SECTION 4. RISK ASSESSMENT

4.3 HAZARD PROFILES

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future occurrences, and impact of climate change) and vulnerability assessment for the disease outbreak hazard in Burlington County.

2024 HMP Changes

- Disease outbreak is a new hazard of concern for this 2024 HMP update.

4.3.2 Disease Outbreak

Hazard Description

An outbreak or an epidemic occurs when new cases of a certain disease, in a given population, substantially exceed what is expected. An epidemic may be restricted to one locale, or it may be global, at which point it is called a pandemic. A pandemic is defined as a disease occurring over a wide geographic area and affecting a high proportion of the population. A pandemic can cause sudden, pervasive illness in all age groups on a local or global scale. A pandemic is a novel virus to which humans have no natural immunity that spreads from person to person. A pandemic will cause both widespread and sustained effects and is likely to stress the resources of both the State and Federal government (Columbia University 2021).

Most disease outbreaks occur due to respiratory viruses. A respiratory virus with pandemic potential is a highly contagious respiratory virus that spreads easily from person to person and for which there is little human immunity. This hazard includes pandemic influenza. This hazard strains the healthcare system, requires school closures, causes high rates of illness and absenteeism that undermine critical infrastructure across the city, and decreases community trust due to social distancing measures interfering with personal movement and being perceived as being ineffectual. Previous events that exemplify this hazard include the 1918 ("Spanish flu") and 2009 ("Swine flu") influenza pandemics, the 2003 SARS outbreak, which had pandemic potential, and the 2019 COVID-19 pandemic (CDC 2018).

In addition to respiratory viruses, diseases with new or emerging features can challenge control, including those spread from insects. Emerging diseases are difficult to contain or treat and present significant challenges to risk communication since the mechanics of transmission, laboratory identification, and effective treatment protocols may be unknown (Behler McArthur 2019).

For the purposes of this hazard mitigation plan update, the following infectious diseases will be discussed in further detail: Influenza, West Nile Virus (WNV), Lyme Disease, and Coronavirus.

Influenza

Influenza (the flu) is a contagious virus that affects the nose, throat, lungs, and other parts of the body. It can quickly spread from one person to another, causing mild to severe illness and can lead to death. Symptoms include fever, cough, sore throat, runny or stuffy nose, muscle or body aches, headache, and tiredness (NJDOH 2023).

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

Pandemic influenza differs from seasonal influenza (or 'the flu') because outbreaks of seasonal flu are caused by viruses already living amongst people. Pandemic influenza is a global outbreak of a new influenza A virus, which can infect people easily and spread from person to person in an efficient and sustained manner (CDC 2020). Additionally, the seasonal flu happens annually and usually peaks between December and February.

West Nile Virus

West Nile Virus (WNV) is the leading cause of mosquito-borne disease in the United States. WNV is most commonly spread to people who are bitten by an infected mosquito. WNV is usually diagnosed during mosquito season, starting in the summer months, and continuing through the fall (NJDOH 2023). WNV was first identified in the United States in 1999. Since 1999, 380 human cases of WNV have been reported statewide (CDC 2023). 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 (NJDOH 2023).

Lyme Disease

Lyme disease is the most common vector-borne disease in the United States. It is an illness caused by infection with the bacterium *Borrelia burgdorferi* and rarely, *Borrelia mayoni*, which are carried by ticks and transmitted through its bite. Typical symptoms include fever, headache, fatigue, and skin rash. If left untreated, symptoms can be severe. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics. Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat (CDC 2022). In New Jersey, 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 (NJDOH 2012).

Coronavirus

Coronavirus disease (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 illnesses (WHO 2022). The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person breathes, speaks, coughs, or sneezes.

Reported illnesses have ranged from mild symptoms to severe illness and death. Reported symptoms include difficulty breathing and shortness of breath, fever or chills, cough, fatigue, muscle or body aches, loss of smell or taste, sore throat, congestion, and nausea or vomiting. Emergency symptoms that require immediate medical attention include trouble breathing, persistent pain or pressure in the chest, confusion, or inability to wake or stay awake, 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 2021).

Location

Burlington County, as the largest county in New Jersey, has large areas that have potential to breed mosquitoes. These areas include, farm land, wetlands (fresh and salt water), home yards, stormwater facilities, and sewer plants. These areas need to be addressed as best as possible to control mosquitoes and the viruses they can spread (Burlington County n.d.).

Disease outbreaks can occur without regard for location. However, factors such as density, visitation, and the length of time in which the public spends in a location all contribute to the spread of infectious diseases. For example, COVID-19 and Influenza are more likely spread by persons in close contact. Indoor areas in which people are in close contact with each other appear to be significant vectors for the disease, which is spread through respiratory droplets. Infectious diseases spread by insects may be subject to other types of location hazards. For example, the prevalence of standing water can provide breeding grounds for diseases such as West Nile Virus, and wooded areas are favored by the ticks which spread Lyme Disease. Diseases that can infect humans are variable in nature and methods of transmission. Ultimately, residents need to be vigilant about diseases altogether in order to better understand and respond to disease outbreaks.

