

#### Pathogen Type:

Oswego Virus (OSWV) is a novel Orthohantavirus. OSWV is a heavily mutated Andes orthohantavirus, as such it is a Viral Hemorrhagic Fever (VHF) which frequently results in hantavirus cardiopulmonary syndrome (HCPS) in patients.

#### Origin & Emergence Details:

OSWV was first detected in sports fishermen and spectators who attended the Oswego Pro-Am Fishing Tournament (OPFT) on the Oswego River in Upstate New York. It is believed that the original carrier was in the local, wild rodent population. How a variant of a virus, which is usually found in South America, came to be found around the Great Lakes of North America is currently unclear. Evidence suggest that the deer mouse (*Peromyscus maniculatus*) is a likely carrier in the local environment.

Evidence suggests that a single event, a charity barbeque held in the evening of the OPFT, was the largest source of infection. The current hypothesis is that an infected deer mouse contaminated paper plates, plastic cups, or cutlery which were used at the event. These had been stored in an outside shed for some weeks prior to the day. Staff reported that some items in the shed exhibited rodent damage.

Of 500 attendees at the barbeque, 34% have been found to be infected with OSWV. For attendees of the OPFT who did not attend the barbeque, infection rate is less than 1%.

OSWV is a highly infectious agent, with a currently estimated basic reproduction number ( $R_0$ ) of around 3.6 and with an asymptomatic but contagious incubation period of 21 to 28 days. The OPFT attracted sportsmen from across the United States and Europe. These attendees were typically from the more affluent end of society, with many either being on vacation in the area or going on vacation shortly after the event. This meant that by the time the first patients became symptomatic, they were spread across the world.

As patients began to exhibit symptoms, no initial pattern was spotted. Although there was a large cluster of infection in the northeast of America, smaller clusters in 35 other locations initially appeared unrelated until supranational organisations began to get involved. By that point, OSWV was already freely moving through transport networks and within local and regional communities.

Transmission occurs through fluid transmission. OSWV remains active on surfaces for several days and when released into the air in liquid droplets. During the incubation phase transmission occurs through coughing, sneezing, sharing of utensils or cups, or insufficiently cleaned surfaces, such as door handles, taps or handrails. Airports and other massed-transport locations plus public or shared toilets were quickly hubs for the rapid transmission and distribution of the virus on a global scale.

#### Pathogen Characteristics:

OSWV has proven to be a highly adaptable virus when it comes to host. The virus has been found in humans, rodents and other mammals. Of particular note is transmission between humans, canines and felines. This enabled the virus to be transmitted to then between family pets, then between families. It is also resilient, surviving on surfaces for over 48 hours in temperatures below 25°C and for over 4 hours in direct sunlight. OSWV has an extended incubation period, with most patients remaining asymptomatic for 21 to 28 days. However, during this period, transmission of the virus is still possible via bodily fluids. 40% of patients will then experience 7 to 10 days of mild flu-like symptoms including fever, cough, headache, shortness of breath, runny nose and nausea. Of this subset, ≈ 8% will also experience increased bruising, urine in the blood, lethargy, and vomiting. 50% of symptomatic patients will see a rapid deterioration more in line with aggressive HCPS for 10 to 14 days. These patients will experience the onset of acute respiratory failure. Symptoms include shortness of breath, pulmonary edema, cardiac failure, with hypotension, tachycardia and shock. 25% of these patients will develop the severe disease.

The death rate of OSWV is around 2.5%, with 50% of patients who experience the severe disease dying. All patients with the severe disease have a protracted recovery period of 12 to 18 months.

#### Other Impacting Factors:

Climate: Climate change coupled with adaptation of the virus, has enabled the virus to survive and spread more easily in North America.

Ecology: No confirmed factors.

#### Economic & Social Issues:

Residual scepticism, misinformation and fatigue which remain from the COVID-19 pandemic hampered the initial response to OSWV. Governments, under pressure from business and the public, were unwilling to take strong, rapid measures to control the spread of the disease.

Whilst recommendations were made to learn lessons from COVID-19, no extra funding or changes were made at local levels, despite warnings from the WHO and the global scientific community. Consequently, local and regional medical facilities had no facilities or training to manage, control and isolate large volumes of highly contagious patients. This resulted in the near collapse of medical facilities in some areas and large cities. Inevitably, OSWV was able to spread, unchecked through these areas, putting pressure on surrounding areas in a domino effect.