3.12 Risk Assessment: Pandemic

Description

Pandemic is defined as an epidemic occurring worldwide, or over a very wide area, crossing international boundaries and usually affecting a large number of people. Seasonal epidemics of influenza, however, are not considered pandemics. Simultaneous worldwide transmission of a new influenza strain has defined an influenza pandemic, but whether the severity of illness it causes should be included in the definition of an influenza pandemic is still debated. The severity of any pandemic can be higher when a large number of people in the population lack pre-existing immunity to the causative agent or when a larger proportion of the population is infected. Organisms that cause pandemics may be transmitted from animals to humans, but the potential to cause a pandemic is increased when organisms are readily transmitted from human to human, especially before a person has any symptoms.

An outbreak is defined by the U.S. Centers for Disease Control and Prevention (CDC) as the occurrence of more cases of disease than normally expected within a specific place or group of people over a given period of time. In the State of Idaho, certain health care providers, health care facility administrators, and laboratorians, among others, must report any suspected outbreak or diseases or other health conditions identified in IDAPA 16.02.10 "Idaho Reportable Diseases" (https://adminrules.idaho.gov/rules/current/16/0210.pdf) to their local Public Health District or the Idaho Department of Health and Welfare (IDHW), Division of Public Health, and the Bureau of Communicable Disease Prevention, Epidemiology Program within a specified time frame.

The following diseases, in alphabetical order, have potential to become widespread in Idaho without ongoing surveillance and mitigation measures in Idaho and abroad.

Ebola virus disease is a rare and deadly disease caused by infection with one of the Ebola virus species. Ebola viruses are transmitted through direct contact with contaminated blood or body fluids of a person who is sick or has died from Ebola. In Africa, Ebola virus may be spread as a result of handling wild animals hunted for food. Ebola can cause disease in humans and nonhuman primates (for example, monkeys, gorillas, and chimpanzees). Ebola was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo and are found in several African countries (https://www.cdc.gov/vhf/ebola/outbreaks/history/distribution-map.html). Known outbreaks have appeared sporadically in Africa. There have been no reported cases of Ebola virus disease contracted in the United States, but in 2014, two U.S. residents were infected with Ebola virus while traveling to areas where it is found, and were diagnosed in the United States; two healthcare workers who provided care for the first of these patients also became infected with Ebola virus.

HIV is an abbreviation for human immunodeficiency virus. This viral infection is transmitted from someone who has HIV to another person by exposure to certain body fluids through sexual intercourse, sharing needles or syringes, from an infected mother to child during pregnancy or breastfeeding, and by

receiving a blood transfusion, blood products, or organ/tissue transplants that are contaminated by HIV (currently an extremely small risk in the United States). If HIV infection is not treated, HIV severely compromises the immune system and leads to AIDS (acquired immune deficiency syndrome). There is no effective cure for HIV, but HIV can be controlled with proper medical care and antiretroviral therapy. The first official report of what became known as the AIDS epidemic occurred in 1981.

Influenza is an infectious viral disease of birds and mammals commonly transmitted through aerosols produced by coughing or sneezing. People who have influenza can have some or all of these symptoms: fever, cough, sore throat, runny nose, muscle aches, headaches, fatigue, and sometimes vomiting and diarrhea. Complications from influenza virus infection can be moderate (e.g., sinus or ear infections) to severe (e.g., pneumonia, inflammation of the heart [myocarditis], inflammation of the brain [encephalitis], failure of multiple organs, and death). Influenza virus strains that were new or had not circulated in a while caused pandemics in the late 20th and 21st centuries (https://www.cdc.gov/flu/pandemic-resources/basics/past-pandemics.html). Influenza type A viruses are found in many other animals and can evolve to infect humans (https://www.cdc.gov/flu/other_flu.htm). Vaccines against a novel pandemic influenza will not be available immediately in most pandemics.

Measles (also known as rubella) is a serious respiratory disease caused by the measles virus. It can lead to pneumonia, encephalitis (swelling of the brain), and death. Measles is one of the most contagious of all infectious diseases: approximately 90% of susceptible people with close contact to someone with measles will get measles. The virus spreads through the air through coughing and sneezing. The measles-mumps-rubella (MMR) vaccine protects against measles.

Mosquito-borne diseases are those spread by the bite of an infected mosquito. Diseases that are spread to people by mosquitoes include Chikungunya, dengue, malaria, Saint Louis encephalitis (SLE), West Nile virus (WNV) disease, and Zika virus disease. Diseases included in this plan update are malaria, SLE, West Nile virus disease, and Zika virus disease.

> *Malaria* is a disease caused by a parasite transmitted by the bite of *Anopheles* mosquitoes. People with malaria are typically very sick with high fever, chills, sweats, headaches, body aches, general malaise, and nausea and vomiting. Severe malaria may include brain infection, sudden difficulty breathing, heart failure, and kidney failure. Illness and death can usually be prevented with timely, appropriate treatment. About 1,700 cases of malaria are diagnosed in the United States each year. The vast majority of cases in the United States are in travelers and immigrants returning from countries where malaria transmission occurs, many from sub-Saharan Africa and South Asia. *Anopheles* mosquitoes capable of transmitted malaria exist in the United States, so there is a constant risk that malaria transmission could resume in the United States. Prior to malaria elimination efforts in the United States during 1947–1951, malaria was endemic over much of the United States.

Saint Louis encephalitis virus is transmitted to humans by the bite of an infected mosquito. Most infected persons have no apparent illness. Early symptoms of those who become ill include fever, headache, nausea, vomiting, and fatigue. Severe disease (inflammation of the brain) occurs more commonly in older adults; in rare cases, long-term disability or death can result. There is no specific treatment for SLE. Most cases of SLE have been in eastern and central United States. No cases of SLE have been reported in Idaho during 2007–2017; however, SLE was detected in mosquitoes in Gem County, Idaho in 2017.

West Nile virus is most commonly spread to people by mosquito bites. About 1 in 5 people who are infected have a fever and other symptoms. About 1 out of 150 infected people develop a serious, sometimes fatal, illness. There are no vaccines to prevent WNV disease in human and no specific medications to treat WNV disease. WNV has been reported from all states in the continental United States.

Zika virus is transmitted by mosquitos (*Aedes aegypti* and *Aedes albopictus*), through sex, from an infected pregnant woman to her fetus, and likely by transfusion of tainted blood. Many people infected with Zika virus won't have symptoms or will only have mild symptoms. The most common symptoms of Zika virus disease are fever, rash, headache, joint pain, red eyes, and muscle pain. Zika virus infection during pregnancy can cause a birth defect of the brain called microcephaly and other severe brain defects. It is also linked to other problems, such as miscarriage, stillbirth, and other birth defects. Anyone who lives in or travels to an area where local transmission of Zika virus is occurring can be infected. Once a person has been infected, he or she is likely to be protected from future infections. In the United States, local mosquito-borne transmission of Zika virus has been reported in Miami-Dade County, Florida, and Brownsville, Texas. Zika virus infections in Idahoans have been reported; however, they were not infected in Idaho. The mosquito species known to transmit Zika virus are not found in Idaho, but could be imported (for example, in tires or potted plants) from areas where they occur.

Mumps is a contagious disease caused by the mumps virus. It is spread through saliva or mucus from the mouth, nose, or throat through coughing, sneezing or talking, sharing items such as cups or eating utensils, and touching contaminated objects. Mumps typically starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite, followed by swollen and tender salivary glands under the ears on one or both sides. Some people who get mumps have very mild or no symptoms; most people with mumps recover completely in a few weeks. Complications of mumps include inflammation of the testicles, brain, lining of the brain and spinal cord, ovaries, or breasts. Deafness can also occur. There is no specific treatment for mumps. The best way to protect against mumps is to be vaccinated with the measles-mumps-rubella (MMR) vaccine. Mumps outbreaks can occur in a highly vaccinated population, especially in settings where people are in close contact, such as colleges and camps.