Extent

The exact size and extent of a disease outbreak event depends on how easily the illness is spread, the mode of transmission, and the amount of contact between infected and uninfected individuals. The transmission rate of infectious diseases will depend on the mode of transmission of a given illness. The transmission rates of respiratory disease are often higher in more densely populated areas while the transmission rates of insect borne disease are often higher in less densely populated areas that provide more habitat for insects The severity and length of the next

disease outbreak cannot be predicted; however, experts anticipate that its effect on the United States could be severe as demonstrated by the Covid-19 pandemic.

The CDC and public health officials use the Pandemic Severity Assessment Framework (PSAF) to determine the impact of the pandemic, or how "bad" the pandemic will be; the PSAF replaced the Pandemic Severity Index (PSI) in 2014. There are two main factors that can be used to determine the impact of a pandemic. The first is clinical severity, or how serious is the illness associated with infection. The second factor is transmissibility, or how easily the pandemic virus spreads from person-to-person. These two factors combined are used to guide decisions about which actions CDC recommends at a given time during the pandemic. The results help public health officials and health care professionals make timely and informed decisions, and to take appropriate actions (CDC 2016).

In 1999, The World Health Organization (WHO) published guidance for pandemic influenza and defined the six phases of a pandemic. The updated guidance was published in 2005 to redefine these phases, and in 2009 WHO published the *Pandemic Influenza Preparedness and Response,* this guidance significantly updates and replaces the guidance published in 2005 (World Health Organization 2009). The revised guidance retains the six-phase approach to facilitate the incorporation of new recommendations. Phases 1-3 and 5-6 have been grouped to include common action points. The WHO pandemic phases are outlined in Table 4.3.2-2 below.

Table 4.3.2-1. WHO Global Pandemic Phases

Phase	Description
Preparedness and Response– Global, Regional, National, Sub-National Level	
Phase 1	No animal influenza virus circulating among animals has been reported to cause infection in humans.
Phase 2	An animal influenza virus circulating in 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.
Containment	
Phase 4	Human-to-human transmission (H2H) of an animal or human-animal influenza reassortant virus able to sustain community-level outbreaks has been verified.
Response – Global Level	
Phase 5	The same identified virus has caused sustained community-level outbreaks in two or more countries in one WHO region.
Phase 6	In addition to the criteria defined in Phase 5, the same virus has caused sustained community-level outbreaks in at least one other country in another WHO region.
Post-Pandemic	
Post-Peak Period	Levels of pandemic influenza in most countries with adequate surveillance have dropped below peak levels.
Possible New Wave	Level of pandemic influenza activity in most countries with adequate surveillance rising again.
Post-Pandemic Period	Levels of influenza activity have returned to the levels seen for seasonal influenza in most countries with adequate surveillance

Source: WHO 2009

In New Jersey, activities to be undertaken during the pandemic period, use the World Health Organization's classification system. The Pandemic Influenza Preparedness and Response document provides guidance to government agencies, individuals, families and communities, and the health sectors at the local and global levels.

Influenza and Coronavirus

The US EPA has noted fine droplets and particles spread and accumulate more rapidly in an indoor setting. Therefore, the transmission of respiratory illness from contact with infected individuals is more likely to occur in indoor spaces.

Between January 2019 and December 2022, there were 1,831 confirmed cases of influenza in Burlington County (NJDOH 2022). Those most vulnerable to influenza include young children and the elderly, although anyone can become infected. Table 4.3.2-1 displays the current flu seasons and compares it to previous seasons.

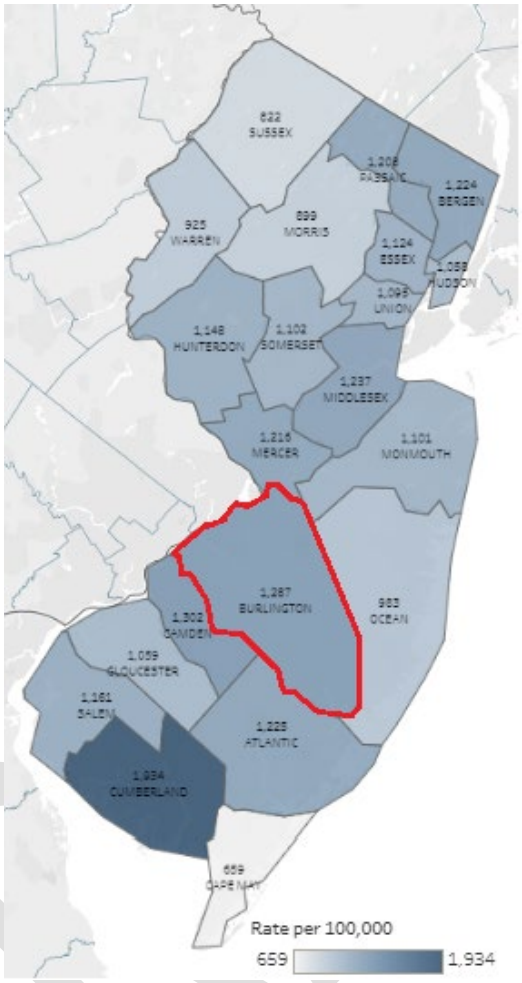
Table 4.3.2-2. Influenza Cases Comparison by Season for Burlington County

