specific areas of development indicated in tabular form and/or on the hazard maps included in the jurisdictional annexes in Volume II, Section 9 of this plan.



Projected Changes in Population

According to the U.S. Census Bureau, the population in Cayuga County has decreased by approximately 4.3-percent between 2010 and 2018 (US Census Bureau 2020). Estimated population projections provided by the 2017 Cornell Program on Applied Demographics indicates that the county’s population will decrease slowly into 2040, decreasing the total population to approximately 72,494 persons (Cornell Program on Applied Demographics 2017). Changes in the density of population when households move throughout the county could influence the number of persons exposed to disease outbreaks. Higher density jurisdictions are not only at risk of greater exposure to disease outbreak, density may also reduce available basic services provided by critical facilities such as hospitals and emergency facilities for persons that are not affected by a disease.

Climate Change

As discussed earlier in this section, the relationship between climate change and increase in infectious diseases is difficult to predict with certainty, however there may be linkages between the two. Changes in the environment may create a more livable habitat for vectors carrying disease as suggested by the Centers for Disease Control and Prevention (CDC n.d.). Localized changes in climate and human interaction may also be a factor in the spread of disease.

The relationship between climate change and infectious diseases is somewhat controversial. The notion that rising temperatures will increase the number of mosquitoes that can transmit malaria among humans (rather than just shift their range) has been the subject of debate over the past decade. Some believe that climate change may affect the spread of disease, while others are not convinced. However, many researchers point out that climate is not the only force at work in increasing the spread of infectious diseases into the future. Other factors, such as expanded rapid travel and evolution of resistance to medical treatments, are already changing the ways pathogens infect people, plants, and animals. As climate change accelerates it is likely to work synergistically with many of these factors, especially in populations increasingly subject to massive migration and malnutrition (Harmon 2010).

Change of Vulnerability Since the 2014 HMP

Disease outbreak is a new hazard profile for the 2021 HMP update and no new changes have been recorded.

Identified Issues

The Community Health Assessment for Cayuga County notes a variety of challenges impacting the delivery of health and health outcomes in the county. Additionally, there is only one hospital in Cayuga County. As a rural county, many challenges are exacerbated. There is a lack of medical providers who accept Medicaid, and transportation barriers exist for patients. Respondents to a Community Health Assessment survey also noted a lack of continuum of care and coordination among an individual patient’s providers.