Pertussis (whooping cough) is a highly contagious, respiratory disease caused by the pertussis bacterium. Early signs of pertussis resemble those of a cold, after 1-2 weeks, uncontrollable, violent coughing followed by vomiting or exhaustion can occur. Pertussis can cause serious illness in people of all ages, but is most dangerous for young babies. About half of babies younger than one year old who

get pertussis need hospital care and of those, about 1 in 100 will die. Vaccines that protect against pertussis include DtaP, for babies and children, and Tdap for preteens, teens, and adults.

Plague is a disease that affects humans and other mammals. It is caused by the bacterium, *Yersinia pestis*. Humans usually get plague after being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Historically, plague pandemics have killed millions of people in Asia and Europe (https://www.cdc.gov/plague/history/index.html). Today, prompt treatment or prophylaxis with certain antibiotics is effective against plague. Plague was introduced into the United States in 1990 and human plague infections continue to occur in the western United States. Significantly more cases occur in parts of Africa and Asia (https://www.cdc.gov/plague/maps/index.html). An outbreak of plague among ground squirrels occurred in southwestern Idaho during 2016 and 2017.

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by SARS-associated coronavirus (SARS-CoV). SARS usually begins with a high fever and mild respiratory symptoms that can progress to a condition in which oxygen levels in the blood are too low. SARS was first reported in Asia in February 2003. Over the next few months, the disease spread to more than two dozen countries in North America, South America, Europe, and Asia before the SARS global outbreak of 2003 was contained. There is no known SARS transmission anywhere in the world.

Tuberculosis (TB) is a disease caused by the bacterium *Mycobacterium tuberculosis.* The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain. TB is spread through the air from one person to another when a person with TB disease of the lungs or throat coughs, sneezes, speaks, or sings. People nearby may breathe in these bacteria and become infected. Not everyone infected with TB bacteria becomes sick. If not treated properly, TB disease can be fatal. TB disease was once the leading cause of death in the United States and is one of the top ten causes of death worldwide. Multidrug-resistant TB (MDR-TB) is a public health crisis and security threat.

Rabies is a viral disease of mammals most often transmitted through the bite of a rabid animal. It infects the central nervous system, ultimately causing disease in the brain and death. Over the last 100 years, rabies in the United States has changed dramatically. More than 90% of all animal cases reported annually to CDC now occur in wildlife; before 1960 the majority were in domestic animals. The principal rabies hosts in the United States today are wild carnivores and bats. The number of rabies-related human deaths in the United States has declined from more than 100 annually at the turn of the century to one or two per year in the 1990s. In Idaho, rabies is endemic in bats, but not in terrestrial mammals. Only bat strains of rabies have been documented in Idaho. Most rabid species detected have been bats; however, since 1967, three skunks, three cats, one bobcat, and one horse were found to have rabies, as well as one raccoon, which was imported from Florida. Since 2012, skunk rabies has rapidly spread westward to the Colorado Front Range, illustrating potential for spread into previously non-endemic areas.

Location, Extent, and Magnitude

Location

A pandemic could affect any part of the State of Idaho. Densely populated areas have greater potential for person-to-person transmission than less densely populated areas. Areas of abundant standing water (including areas used for flood irrigation) which provide a breeding site for mosquitos could be more prone to an outbreak of mosquito-borne diseases.

Extent

The exact size and extent of an infected population depends on factors related to the organism, the people or animals affected, and the environment. Factors related to the organism include what species it affects, how much of an organism is needed to establish an infection, how the organism is transmitted, and how stable it is in the environment. Factors related to people include how susceptible they are to infection, how long they are infectious, and the amount of contact between infected and uninfected individuals. Transmission rates of pandemic diseases are often higher in more densely populated areas.

Severity

The severity of an infectious disease pandemic or threat in Idaho varies depending on the organism, the susceptible population, ease of transmission, ability to identify infected persons before they can spread disease, and availability and effectiveness of control measures. Pandemics around the nation have the potential to affect the State's populated areas. As described in the Idaho Emergency Operations Plan (EOP), a yearlong influenza pandemic without intervention could result in almost 10 million hospitalizations and an estimated 1.9 million Americans could die.

Warning Time

Pandemics could occur with very little warning. Air travel could hasten the spread of a new organism and decrease the time available for early implementation of interventions. Influenza outbreaks are expected to occur simultaneously throughout much of the United States, preventing shifts in human and material resources that usually occur in response to other disasters. Warning time for influenza will depend on the origin of the virus and the amount of time needed to identify the virus.

Relationships to Other Hazards

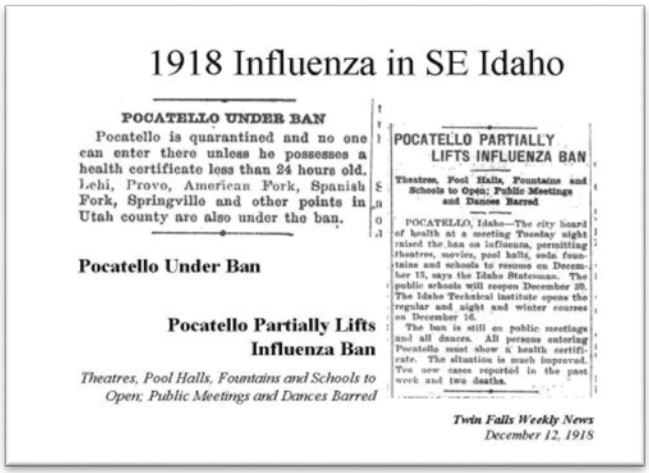
Secondary Impacts

Pandemic events do not influence any natural hazards. From a human-caused perspective, it is possible that a large, long-term event could result in civil disorder. Secondary impacts related to pandemics are related to an outbreak's direct impact on the population of Idaho. Most estimates of population effects have been done in relation to pandemic influenza. The State's healthcare systems and critical infrastructure will be impacted. Economic impacts are likely to occur during a pandemic and may lead to a global recession. Approximately 10 percent of the workforce will be absent at a given time during a pandemic. Without workers to fulfill key roles during a pandemic, secondary effects could include utility failures and other critical infrastructure disruptions. There could also be a reduction in the efficiency of

emergency services. Healthcare systems' ability to respond to pandemic events could be affected. Power outages could cause loss of HVAC and water pressure, inability to sterilize instruments, and loss of refrigeration and ability to cook meals. Staff may be unable to view radiographs using digital systems, register patients, or transport patients and supplies between floors.

Past Occurrence

In the past 100 years, there have been four influenza pandemics: 1918–1919, 1957–1958, 1968–1969, and 2009–2010. The most severe pandemic to affect the State was the 1918 influenza pandemic.



1918 Influenza in SE Idaho

POCATELLO UNDER BAN

Pocatello is quarantined and no one can enter there unless he possesses a health certificate less than 24 hours old. Lehi, Provo, American Fork, Spanish Fork, Springville and other points in Utah county are also under the ban.

Pocatello Under Ban

POCATELLO PARTIALLY LIFTS INFLUENZA BAN

Theatres, Pool Halls, Fountains and Schools to Open; Public Meetings and Dances Barred

POCATELLO, Idaho—The city board of health at a meeting Tuesday night raised the ban on influenza, permitting theatres, movies, pool halls, soda fountains and schools to resume on December 15, says the Idaho Statesman. The public schools will reopen December 20. The Idaho Technical institute opens the regular and night and winter courses on December 16.

The ban is still on public meetings and all dances. All persons entering Pocatello must show a health certificate. The situation is much improved. Ten new cases reported in the past week and two deaths.