Flu Type	Season 2019-2020	2020-2021	2021-2022
Influenza Type A	552	534	331
Influenza Type B	82	313	19
Total	634	847	350

Source: NJDOH 2022

According to the State of New Jersey Department of Health, Burlington County totaled 116,563 positive tests of Covid-19 between January 2020 and August 2023; 1,268 residents of Burlington County lost their lives due to Covid-19 during the same time period (NJDOH 2023). Figure 4.3.2-3 visualizes the annual average number of positive cases per 100,000 by county in New Jersey.

Figure 4.3.2-1. Annual Average Positive Case Rate per 100,000 residents, by County



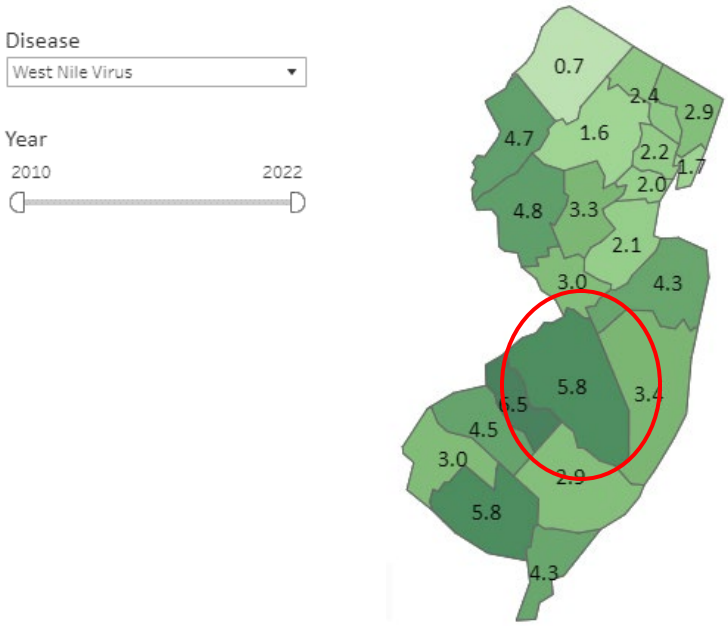
Source: *NJDOH 2023*
Notes: *Burlington County is outlined in red*

West Nile Virus

WNV is the leading cause of mosquito-borne diseases in the continental United States. There are no vaccines to prevent or medications to treat WNV in people, and those infected rarely experience sickness or symptoms. About 1 in 5 infected people will develop a fever and other symptoms, and 1 in 150 infected people will develop a serious, sometimes fatal, illness (CDC 2023). Figure 4.3.2-1 below shows the West Nile Virus Incidence Rate (per 100,000) by County between year 2010 and 2022. Burlington County has a 5.8 incidence rate of WNV.

Figure 4.3.2-2. West Nile Virus Incidence Rate (per 100,000) by County

Figure 4-3.



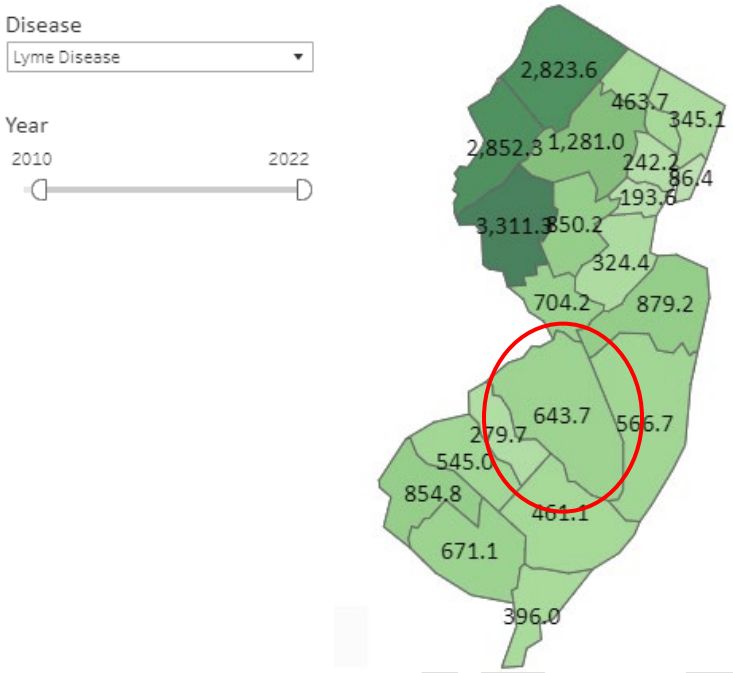
Source: *NJDOH 2023*
Note: *Burlington County is circled in red* (NJDOH 2023)

Burlington County, as the largest county in New Jersey, has large areas that have potential to breed mosquitoes which can transmit WNV. These areas include, farmland, wetlands (fresh and salt water), home yards, stormwater facilities, and sewer plants (Burlington County n.d.). New Jersey Title 7 Administrative Code requires that county governments in New Jersey maintain a division of mosquito control. Burlington County Mosquito Control (BCMC) is required to set traps and provide specimens for testing to New Jersey Department of Health to check for certain communicable diseases. The goal is to reduce the mosquito population, which are a primary vector for diseases. The New Jersey Department of Health tests for the following diseases: West Nile Virus, Eastern Equine Encephalitis, Jamestown Canyon Virus, St. Louis Encephalitis, La Crosse Encephalitis, Dengue and Zika (Burlington County 2019).

Lyme Disease

Lyme disease, most commonly found in wooded areas, is the most reported vector borne illness in the U.S. Between 2000 and 2020, there was a total of 3,884 confirmed cases in Lyme disease in Burlington County, including 406 cases in 2009, the highest number of reported cases of a given year (TickCheck 2023). The CDC only reports confirmed cases, due to this the true number of cases is estimated at 38,840. Figure 4.3.2-2 below shows the Lyme Disease Incidence Rate (per 100,000) by County between year 2010 and 2022. Burlington County has a 643.7 incidence rate of Lyme Disease.

Figure 4.3.2-4. Lyme Disease Incidence Rate (per 100,000) by County



Source: *NJDOH 2023*
Note: Burlington County is circled in red

Previous Occurrences and Losses

Historical information regarding previous occurrences and losses associated with disease outbreak events throughout New Jersey and areas within Burlington County was obtained from many sources. Given so many sources reviewed for the purpose of this HMP, loss and impact information regarding many events could vary depending on the source.

FEMA Major Disaster and Emergency Declarations

Between 1954 and 2022, New Jersey was included in three FEMA declared disease outbreak-related disasters (DR) or emergency declarations (EM); Burlington County was included in all three of these declared disasters, as shown in Table 4.3.2-3.

Table 4.3.2-3. FEMA Declarations for Disease Outbreak Events in Burlington County

FEMA Declaration Number	Date of Declaration	Date(s) Of Event	Event Type	Details
EM-3156-NJ	November 1, 2000	May 22, 2000 - November 1, 2000	Pandemic: West Nile Virus	New Jersey Virus Threat
DR-4488-NJ	March 25, 2020	January 20, 2020 - May 11, 2023	Pandemic: Coronavirus	New Jersey Covid-19 Pandemic
EM-3451-NJ	March 13, 2020	January 20, 2020 - May 11, 2023	Pandemic: Coronavirus	New Jersey Covid-19

Source: FEMA 2022

USDA Declarations

The Secretary of Agriculture from the U.S. Department of Agriculture (USDA) is authorized to designate counties as disaster areas to make emergency loans to producers suffering losses in those counties and in counties that are contiguous to a designated county. Between 2018 and 2022, Burlington County was not included in any USDA-designated agricultural disasters that included disease outbreak events.

Previous Events

Table 4.3.2-4 identifies the known disease outbreak events that impacted Burlington County between 2018 and 2023. For detailed information on damages and impacts to each municipality, refer to Section 9 (Jurisdictional Annexes).