Pocatello Partially Lifts Influenza Ban

Theatres, Pool Halls, Fountains and Schools to Open; Public Meetings and Dances Barred

Twin Falls Weekly News
December 12, 1918

Researchers have estimated that global mortality was between 21.5 and 50 million people as a result the Great Pandemic of 1918. During that pandemic, twenty-five percent of the American population became ill and 675,000 Americans died. Communities throughout Idaho reported 1918 influenza outbreaks and deaths and prohibited public events. The State Board of Health cancelled public and private-schools statewide in hopes of preventing the spread to children and families. The community of Hansen reported 46 cases in one day. The Pandemic of 1918 first affected Idaho in Canyon County. In less than two weeks, the number of cases grew to the extent the State was unable to track the disease accurately. Idaho officials and media urged Idahoans to remain calm, adding prohibition of public gatherings. By late October, there were reported influenza cases in Boise, Coeur d'Alene, Idaho Falls, Lewiston, Moscow, Pocatello, Twin Falls, Wallace, and other areas in the state. Spitting on public streets led to threatened punishment of fines and imprisonment. The military servicemen suffered great losses. Special trains transported the dead and coffins were in short supply. (CDC Pandemic Influenza – Past, Present, Future Workshop, Oct.17, 2006, https://www.cdc.gov/flu/pandemic-resources/pdf/workshop.pdf).

Idaho experiences seasonal influenza yearly. Idaho seasonal influenza surveillance reports are available at www.flu.idaho.gov.

Each year, the Idaho Department and Health and Welfare releases an annual reportable disease summary and updates Idaho reportable disease trends. Both can be found by following appropriate links at www.epi.idaho.gov. The annual reports are located on the Department's website (http://healthandwelfare.idaho.gov/Health/Epidemiology/IdahoDiseaseSummary/tabid/202/Default.aspx).

CHAPTER 3.12
RISK ASSESSMENT: PANDEMIC

Pandemic events that occurred in Idaho during 1918 through October 1, 2017 are summarized in Table 3.12.A. Loss and impact information for many events depends on the source, which can vary; therefore, Table 3.12.A might not include all events that have occurred in the state and the accuracy of monetary figures shown is based only on the available information identified during research for this update.

Table 3.12.A. Pandemic Events in Idaho, 1918 – 2017

Date(s) of Event	Event Type	Counties Affected	Description
1918	Influenza	Statewide	Caused an estimated 50 million deaths worldwide and about 675,000 in the United States. Communities throughout Idaho reported 1918 influenza outbreaks and deaths and prohibited public events. The State Board of Health cancelled public and private schools statewide in hopes of preventing the spread to children and families. The community of Hansen reported 46 cases in one day. The Pandemic of 1918 first affected Idaho in Canyon County. In less than two weeks, the number of cases grew to the extent the State was unable to track the disease accurately. Idaho officials and media urged Idahoans to remain calm, adding prohibition of public gatherings. By late October, there were reported influenza cases in Boise, Coeur d'Alene, Idaho Falls, Lewiston, Moscow, Pocatello, Twin Falls, Wallace, and other areas in the state. The military servicemen suffered great losses. Special trains transported the dead and coffins were in short supply.
1957–1958	Influenza	Statewide	Killed and estimated 1.1 million people worldwide and 116,000 in the United States. In Idaho, 49 deaths were attribute to the pandemic.
1968–1969	Influenza	Statewide	Caused an estimated 1 million deaths worldwide and about 100,000 in the United States. In Idaho, 61 deaths were attribute to the pandemic.
2009–2010	Influenza A(H1N1)	Statewide	Killed nearly 12,000 Americans during2009 through 2010; widespread in Idaho and led to several deaths
2014–2016	Ebola virus disease	N/A	During March 2014 through April 2016, West Africa experienced the largest outbreak of Ebola in history, with multiple countries affected, including the United States. In the United States, there were four cases including one death. Two cases were imported and two were locally acquired cases by healthcare workers. No cases occurred in Idaho; however, Idaho local and state public health officials and IOEM met with medical professionals, hospitals, emergency responders, universities and airports to discuss the need to look for symptoms that could indicate Ebola virus infection and educate health workers about effective response protocols to a suspected case. Exercising of Ebola virus disease response plans continues.
2015	Measles	N/A	A measles outbreak spread from Disneyland to 14 states and infected 102 people. Although there were no cases confirmed in Idaho, cases were detected in neighboring states affected.
September 2015	Mumps	Ada, Kootenai	A mumps outbreak began in September at the University of Idaho in Moscow and spread to other parts of Idaho. The State confirmed 21 cases of mumps on February 8, 2015. This outbreak led to confirmed cases in the Washington State, linked to those identified at the University. .
2016	Zika virus disease	Statewide	A widespread epidemic of Zika virus disease started in Brazil and spread to other parts of South and North America. Islands in the Pacific and Southeast Asia were also affected. The epidemic ended November 2016, as per WHO. In the United States, local cases of Zika virus transmission were was reported in Miami-Dade County, Florida, and in Brownsville,

Date(s) of Event	Event Type	Counties Affected	Description
			Texas. There were five reported cases of Zika in Idaho; however, these were not acquired in the State.
2017	Rabies (bat)	Statewide	In Idaho, only bats are known to be natural reservoirs for rabies. During 1999 through 2016, an average of 15 bats tested positive for rabies each year. A handful of other species in Idaho have also been documented with a bat strain of rabies virus. Because other mammals have tested positive for rabies, the risk of rabies exposure from bites, scratches, or other exposures to saliva and nervous tissue from mammals other than bats must not be ignored as a possible source of rabies. Other strains of rabies (skunk, raccoon, fox, and canine) are not currently found in Idaho, but skunk strains have been moving westward and could potentially affect Idaho.

Sources: Idaho State Hazard Mitigation Plan 2013; FEMA 2017

Idaho Department of Health and Welfare releases an annual reportable disease summary. The number of reported cases of selected diseases during CY2013 through CY2016 are listed below in Table 3.12.B.

Table 3.12.B. Number of reported cases of selected diseases — Idaho, 2013–2106

State of Idaho Reportable Disease Summary – Number of Cases				
Reportable Disease	**2013**	**2014**	**2015**	**2016**
HIV	44	21	43	47
Measles	0	0	0	0
Mosquito-borne diseases				
Malaria	5	3	6	0
Zika virus disease	-	-	-	5
West Nile Virus Infections	40	19	13	9
Mumps	0	26	8	1
Pertussis	237	367	194	83
Plague	0	0	0	0
SARS (Severe Acute Respiratory Syndrome)	0	0	0	0
Tuberculosis	11	11	11	18

Source: Idaho Department of Health and Welfare, Idaho Reportable Disease Data and Statistics

FEMA Disaster Declarations

During 1954 through 2017, FEMA has not included Idaho in any pandemic-related disasters (DR) or emergencies (EM) declarations.

Future Occurrence

Probability

Future occurrences of pandemic events are expected to continue. As bacteria and viruses continually evolve, there is always the opportunity for new diseases to occur. Planning for pandemic influenza is a

high priority because influenza A viruses evolve quickly by mutation and by trading genetic material with other influenza A viruses.

Factors in Idaho that heighten the probability of occurrences of such events include large numbers of travelers arriving via the region's airports, the transportation of infected animals into the area, or disease transmission through individuals transporting or coming into contact with infectious patients.

Although many of the diseases listed earlier in this section have not been experienced at pandemic magnitudes, there is the potential of a pandemic occurring at any time in the State of Idaho, with pandemic influenza being the most likely.

Environmental Impacts

The environmental impact of an epidemic or pandemic depends on the type of disease. Immediate environmental effects may be related to waste management and water treatment. Indirect environmental effects could occur as a result of population loss and are outside the scope of this document.

Diseases that are transmitted from animals to humans could affect agriculture, possibly resulting in the need for quarantine, testing, depopulation, and mass disposal through burial, composting, or incineration, each of which have potential environmental impacts. For more information on animal health emergencies see USDA Carcass Management during a Mass Animal Health Emergency, Final Programmatic Environmental Impact Statement, December 2015, https://www.aphis.usda.gov/stakeholders/downloads/2015/eis_carcass_management.pdf.

Diseases caused by highly infectious agents or those that persist in the environment can have high environmental impact and high costs from the need to dispose of contaminated waste. In November 2015, New York City was challenged with a "staggering waste stream" and costs from a single Ebola virus disease patient. Seven trailer loads comprising 352 drums of waste were sent for disposal at a total cost of $1,1200,000 (https://www.nrt.org/site/download.ashx?counter=3098).