Table 4.3.2-4. Disease Outbreak Events in Burlington County, 2018 to 2023

Dates of Event	Event Type	FEMA Declaration Number	Burlington County Designated?	Description
2018	Influenza	N/A	N/A	663 confirmed cases of Influenza in Burlington County
2018	Lyme Disease	N/A	N/A	190 confirmed cases of Lyme Disease in Burlington County
2018	West Nile Virus	N/A	N/A	3 confirmed cases of human-infected West Nile Virus in Burlington County
2019	Influenza	N/A	N/A	634 confirmed cases of Influenza in Burlington County
2019	Lyme Disease	N/A	N/A	236 confirmed cases of Lyme Disease in Burlington County
2019	West Nile Virus	N/A	N/A	2 confirmed cases of human-infected West Nile Virus in Burlington County
2020	Influenza	N/A	N/A	847 confirmed cases of Influenza in Burlington County
2020	Lyme Disease	N/A	N/A	158 confirmed cases of Lyme Disease in Burlington County
2020	Coronavirus	DR-4488-NJ, EM-3451-NJ	Yes	In 2020, Burlington County reported 23,463 positive cases of COVID-19 and 643 deaths.
2021	Influenza	N/A	N/A	350 confirmed cases of Influenza in Burlington County
2021	Lyme Disease	N/A	N/A	201 confirmed cases of Lyme Disease in Burlington County
2021	West Nile Virus	N/A	N/A	8 confirmed cases of human-infected West Nile Virus in Burlington County
2021	Coronavirus	DR-4488-NJ, EM-3451-NJ	Yes	In 2021, Burlington County reported 40,429 positive cases of COVID-19 and 327 deaths.
2022	Influenza	N/A	N/A	176 confirmed cases of Influenza in Burlington County
2022	Lyme Disease	N/A	N/A	187 confirmed cases of Lyme Disease in Burlington County
2022	West Nile Virus	N/A	N/A	2 confirmed cases of human-infected West Nile Virus in Burlington County
2022	Coronavirus	DR-4488-NJ, EM-3451-NJ	Yes	In 2022, Burlington County reported 46,728 positive cases of COVID-19 and 309 deaths.
2023 [a]	Influenza	N/A	N/A	74 confirmed cases of Influenza in Burlington County

Dates of Event	Event Type	FEMA Declaration Number	Burlington County Designated?	Description
2023 [b]	Lyme Disease	N/A	N/A	168 confirmed cases of Lyme Disease in Burlington County
2023 [c]	West Nile Virus	N/A	N/A	0 confirmed cases of human-infected West Nile Virus in Burlington County
2023 [d]	Coronavirus	DR-4488-NJ, EM-3451-NJ	Yes [e]	In 2023, Burlington County reported 6,127 positive cases of COVID-19 and 32 deaths.

Source: NJDOH 2022; CDC 2023; NJDOH 2023; NJDOH 2023; FEMA 2023
Notes:
a totals last updated May 20, 2023
b totals last updated August 30, 2023
c totals last update September 5, 2023
d totals last update September 5, 2023
e the declarations for the COVID-19 Pandemic expired on May 11, 2023

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 disease outbreaks. The United States 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 the detection of disease and response to outbreaks and pandemics. Preparedness efforts are ongoing via the New Jersey State Department of Health, and local health departments through community preparedness programs to empower local health departments and their community partners to promote local readiness, foster community resilience, and to ensure comprehensive, coordinated, and effective responses.

In Burlington 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 to occur. When there is a significant change in a circulating strain of a virus, more of the population is susceptible and the strain could rapidly spread from person to person.

As for mosquito-borne and tick-borne diseases, as long as mosquitoes and ticks are found in Burlington County, the risk of contracting WNV, Lyme disease, or other diseases carried by these insects exists. Instances of WNV have been generally decreasing throughout the northeast United States due to planning and eradication efforts. However, some scientists anticipate an increase in WNV and other mosquito-borne diseases due to changing climate conditions creating suitable habitats for mosquitoes (CDC 2013). Disease-carrying ticks will continue to inhabit Burlington County and the threat of Lyme disease and other tick-borne diseases will continue. Similar to mosquitoes, there are eradication efforts in place to control the tick population and new methods of control are being developed (Steere, Coburn and Glickstein 2004). Therefore, based on all available information and available data regarding mosquito and tick populations, it is anticipated that mosquito- and tick-borne diseases will continue to be a threat to Burlington County. However, vaccines are currently being developed for Lyme Disease, which may assist in slowing the contraction rates (CDC 2022).

Based on historical records and input from the Steering Committee, the probability of occurrence for disease outbreak events in the County is considered "occasional" (between 10 and 100 percent annual probability of a hazard event occurring). Disease Outbreak was not previously ranked as a hazard of concern for the County. With the emergence of COVID-19, disease outbreak has been identified as a new hazard of concern for many counties throughout the State.

Climate Change Impacts

Providing projections of future climate change for a specific region is challenging. Shorter term projections are more closely tied to existing trends making longer term projections even more challenging. The further out a prediction reaches the more subject to changing dynamics it becomes.

Climate change includes major changes in temperature, precipitation, or wind patterns, which occur over several decades or longer. Due to the increase in greenhouse gas concentrations since the end of the 1890s, New Jersey has experienced a 3.5° F (1.9° C) increase in the State's average temperature, which is faster than the rest of the Northeast region (2° F [1.1° C]) and the world (1.5° F [0.8° C]) (IPCC 2014). This warming trend is expected to continue. By 2050, temperatures in New Jersey are expected to increase by 4.1 to 5.7° F (2.3° C to 3.2° C). Thus, New Jersey can expect to experience an average annual temperature that is warmer than any to date (low emissions scenario) and future temperatures could be as much as 10° F (5.6° C) warmer (high emissions scenario). New Jersey can also expect that by the middle of the 21st century, 70 percent of summers will be hotter than the warmest summer experienced to date. The increase in temperatures is expected to be felt more during the winter months (December, January, and February), resulting in less intense cold waves, fewer sub-freezing days, and less snow accumulation (NJDEP 2020).

As temperatures increase, Earth's atmosphere can hold more water vapor which leads to a greater potential for precipitation. Currently, New Jersey receives an average of 46 inches of precipitation each year. Since the end of the twentieth century, New Jersey has experienced slight increases in the amount of precipitation it receives each year, and over the last 10 years there has been a 7.9 percent increase. By 2050, annual precipitation in New Jersey could increase by 4 percent to 11 percent. By the end of this century, heavy precipitation events are projected to occur two to five times more often and with more intensity than in the last century. New Jersey will experience more intense rain events, less snow, and more rainfalls. Also, small decreases in the amount of precipitation may occur in the summer months, resulting in greater potential for more frequent and prolonged droughts. New Jersey could also experience an increase in the number of flood events (NJDEP 2020).

The relationship between climate change and increase in infectious diseases is difficult to predict with certainty, but there are scientific linkages between the two. Increased rainfall and heavy rainfalls increase the chances of standing water where mosquitos breed. As flooding events increase in the County owing to climate change, water-borne and vector-borne diseases (particularly those associated with mosquitos) may similarly increase owing to the prevalence of standing water over long periods (National Geographic 2022).

The notion that rising temperatures will increase the number of ticks and mosquitoes that can transmit diseases such as Lyme disease and WNV 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 (Jordan 2019). However, a warming climate is likely to increase the length of the insect season, increasing the potential rates of transmission of insect borne disease.

Vulnerability Assessment

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

Impact on Life, Health, and Safety

The entire population of Burlington County (461,860) 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.

Maintaining certain key functions is important to preserve life and decrease societal disruption during disease outbreaks. Heat, clean water, waste disposal, and corpse management all contribute to public health. Ensuring functional transportation systems also protects health by making it possible for people to access medical care and by transporting food and other essential goods. Critical infrastructure groups have a responsibility to maintain public health, provide public safety, transport medical supplies and food, implement a disease outbreak response, and maintaining societal functions. If these workers were absent due to disease outbreak, these systems will fail (CISA n.d.).

Socially Vulnerable Populations

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 due to their proximity to potentially infected people. Further, the elderly and immunocompromised individuals may have increased vulnerability to becoming infected or experience exacerbated impacts depending upon the disease.

As shown in Table 4.3.2-5, Evesham Township has the highest population over 65 (8,574) and highest population under the age of 5 (2,237). Pemberton Township has the largest population of non-English speaking persons (1,092). Willingboro Township has the greatest population of individuals living in poverty (2,685) and the largest disabled population (5,100). Wrightstown Township has the lowest population over 65 (58). Washington Township has the lowest population of individuals under the age of 5 (8). Bass River Township, Beverly City, Eastampton Township, Fieldsboro Borough, Medford Lakes Borough, Shamong Township, and Woodland Township all have no (0) non-English speaking persons living within the jurisdiction. Fieldsboro Borough has fewest number of disabled persons in their jurisdiction (62). Wrightstown Borough has the lowest population living in poverty (21).