Antivirals and antibiotics used for treatment of infectious diseases can be excreted into wastewater in a biologically active form and affect microorganism responsible for wastewater nutrient removal in wastewater treatment plants or rivers. In one model applied to the Thames river catchment, a mild influenza pandemic was projected to have a negligible ecotoxicologic hazard, but the fraction of microorganisms potentially affected in moderate and severe pandemics ranged from 0%–14% and 5%–32%, respectively, in wastewater treatment plants, and 0%–14% and 0%–30%, respectively, in rivers (Assessing the Ecotoxicologic Hazards of a Pandemic Influenza Medical Response, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3237342/).

Climate Change Impacts

Worldwide, there has been an apparent increase reports of infectious diseases, many of which reflect the combined effects of rapid demographic, environmental, social, technological, and other changes in

how we live. Mathematical models predict that climate change will likely affect changes in transmission patterns of infectious diseases (Climate Change and Human Health, Risks and Responses. World Health Organization, 2003, http://www.who.int/globalchange/environment/en/chapter6.pdf). Emergence of new pathogens and improved detection and reporting can also contribute to increases in numbers of reported cases.

The relationship between climate change and infectious diseases is complex and not well understood. The ranges and impacts of important pathogens might change as a result of changing temperatures and precipitation. Changing climate might increase or change the range of disease vectors such as mosquitoes or rodents. Heavy rainfall and flooding can be associated with waterborne disease outbreaks, especially where the drinking water supply is not treated. (Advancing the Science of Climate Change, National Academies Press, 2010, https://www.nap.edu/read/12782/chapter/15#314).

Development Trend Impacts

An understanding of population and development trends can help planners take action to ensure that appropriate mitigation, planning, and preparedness measures are in place. The State considered the following factors to examine previous and potential development trends that could affect hazard vulnerability:

- Projected changes in population
- Potential or projected development
- Other identified conditions as relevant and appropriate

The U.S. EPA's Integrated Climate and Land-Use Scenarios (ICLUS) project, https://www.epa.gov/iclus, generated projected population and land use projections for the United States through 2100. The project examined multiple scenarios taking into account various population growth and economic development parameters that have been used as the baseline for the Intergovernmental Panel on Climate Change's Special Report on Emissions Scenarios. Population change projections were made with assumptions regarding fertility, mortality, and immigration, which were then used to drive the land use projections.

Counties that are projected to experience population growth by 2026 are shown in Chapter 2, State Profile, Table 2C. Future population growth will directly impact the State's vulnerability to pandemics: as populations grow, so will population density, which will increase the chance of transmission of communicable diseases from person to person. High density developments will also increase the State's vulnerability to pandemics transmitted from person to person, as people live and work closer together.

Vulnerability Assessment

Loss estimation for pandemics has been done at global, national, and state levels. The response to severe acute respiratory syndrome (SARS) is an example of how fear can drive reactions with global consequences. As people tried to avoid infection by minimizing face-to-face interactions, sectors such as

tourism, mass transportation, retail sales, hotels, and restaurants were affected. Workplace absenteeism, disruption of production processes and shifts led to costly procedures and increase in production, employment, and training costs. Schools, hospitals, and some borders were closed. International travel to affected areas fell by 50%–70%. Hotel occupancy dropped by more than 60% (http://www.who.int/whr/2003/chapter5/en/index4.html). Loss estimates for GDP of affected countries for the second quarter of 2003 ranged from 5% to 10% (http://documents.worldbank.org/curated/en/101511468028867410/pdf/wps4466.pdf). Persons of Asian race in the United States were stigmatized and members of the general public expressed concern about having contact with persons of Asian descent ("Fear and Stigma: The Epidemic with the SARS Outbreak," https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3322940/).

In 2005, the Asian Development Bank estimated potential losses under two different influenza pandemic scenarios (https://www.adb.org/sites/default/files/publication/28082/pb042.pdf). The estimated percentages of gross domestic product (GDP) losses in Asia in the first scenario were 2.3% from demand shock and 0.3% from supply shock; in the second scenario, .6.5% of GDP was lost from demand shock and 0.3% from supply shock. Growth in Asia would nearly stop, global GDP would shrink 0.6%, and global trade of goods and services would shrink about 14%.

According to estimates prepared by the United States Congressional Budget Office, https://www.cbo.gov/sites/default/files/109th-congress-2005-2006/reports/12-08-birdflu.pdf, a severe influenza pandemic would result in estimated demand-side reductions of about 2% of gross domestic product (GDP) and about 2.5% in supply-side reductions. This would lead to an economic impact slightly larger than the typical recession since World War II.

Economic losses in Idaho as a result of a pandemic were estimated in March 2007 by the Trust for America's Health, http://healthyamericans.org/reports/flurecession/releases/ID.pdf, http://healthyamericans.org/reports/flurecession/ using 2005 GDP and 2005 Census data. At that time, GDP loss from a severe pandemic was estimated to be $2.6 billion, or 5.42%. Since then, the population of Idaho has grown and the population's structure has changed, with the percentage of children under 5 years of age decreasing and the percentage of adults 65 years of age and older increasing. Additionally, changes in employment sectors continue to occur (for example, the percentage of persons employed in healthcare and social assistance is expected to increase 26.5% from 2012 to 2022, https://labor.idaho.gov/publications/2022-Idaho-Projections.pdf), which also affects loss estimates. Because estimates for economic losses are outdated, consideration should be given to obtaining updated, projected estimates through 2022 and for each future State of Idaho Hazard Mitigation Plan. Costs for prevention and response should also be considered. Idaho receives federal funding for public health preparedness as described below. State and local public health agencies have an increasing partial matching requirement to receive these funds. Federal funding alone will not provide for all preparedness needs in Idaho.

Congress first passed the Pandemic and All Hazards Preparedness Act (PAHPA) in 2006, and reauthorized the Act in March 2013, through the Pandemic and All-Hazards Preparedness Reauthorization Act (PAHPRA), set to expire October 2018 without further reauthorization. This act supports communities in preventing, preparing for, and responding to adverse health effects of such disasters. It authorizes funding for programs such as the Public Health Emergency Preparedness (PHEP) cooperative agreement, which, since 2002, has provided more than $11 billion to public health departments across the United States, to help them build and strengthen their abilities to effectively respond to a range of public health threats, including infectious diseases (CDC, https://www.cdc.gov/phpr/readiness/phep.htm). The PHEP Cooperative Agreement in Idaho is managed by the Idaho Department of Health and Welfare, Division of Public Health, Bureau of Emergency Medical Services and Preparedness, Public Health Preparedness and Response Section.
https://healthandwelfare.idaho.gov/Health/PublicHealthPreparednessandResponseSection/tabid/110/Default.aspx.

Critical Infrastructure and State Facility Impacts

Although actual structures of State buildings, critical facilities, and infrastructure are not directly affected by a pandemic or disease outbreak, maintenance could be adversely affected when the available workforce is reduced. Absenteeism of State workers is expected to affect State services, even when continuity of operations plans are implemented. Procedures for continuity of government operations will need to be implemented during a pandemic. A CDC model suggests that approximately 10% of the workforce will be ill or caring for an ill family member at the peak of a pandemic disease (HHS Pandemic Influenza Plan, U.S. Department of Health and Human Services, 2005, https://www.cdc.gov/flu/pdf/professionals/hhspandemicinfluenzaplan.pdf). According to Transparent Idaho, http://transparent.idaho.gov/Pages/transhome.aspx, as of April 23, 2018, there are 25,997 State agency employees in Idaho. A 10% absentee rate equates to 2,600 State employees who do not report to work, which could affect the delivery of state services.

Similarly, the most significant effect on critical facilities would be employees who do not come to work resulting in a loss of service. Table 3.12.C shows a range of estimated number of ill workers in a few critical infrastructure industries, based on data from the 2016 American Community Survey, https://www.census.gov/programs-surveys/acs/ and ill and absenteeism estimates for an influenza pandemic. A CDC tool for estimated work loss from influenza (FluWorkLoss 1.0) is available at https://www.cdc.gov/flu/pandemic-resources/tools/fluworkloss.htm. Because estimates for number of ill, hospitalized, and deceased are outdated, consideration should be given to obtaining updated, estimates for projected populations through 2022 and for each future State of Idaho Hazard Mitigation Plan.

Table 3.12.C. Estimated Number of Absent Workers by Industry during a Pandemic (2016)

Industry	Total Workforce (2016)	Total Number of workers Ill		Total Number of Workers Absent (40%)
		15% Attack Rate	35% Attack Rate	
Admin Support/Waste Mgt/ Remediation Services	31,196	4,680	10,919	12,479
Health Care and Social Assistance	99,149	14,873	34,703	39,660
Utilities	7,008	1,052	2,453	2,804
	137,353	20,605	48,075	54,943

Note: The estimated attack rate for seasonal influenza typically ranges from 5% to 15%. Attack rates for pandemic influenza are reported in the range of 25% to 50%.Source (total workforce numbers by industry)
Source: American Community Survey, Accessed on April 24, 2018.

An increase in emergency room visits and hospitalization is anticipated to occur in an outbreak of severe illness, creating a greater demand on these critical facilities, their staff, and resources. The planning scenario in the2005 HHS Pandemic Influenza Plan anticipates a 25% increase in the demand for hospitalization and intensive care unit services, even in a moderate pandemic.

As a pandemic sweeps across an area, first responders such as police and fire, medical staff, hospitals, pharmacies, drug stores, and other local businesses will be strained from the effect of the disease on the community. Emergency rooms could reach capacity, and social services and support agency offices (including shelters, Health & Welfare, Social Security, Disability, Unemployment, and Probation and Parole) could potentially close as skeleton crews are unable to maintain the workload. Health clinics, non-governmental organizations, community-based organizations (such as after school programs for working families), and financial institutions may be limited and forced to close doors because of ill employees or employees who stay home to care for loved ones, or from fear of becoming ill. Entire court systems, prisons, and hospitals have potential, if strained enough, to collapse.

Assessment of Local Vulnerability and Potential Losses

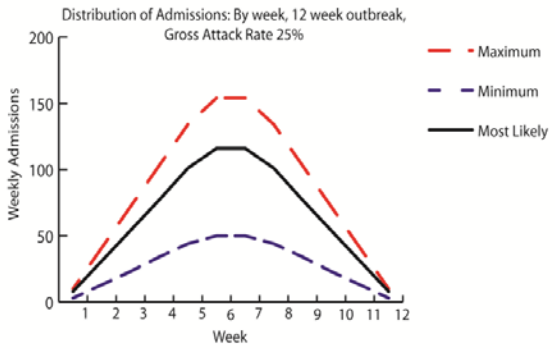
The entire State's population is vulnerable to an epidemic or pandemic hazard. However, areas with higher population density will have a higher number of contacts and thus greater transmission of contagious diseases. Subpopulations, such as the very young and elderly, are typically, but not always, considered at higher risk. Chapter 2 of this SHMP includes a detailed description of the State's demographics.

CDC pandemic influenza modeling tools, https://www.cdc.gov/flu/pandemic-resources/pandemic-resources.html, have been provided to help understand how influenza pandemics of different severity might affect the State. CDC FluAid 2.0, https://www.cdc.gov/flu/pandemic-resources/tools/fluaid.htm, and CDC FluSurge 2.0, https://www.cdc.gov/flu/pandemic-resources/tools/flusurge.htm, are tools that can be used for preparing estimated numbers of deaths for different populations and data for hospital capacity analysis (see Figure 3.12.D for an example of the later). Jurisdictions and hospitals are encouraged to use these tools for pandemic planning. Updated maps with county-level estimates of illness, hospitalizations, and deaths should be considered for inclusion in future SHMP updates.

Figure 3.12.D. Sample county pandemic capacity analysis output.

SAMPLE COUNTY PANDEMIC CAPACITY ANALYSIS

Pandemic Influenza Impact / Attack Rate	25%
Total Hospital Admissions	
Most Likely Scenario	774
Minimum Scenario	335
Maximum Scenario	1,028
Total Deaths	
Most Likely Scenario	161
Minimum Scenario	102
Maximum Scenario	259



Hosp Adm. / Week	1	2	3	4	5	6	7	8	9	10	11	12
Most Likely Scenario	8	31	54	77	101	116	116	101	77	54	31	8
Minimum Scenario	3	13	23	34	44	50	50	44	34	23	13	3
Maximum Scenario	10	41	72	103	134	154	154	134	103	72	41	10

Regional Hospital Capacity

Pandemic Influenza Impact / Weeks		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Hospital Admission	Weekly admissions	8	31	54	77	101	116	116	101	77	54	31	8		
	Peak admissions/day	0	0	0	0	0	18	18	0	0	0	0	0		
Hospital Capacity	# of influenza patients in hospital	6	23	40	57	74	85	88	79	67	51	34	18		
	% of hospital capacity needed	2%	6%	11%	16%	20%	23%	24%	22%	18%	14%	9%	5%		
ICU Capacity	# of influenza patients in ICU	1	5	10	15	20	24	26	25	22	17	12	7		
	% of ICU capacity needed	3%	15%	30%	45%	60%	71%	75%	74%	63%	50%	35%	21%		
Ventilator Capacity	# of influenza patients on ventilators	1	3	5	8	10	12	13	13	11	8	6	3		
	% usage of ventilator	2%	8%	16%	23%	31%	37%	39%	38%	33%	26%	18%	11%		
Deaths	# of deaths from influenza			2	6	11	16	21	24	24	21	16	11	6	2
	# of influenza deaths in hospital			1	5	8	11	15	17	17	15	11	8	5	1

Vulnerability Summary

Overall, the entire state is exposed and potentially vulnerable to a pandemic event. Urban populations are anticipated to have a higher likelihood of rapid spread of epidemics transmitted person-to-person than rural populations because of a higher population density. Rural populations could be more vulnerable to effects of illness by having less access to medical care; however, all but two counties in Idaho are primary care health professional shortage service areas and much of the state is designated as a medically underserved area or population (see links on https://healthandwelfare.idaho.gov/Health/RuralHealthandPrimaryCare/ShortageDesignations/tabid/415/Default.aspx).

Pandemic preparedness and response capabilities might be inversely related to vulnerability. The Trust for America's Health, has scored each state in the U.S. on its ability to protect the public's health from

diseases, disasters, and bioterrorism. Ten key indicators representing examples of important capabilities, policies and trends, and selected in consultation with leading public health and healthcare officials, were rated and one point given for each yes response for an indicator (http://healthyamericans.org/assets/files/TFAH-2017-ReadyOrNot-Fnl.pdf). Idaho scored a 5 out of 10 (Table 3.12.E), as did five other states, with only 13 states scoring higher. Demonstrating the ability to increase influenza vaccination coverage in Idaho (Indicator #5) would enhance Idaho's preparedness; however, private sector and general public engagement are necessary complements of public health agency efforts to improve vaccination coverage.