Table 4.3.2-5. Burlington County Socially Vulnerable Populations by Municipality

Jurisdiction	Total Population (Decennial Population 2020)	Percent of County Total	American Community Survey 5-Year Population Estimates (2021)									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Bass River (T)	1,355	0.3%	248	18.3%	67	4.9%	0	0.0%	175	12.9%	95	7.0%
Beverly (C)	2,499	0.5%	292	11.7%	183	7.3%	0	0.0%	249	10.0%	300	12.0%
Bordentown (C)	3,993	0.9%	772	19.3%	216	5.4%	16	0.4%	422	10.6%	227	5.7%
Bordentown (T)	11,791	2.6%	1,601	13.6%	472	4.0%	289	2.4%	1,092	9.3%	194	1.6%
Burlington (C)	9,743	2.1%	1,301	13.4%	661	6.8%	208	2.1%	1,251	12.8%	1,422	14.6%
Burlington (T)	23,983	5.2%	3,526	14.7%	1,497	6.2%	385	1.6%	2,366	9.9%	2,185	9.1%
Chesterfield (T)	9,422	2.0%	760	8.1%	578	6.1%	153	1.6%	423	4.5%	165	1.8%
Cinnaminson (T)	17,064	3.7%	3,103	18.2%	929	5.4%	208	1.2%	1,661	9.7%	584	3.4%
Delanco (T)	4,824	1.0%	1,297	26.9%	191	4.0%	42	0.9%	676	14.0%	322	6.7%
Delran (T)	17,882	3.9%	2,570	14.4%	1,047	5.9%	723	4.0%	1,548	8.7%	902	5.0%
Eastampton (T)	6,191	1.3%	557	9.0%	264	4.3%	0	0.0%	478	7.7%	488	7.9%
Edgewater Park (T)	8,930	1.9%	1,571	17.6%	700	7.8%	367	4.1%	1,465	16.4%	1,645	18.4%
Evesham (T)	46,826	10.1%	8,574	18.3%	2,237	4.8%	749	1.6%	4,504	9.6%	1,476	3.2%
Fieldsboro (B)	526	0.1%	82	15.6%	64	12.2%	0	0.0%	62	11.8%	36	6.8%
Florence (T)	12,812	2.8%	2,122	16.6%	645	5.0%	260	2.0%	1,460	11.4%	827	6.5%
Hainesport (T)	6,035	1.3%	1,327	22.0%	58	1.0%	0	0.0%	744	12.3%	250	4.1%
Lumberton (T)	12,803	2.8%	2,048	16.0%	661	5.2%	107	0.8%	1,490	11.6%	805	6.3%
Mansfield (T)	8,897	1.9%	2,506	28.2%	394	4.4%	330	3.7%	1,465	16.5%	181	2.0%
Maple Shade (T)	19,980	4.3%	2,897	14.5%	1,159	5.8%	694	3.5%	2,433	12.2%	1,971	9.9%
Medford (T)	24,497	5.3%	5,151	21.0%	1,085	4.4%	31	0.1%	2,775	11.3%	724	3.0%
Medford Lakes (B)	4,264	0.9%	879	20.6%	211	4.9%	0	0.0%	407	9.5%	26	0.6%

Jurisdiction	Total Population (Decennial Population 2020)	Percent of County Total	American Community Survey 5-Year Population Estimates (2021)									
			Over 65	Percent of Jurisdiction Total	Under 5	Percent of Jurisdiction Total	Non-English Speaking	Percent of Jurisdiction Total	Disability	Percent of Jurisdiction Total	Poverty Level	Percent of Jurisdiction Total
Moorestown (T)	21,355	4.6%	3,480	16.3%	837	3.9%	603	2.8%	1,654	7.7%	807	3.8%
Mount Holly (T)	9,981	2.2%	1,199	12.0%	454	4.5%	133	1.3%	1,624	16.3%	958	9.6%
Mount Laurel (T)	44,633	9.7%	8,299	18.6%	2,011	4.5%	889	2.0%	4,203	9.4%	1,689	3.8%
New Hanover (T)	6,367	1.4%	311	4.9%	214	3.4%	29	0.4%	192	3.0%	116	1.8%
North Hanover (T)	7,963	1.7%	532	6.7%	975	12.2%	125	1.6%	631	7.9%	481	6.0%
Palmyra (B)	7,438	1.6%	1,077	14.5%	190	2.6%	44	0.6%	961	12.9%	616	8.3%
Pemberton (B)	1,371	0.3%	282	20.6%	56	4.1%	47	3.4%	308	22.5%	140	10.2%
Pemberton (T)	26,903	5.8%	4,306	16.0%	1,429	5.3%	1,092	4.1%	4,006	14.9%	2,518	9.4%
Riverside (T)	8,003	1.7%	1,039	13.0%	354	4.4%	754	9.4%	972	12.1%	1,257	15.7%
Riverton (B)	2,764	0.6%	554	20.0%	80	2.9%	5	0.2%	187	6.8%	72	2.6%
Shamong (T)	6,460	1.4%	1,313	20.3%	324	5.0%	0	0.0%	671	10.4%	136	2.1%
Southampton (T)	10,317	2.2%	3,153	30.6%	293	2.8%	125	1.2%	1,551	15.0%	589	5.7%
Springfield (T)	3,245	0.7%	479	14.8%	129	4.0%	65	2.0%	311	9.6%	160	4.9%
Tabernacle (T)	6,776	1.5%	1,524	22.5%	380	5.6%	0	0.0%	747	11.0%	233	3.4%
Washington (T)	693	0.2%	138	19.9%	8	1.2%	8	1.1%	87	12.6%	21	3.0%
Westampton (T)	9,121	2.0%	1,139	12.5%	263	2.9%	81	0.9%	802	8.8%	268	2.9%
Willingboro (T)	31,889	6.9%	5,707	17.9%	1,916	6.0%	538	1.7%	5,100	16.0%	2,685	8.4%
Woodland (T)	1,544	0.3%	319	20.7%	49	3.2%	0	0.0%	627	40.6%	363	23.5%
Wrightstown (B)	720	0.2%	58	8.1%	69	9.6%	5	0.7%	119	16.5%	13	1.8%
Burlington County Total	**461,860**	**100.0%**	**78,093**	**16.9%**	**23,350**	**5.1%**	**9,103**	**2.0%**	**51,899**	**11.2%**	**27,947**	**6.1%**

Source: *U.S. Census Bureau 2020, 2021*
Note: *Persons per household = 2.6*

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). According to the 2021 5-year ACS estimates, there are 27,947 total persons living below the poverty level, 78,093 persons over the age of 65 years, 23,350 persons under the age of 5 years, 9,103 non-English speakers, and 51,899 persons with a disability in Burlington County. While the statistics of this virus are subject to change during the publication of this HMP, the New Jersey Covid-19 dashboard shows that Burlington County is within the second third of the impacted Counties. Overall, persons over 65 make up approximately 14.3-percent of positive COVID-19 cases in the entire State (NJDOH 2023).