Table 3.12.E. Key Preparedness Indicators in Idaho*

Indicator Number	Indicator	Idaho
1	Public Health Funding Commitment: State increased or maintained funding for public health from FY 2015 to FY 2016 and FY2016 to FY2017.	No
2	National Health Security Preparedness Index: State increased their overall preparedness scores based on the National Health Security Preparedness Index™ between 2015 and 2016.	Yes
3	Public Health Accreditation: State has accredited public health department.	Yes
4	Antibiotic Stewardship Program for Hospitals: State has 70 percent or more of hospitals reporting meeting Antibiotic Stewardship Program core elements in 2016.	No
5	Flu Vaccination Rate: State vaccinated at least half of their population (ages 6 months and older) for the seasonal flu from Fall 2016 to Spring 2017.	No
6	Enhanced Nurse Licensure Compact (eNLC): State participates in an eNLC.	Yes
7	United States Climate Alliance: State has joined the U.S. Climate Alliance to reduce greenhouse gas emissions consistent with the goals of the Paris Agreement.	No
8	Public Health Laboratories: State laboratory provided biosafety training and/or provided information about biosafety training courses (July 1, 2016 to June 30, 2017).	Yes
9	Public Health Laboratories: State laboratory has a Biosafety Professional (July 1, 2016 to June 30, 2017).	Yes
10	Paid Sick Leave: State has paid sick leave law.	No

**Trust for America's Health. Ready or Not? Protection the Public's Health from Diseases, Disasters, and Bioterrorism. December 2017 p.16-17 Washington. DC: Trust for American's Health; 2017. Retrieved from http://healthyamericans.org/assets/files/TFAH-2017-ReadyOrNot-Fnl.pdf on 4/24/2018.*

Note: Yes means the state received a point for that indicator

Consequence Analysis Evaluation

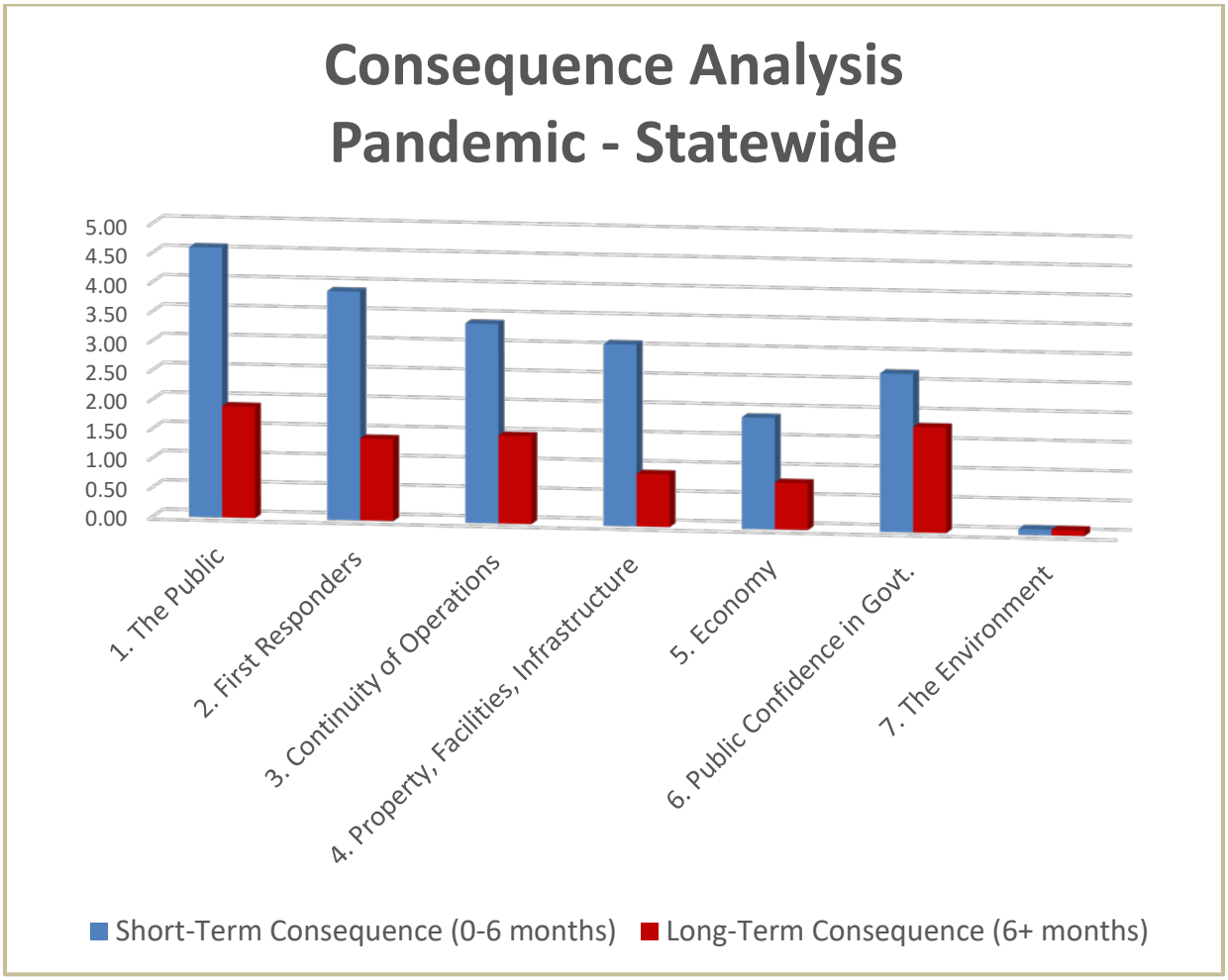
On June 8, 2017, a consequence analysis evaluation was conducted for hazard scenarios, aligning with hazards profiled in the SHMP. The assessment was conducted by a diverse planning team comprised of subject matter experts from across the State. This effort mirrored a similar exercise that occurred during both the 2010 and 2013 State Hazard Mitigation Plan updates.

Pandemic consequence analysis evaluation for a pandemic was conducted using the following influenza scenario: "In November, a novel strain of influenza has impacted the northwest part of the United States, including the state of Idaho. Numerous hospitals in the state are reporting record numbers of admissions statewide and many are diverting patients to other hospitals. The elderly and young children appear to be at greatest risk and while not as severe as some "worst-case" predictions, the numbers of people showing serious symptoms due to infection has alarmed medical experts. Although not official, it appears that the virus affects about 20%–25% ("attack rate"), and approximately 3% of ill persons die (case fatality rate)."

The exercise was intended to provide another way to assess the State's vulnerability to its hazards and was conducted as a group exercise. Participants were asked to individually rank the following systems on a scale from 0 (no consequences) to 5 (most severe consequences), separately evaluating both the short-term (0-6 month) and long-term (6+ months) consequences of the scenario:

- The public
- First responders
- Continuity of operations
- Property, facilities, and infrastructure
- Economic conditions
- Public confidence in government
- The environment

Results



Looking at the short-term consequences of this pandemic event, exercise participants felt that the most severe consequences would be felt by the public, first responders, continuity of operations, and the built environment. From a long-term standpoint, the two systems suffering the most severe consequences (in decreasing order) include the public and the public's confidence in government. Overall, what stands out is that the environment is not expected to experience much, if any, short and long-term consequences.

Some observations of the group to note included:

- Consequences would be even greater if this virus also affects the animal population, especially relating to the economy.
- Winter is the worst time for this event to occur due to populations being forced indoors.
- This event could have regional impacts and strain the healthcare systems and supplies.
- The overall widespread loss of institutional knowledge could have far-reaching impacts to all systems.

- Recent improvements in planning, public outreach, and exercises would lead to a better response to this type of event.
- The ease and volume of public travel could quickly escalate this scenario.

Community Mitigation Guidelines to Prevent Pandemic Influenza. – United States, 2017

"The purpose of these guidelines is to help state, tribal, local, and territorial health departments with prepandemic planning and decision-making by providing updated recommendations on the use of NPIs. These recommendations have incorporated lessons learned from the federal, state, and local responses to the influenza A (H1N1) pdm09 virus pandemic (hereafter referred to as the 2009 H1N1 pandemic) and findings from research. Communities, families and individuals, employers, and schools can create plans that use these interventions to help slow the spread of a pandemic and prevent disease and death."

Mitigation Rationale

In comparison with other hazards, pandemics have low structural impact, but high socio-economic impact. Applying national default estimates to Idaho, for an influenza pandemic with 35% of the population affected, up to roughly 3,000 deaths and 10,000 hospitalizations could occur. Absenteeism could affect continuity of operations of critical services.

General Mitigation Approaches

Although hazard mitigation is defined as sustained action to reduce or eliminate long-term risk to human life and property, and IOEM states that mitigation actions are usually permanent solutions to hazards faced by Idahoans, the elimination of pandemics is not the goal of pandemic mitigation.

To *eradicate* an organism, three factors are of primary importance: 1) effective intervention is available to interrupt transmission, 2) practical and accurate diagnostic tools are available to identify infections, and 3) humans are essential of the life-cycle of the organism, which has no other vertebrate reservoir and does not amplify in the environment. In addition, economic, social, and political factors must be met. Smallpox is the classic example of a successful disease eradication program. Other diseases that could be eradicated in the next several years are poliomyelitis, Guinea worm disease, lymphatic filariasis, and onchocerciasis.

Hazard Management

Elimination of disease or infections in a defined geographic area requires continual intervention measures to prevent reestablishment of transmission. For example, in the United States, measles was declared eliminated in 2000, and rubella was declared eliminated in 2004; however, imported cases of both diseases continue to be reported and transmission to unvaccinated persons caused several measles outbreaks in the United States since then.

Routine public health interventions at the local level that mitigate potentially pandemic disease include disease surveillance, case investigation and contact tracing, screening of exposed persons, exclusion of

ill or exposed persons from activities that put others at risk of disease, monitoring treatment of cases, ongoing immunization programs, health education, and environmental control measures.

Additional public health interventions during an epidemic or pandemic could include:

- Pharmaceutical interventions
  - Mass distribution of medication for prophylaxis or treatment (Strategic National Stockpile, https://www.cdc.gov/phpr/stockpile/index.htm)
  - Mass immunization
- Non-pharmaceutical interventions, also known as "community mitigation strategies" https://www.cdc.gov/mmwr/volumes/66/rr/rr6601a1.htm
  - Public education on personal and precautionary protection behaviors
  - Social distancing
    - School and daycare closures
    - Postponement or cancellation of mass gatherings
    - Closures and modifications of workplace or community events
    - Teleworking, https://www.telework.gov/guidance-legislation/telework-guidance/emergency-telework/
  - Restrictions on movement; travel advisories and warnings
  - Mass evacuation, https://www.fema.gov/pdf/emergency/nrf/nrf_massevacuationincidentannex.pdf
- Environmental interventions
  - Disposal of contaminated material, http://www.deq.idaho.gov/waste-mgmt-remediation/hazardous-waste/
  - Decontamination of environment, https://www.cdc.gov/nonpharmaceutical-interventions/environmental/index.html
  - Vector control, https://www.cdc.gov/nceh/ehs/topics/vectorcontrol.htm
  - Embargo of food product or equipment used in food production (Idaho Food Code, http://healthandwelfare.idaho.gov/Portals/0/Health/FoodProtection/Full%20Idaho%20Food%20Code.pdf)
- Mass care
  - Mobilization of medical reserve corps, https://servid.org/
  - Shelters, https://www.cdc.gov/nceh/ehs/etp/shelter.htm
  - Alternate care facilities, https://asprtracie.hhs.gov/technical-resources/48/alternate-care-sites-including-shelter-medical-care/47
  - Seizure of medical equipment or facilities (Idaho Statute Title 46 Section 1012, https://legislature.idaho.gov/statutesrules/idstat/title46/t46ch10/sect46-1012/)
- Depopulation of affected agricultural animal unit (https://www.aphis.usda.gov/aphis/ourfocus/emergencyresponse/sa_tools_and_training/ct_aphis_role_emergency_depopulation}

Laws, Policies, and Programs

Links to relevant laws, policies, and programs are detailed below by disease condition.

All reportable diseases:

- IDAPA 16.02.10 "Idaho Reportable Diseases" https://adminrules.idaho.gov/rules/current/16/0210.pdf
- Idaho Investigative Guidelines for Public Health (not available online)
- IDHW Epidemiology Program, www.epi.idaho.gov

Ebola virus disease

- IDPH Ebola webpages,http://healthandwelfare.idaho.gov/EbolaHome/tabid/1475/Default.aspx

HIV

- Idaho HIV Prevention Program http://healthandwelfare.idaho.gov/Health/FamilyPlanningSTDHIV/HIVAIDS/tabid/390/Default.aspx

Influenza

- Idaho influenza season surveillance data, at www.flu.idaho.gov
- Idaho Pandemic Influenza Plan (not available online)
- Idaho Immunization Program, http://ImmunizeIdaho.com
- ISDA National Poultry Improvement Plan (NPIP) https://agri.idaho.gov/main/animals/avian-species/national-poultry-improvement-plan/
- IDFG avian influenza surveillance, https://idfg.idaho.gov/conservation/wildlife-health/avian-influenza

Measles, Mumps, Pertussis

- Idaho Immunization Program, http://ImmunizeIdaho.com
- IDAPA 16.02.11, Immunization Requirements for Children Attending Licensed Daycare Facilities in Idaho, https://adminrules.idaho.gov/rules/current/16/160211.pdf
- IDAPA 16.02.15, Immunization Requirements for Idaho School Children https://adminrules.idaho.gov/rules/current/16/160215.pdf

Mosquito-borne diseases

- In Idaho, mosquito abatement is conducted by mosquito abatement districts,

- . Idaho Statute Title 39 Chapter 28, the Idaho Mosquito and Vermin Abatement Act, https://legislature.idaho.gov/statutesrules/idstat/title39/t39ch28/, authorizes the formation of abatement districts, describes their powers and duties, and outlines procedures for formation and financing of abatement districts
- Arbovirus Surveillance and Mosquito Control in Idaho: Guidance for Counties, 2nd edition, 2007 http://healthandwelfare.idaho.gov/Portals/0/Health/Epi/WNV/Arbovirus%20Surveillance%20and%20Mosquito%20Control%20in%20Idaho%202nd%20edition%20FINAL.pdf
- ISDA pesticide licensing, https://agri.idaho.gov/main/56-2/pesticides/pesticide-licensing/

Plague

- IDFG Plague Information, https://idfg.idaho.gov/plague
- IDAPA 02.04.03 "Rules Governing Animal Industry" Section 301 https://adminrules.idaho.gov/rules/current/02/0403.pdf

Rabies

- Idaho Rabies Protocol http://healthandwelfare.idaho.gov/Health/DiseasesConditions/RabiesInformation/tabid/176/Default.aspx
- IDAPA 02.04.03 "Rules Governing Animal Industry" Section 175 https://adminrules.idaho.gov/rules/current/02/0403.pdf

SARS

- CDC Severe Acute Respiratory Syndrome webpages https://www.cdc.gov/sars/about/index.html

Tuberculosis

- Idaho Tuberculosis Manual (http://healthandwelfare.idaho.gov/Health/DiseasesConditions/Tuberculosis/tabid/378/Default.aspx)

Pandemics or Other Public Health Emergencies

Pandemic plans at state and local public health district levels are coordinated by the public health preparedness and response program of each jurisdiction and include policies and legal authorities. These plans integrate with the IOEM Idaho Emergency Operations Plan. Hospitals and other healthcare facilities have emergency plans and most participate in healthcare coalitions to coordinate those plans.

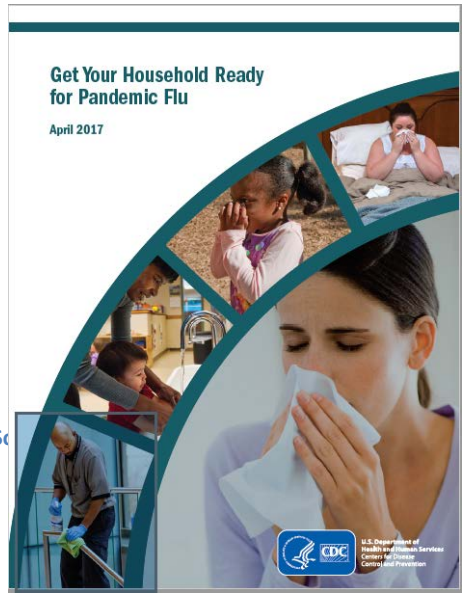
- Idaho Emergency Operations Plan https://ioem.idaho.gov/Pages/Plans/Documents/2017%20IDEOP.PDF
- Incident Annex #6, Pandemic Influenza
- IDHW Emergency Operations Plan (not available online)
- IDHW Public Health Preparedness and Response Program http://healthandwelfare.idaho.gov/Health/PublicHealthPreparednessProgram/tabid/110/Default.aspx

Idaho cities and counties also plan for how to mitigate a pandemic. Many of these plans include public education measures. Public-facing websites such as *Get Pandemic Ready,* http://www.getpandemicready.org/, created by Nez Perce County, have been referenced. As county all-hazard or multi-hazard mitigation plans are updated on different schedules, see your county's website for the most current plan.