Impact on General Building Stock

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

Impact on Critical Facilities

While the actual structures of County and municipal buildings, critical facilities, and infrastructure will not be impacted by a pandemic or disease outbreak, the effect of absenteeism on workers will impact local government services. The most significant impact on critical facilities would be the increase in hospitalization and emergency room visits that would take place as a result of the outbreak. This would create a greater demand on these critical facilities, their staff, and resources.

Mortuary services could be substantially impacted due to the anticipated increased numbers of deaths. The timely, safe, and respectful disposition of the deceased is an essential component of an effective response. Pandemic influenza may quickly rise to the level of a catastrophic incident that results in mass fatalities, which will place extraordinary demands (including religious, cultural, and emotional burdens) on local jurisdictions and the families of the victims (Homeland Security Council 2006).

The healthcare system will be severely taxed, if not overwhelmed, from the large number of illnesses and complications from influenza requiring hospitalization and critical care. Ventilators will be the most critical shortage if an outbreak were to occur (Homeland Security Council 2006).

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 have been implemented by the County and State to address this hazard.

The COVID-19 pandemic had significant economic impacts across the State of New Jersey. Over the course of two months, New Jersey lost nearly 720,000 jobs as businesses were forced to close their doors and residents entered a period of quarantine. This sudden halt of business activity forced the closure of schools, emptied the state's typically busy roads, and disrupted a previously healthy economy. Every

industry sector in New Jersey declined by at least some margin. The leisure and hospitality sector, which includes restaurants and casinos, lost nearly twice as many as any other sector, and accounted for 28-percent of all jobs lost during that time. Employment levels in the retail trade and health care sectors each declined by more than 100,000 jobs. Most of the decline in health care was due to temporary closures and limited capacity of ambulatory care services such as dentist's offices and other outpatient care centers. Many small businesses did not make it through the COVID-19 pandemic, and those that did had to significantly reduce payrolls to make ends meet (New Jersey Department of Labor and Workforce Development 2021).

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. One study has shown that invasive mosquitos such as the Asian tiger mosquito, a common invasive mosquito found in New Jersey, have "desiccation-resistant eggs," which means that they have enhanced survival in inhospitable environments (Juliano and Lounibos 2005). This species is considered a competitive predator and will prey on other species of mosquitos and a range of insects disrupting the natural food chain. Invasive species of mosquitos can be the major transmitters of disease like Zika, dengue, and yellow fever (CDC 2020).

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 United States Department of Health. If these sprays are applied in large concentrations, they could potentially leach into waterways and harm nearby terrestrial species. However, there is a law in New Jersey's Pesticide Regulations that states, "no person shall distribute, sell, offer for sale, purchase, or use any pesticide which has been suspended or canceled by the EPA, except as provided for in the suspension of cancellation order" (NJDEP 2020).

Further 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

Any areas of growth could be potentially impacted by the disease outbreak hazard because the entire planning area is exposed. As population counts change in the County, there may be at increased risk to certain diseases. Higher concentrations of persons traveling via public transportation may become more

vulnerable to the exchange of disease through airborne transmission. Increase development in rural areas may expose a higher percentage of the population to insect borne diseases.

Projected Changes in Population

The New Jersey Department of Labor and Workforce Development produced populations projections by County from 2014 to 2019, 2024, 2029, and 2034. According to these projections, Burlington County is projected to have a population of 460,400 by 2024, 464,900 by 2029, and 472,700 by 2034 (State of New Jersey 2017). Changes in population density may influence the number of persons exposed to disease outbreaks. Higher density jurisdictions are not only at risk of greater exposure to disease outbreak, but 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. Further, as the population ages there may be increased risk to this demographic. Older adults and people who have severe underlying medical conditions like heart or lung disease or diabetes seem to be at higher risk for developing more serious complications from certain diseases, such as COVID-19.

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 2021). 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 (Baker, et al. 2021).

Change of Vulnerability Since 2019 HMP

Disease outbreak was not identified as a hazard of concern in the 2019 HMP. Tick-borne diseases including Lyme and West Nile Virus and respiratory illnesses including coronavirus and influenza are included in this section.