Government and private sectors must plan to provide essential services while significant absenteeism occurs during an influenza pandemic. Absenteeism rates will depend on the severity of a pandemic. In a severe influenza pandemic, absenteeism attributable to illness, the need to care for ill family members, and fear of infection are estimated to range from 20% to 40%. It is estimated that epidemics will last 6 to 8 weeks in affected communities and multiple waves of epidemics will likely occur, each lasting 2 to 3 months. Most guidance documents for pandemic planning and mitigation focus on pandemic influenza.

- DHS' Pandemic Influenza Preparedness, Response, and Recovery: Guide for Critical Infrastructure and Key Resources http://emilms.fema.gov/IS520/assets/cikrpandemicinfluenzaguide.pdf
- CDC Foundation website, "Connecting Business with CDC Preparedness Resources" https://www.cdcfoundation.org/businesspulse/business-continuity-resources
- FEMA IS-520 Introduction to Continuity of Operations Planning for Pandemic Influenza https://emilms.fema.gov/IS520/PAN0101000.htm
- FEMA Non-Federal Continuity Plan Template https://www.fema.gov/media-library/assets/documents/90025
- CDC Healthcare System Preparedness and Response resources https://www.cdc.gov/flu/pandemic-resources/planning-preparedness/healthcare-preparedness-response.html
- IDHW Pandemic Influenza webpages, www.panflu.idaho.gov.

Discussion of national strategies such as research on pandemics or on organisms with pandemic potential, national biosurveillance, funding of pharmaceutical measures development, etc. is beyond the scope of this document.



Public participation is essential for pandemic mitigation. Public resources can be found on many of the above websites and https://www.ready.gov/pandemic. An excellent 2017 publication from CDC is Get Your Household Ready for Pandemic Flu, https://www.cdc.gov/nonpharmaceutical-interventions/pdf/gr-pan-flu-ind-house.pdf.

Funding

IDHW funds programmatic activities through several sources, including federal cooperative agreements, and applies for additional funding opportunities as they become available and are approved by the State.

- IDHW Facts, Figures, and Trends http://healthandwelfare.idaho.gov/AboutUs/Facts,FiguresTrends/tabid/1127/Default.aspx

National policies, as defined in the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) and 44 CFR, Emergency Management and Assistance, outline the types of eligible planning and protective measures. In the event of a major disaster or emergency pandemic-related declaration, the Public Assistance Program may provide funding for specific services or equipment.

- IOEM Public Assistance Program (FEMA) https://ioem.idaho.gov/Pages/Operations/DisasterAssistance/PublicAssistance.aspx
- FEMA Public Assistance Program and Policy Guide (https://www.fema.gov/media-library/assets/documents/111781). Among eligible critical services related to pandemic mitigation measures are medically necessary tests and diagnosis, vaccinations for survivor and emergency workers, vaccination of household pets, temporary medical facilities, and evacuations and sheltering.
- Office of Response and Recovery Fact Sheet FP 104- 009-001, Infectious Disease Event, https://www.fema.gov/media-library-data/1464717519589-ba4712cb1eab5dfb47636b8a2a108676/InfectiousDiseaseFactSheetORR05132016.pdf The HHS Centers for Disease Control and Prevention (CDC) has primary authority to enable support and assistance to States, Territorial, or Tribal Governments in response to an infectious disease event. FEMA may provide assistance for the rescue, evacuation, and movement of persons; movement of supplies; and care, shelter, and other essential needs of affected human

populations. Any assistance provided by FEMA in response to an infectious disease event is done in coordination with the CDC.

- Mosquito Abatement, FEMA Public Assistance Program and Policy Guide, Appendix G. https://www.fema.gov/media-library-data/1515614675577-be7fd5e0cac814441c313882924c5c0a/PAPPG_V3_508_FINAL.pdf. Mosquito abatement measures may be eligible when a State, Territorial, Tribal, or local government public health official validates in writing that a mosquito population poses a specific health threat. FEMA consults with CDC to determine the eligibility of mosquito abatement activities. FEMA only provides public assistance funding for the increased cost of mosquito abatement. This is the amount that exceeds the average amount based on the last 3 years of expenses for the same period.
- Centers for Disease Control, Office of Public Health Preparedness and Response, Cooperative Agreement for Emergency Response: Public Health Crisis Response. The Public Health Preparedness and Response Section, within the Bureau of Emergency Medical Services and Preparedness, is listed on a roster of state public health departments that are pre-approved for rapid funding by CDC to support the surge needs of existing programs responding to a significant public health emergency such as pandemic influenza.

Potential Feasible Mitigation Actions

- Provide funding to update human illness, hospitalization, and death estimates by county and Public Health District for various severities of pandemic influenza, and to update pandemic economic loss estimations based on previously developed models. *Objective*: Provide current estimates for pandemic planning as previous estimates are over a decade old. *Goal*: Improved, more realistic pandemic planning. *Current funding sources*: Although human loss estimation is an allowable activity under federal preparedness funding, current funds are already obligated towards other activities and personnel resources are limited.
- Provide grants for adult immunization clinics for vulnerable populations with limited access to healthcare (e.g., homeless persons, low-income healthcare workers). *Objective*: Provide readily accessible adult immunizations to persons who would likely be unvaccinated and who are at higher risk of exposure or illness. *Goal*: Prevent vaccine-preventable disease epidemics among vulnerable Idaho populations. *Current funding sources*: Limited funding, for vaccine purchase only, for underinsured and uninsured adults from the Idaho Immunization Program. Typically can support 1-2 clinics. Limited funding available for Public Health Districts through Public Health Emergency Preparedness Cooperative Agreement funds, for staff when clinic is conducted as a preparedness exercise. Typically can support 1 clinic in each district. The Idaho Immunization Coalition, a 501(c) 3 organization, http://www.idahoimmune.org/ might be able to provide assistance for some clinics.
- Provide grants for local jurisdictions to hold meetings including local veterinarians to consider passage of rabies control ordinances requiring rabies vaccination of dogs, cats, and ferrets.

AVMA Model Rabies Control Ordinance, https://www.avma.org/KB/Policies/Documents/avma-model-rabies-ordinance.pdf. *Objective*: Promote vaccination of susceptible domestic animals in close contact with humans. *Goal*: Mitigate transmission of rabies from wildlife to humans through pets. *Current funding sources*: None. The State Public Health Veterinarian is a resource for this activity.

- Purchase or provide grants for purchase of mobile self-contained housing for Idaho Public Health Districts to borrow or use for isolation of infectious or exposed persons who do not require hospitalization and are not able to be isolated in other accommodations. *Objective*: Have immediately available housing for persons with infectious diseases. *Goal*: Mitigate tuberculosis, influenza, mumps, pertussis, and other infectious diseases. *Current funding sources*: None outside of a disaster declaration.
- Create a revolving loan fund for start-up mosquito abatement districts to use prior to receipt of tax money and prior to a disaster declaration. *Objective*: Reduction in mosquito habitat and populations, monitoring mosquito populations and infected mosquitoes. *Goal*: Mitigate mosquito-borne diseases. *Current funding sources*: None prior to receipt of tax money or outside of disaster declaration.

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