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Fighting Back Against a Global Pandemic: “The Nebraska Virus"

The scale of the uncontainable Nebraska Virus is causing widespread devastation, not just for the Nebraska community but also to everyone across the world. Due to globalization, the virus has expanded transnationally, wreaking havoc on medical care systems, and economies and individuals on a global scale. As total case number and overall death rates continue to skyrocket, the World Health Organization has officially classified the Nebraska Virus as a pandemic. Since efforts to contain the disease have failed, it is crucial that on an individual, community, and federal level, policymakers do what they can do to mitigate the widespread detriments of this pandemic with the hope of eventually eliminating it completely. With public discussion questioning the best response to this outbreak heating up, many are turning toward previous contagious diseases and pandemics for guidance regarding how to control the Nebraska Virus. To combat infectious diseases, developing an understanding of the virus is crucial in addition to establishing quarantine and other public health policies to reduce the spread of the virus immediately; ultimately, the development of vaccination is instrumental to achieving viral immunity.

It is essential that the genetic evolution of a contagious virus is trapped to derive preventative and protective policies. Epidemiology is a medical study of diseases in populations. More specifically, according to American epidemiologist Jonathan Samett, epidemiologists are interested in uncovering the risk factors of the disease and determining which protective

measures people can use to most effectively protect themselves and their community against the illness (1). As contemporary science continues to improve epidemiological methodologies, technologies, and tools capable of conducting efficient lab investigations and tests, researchers can also utilize modern disease-tracing techniques to track transmission rates, thus proper preventative techniques can be utilized. From December of 2019, molecular geneticists have been tracking the virus genome of SARS-CoV-2, commonly known as Coronavirus or Covid-19. Whenever a patient tests positive for the illness, the genomic sequence of the infecting virus is obtained and uploaded to a viral database. Mutations occur frequently as the virus moves from host to host. From these mutations, molecular geneticists can construct a genetic history of the virus which enables them to "trace the virus through space and time and start to answer questions like how quickly and easily does it spread from one person to another?" (Ely, 3). Since each sequence is derived from a patient who is in a specific place in the world, these viral genome sequences allow scientists to track where the virus has been, and predict its next destination. The more similar the sequences from two particular viruses are, the more closely related they are and "the more recently they've shared a common ancestor" (3). In the United States, a traveler from Wuhan was tested positive for Covid-19 on January 15. By February 28, scientists sequenced a virus sample from an American patient in Seattle and found its mutation signature similar to that of the virus from the Wuhan traveler in addition to three new mutations, leading them to estimate "the mutation rate at about 0.45 mutations per genome per week" (5). By charting the three new mutations, scientists concluded that "this version of the virus had been multiplying undetected for about five weeks in the Seattle area. Since each infected person can infect several other people without experiencing any symptoms themselves, the virus could have spread to more than

100 people in five weeks" (5). The genomic sequences that have linked the virus from the Wuhan traveler to the patient from Seattle after the course of a month alerted state officials that the virus has been spreading undetected through the state. The undiscovered and devastating spread of the virus throughout Washington is a significant reason that pressures public health officials to put protective social distancing policies into place. To study transmissible viruses, genetic tracking is an effective method of gathering information about the virus in the quest to slow the spread in the short term.

Quarantine is a critical step that must be taken in order to decrease the transmission rate of a virus. Being a prominent tool commonly employed to face infectious diseases, quarantine is used by medical personnel to isolate and monitor individuals who have been exposed to the virus or could have been exposed to the pathogen. Generally, these people are isolated and monitored to reduce the risk of infecting others until the incubation period of the virus has passed without any detection of symptoms (Feuer, 1). During the early stages of the coronavirus outbreak, when the majority of cases and deaths occured in China, a national quarantine was enacted by Chinese authorities to thwart the deadly spread throughout the country. The New York Times journalist, William Feuer, noticed that the Chinese national television has ordered that "everyone returning to Beijing [are] required to isolate themselves for 14 days" and those who do not comply with this mandate will be "held accountable according to law" (3). As Covid-19 continues to wreak havoc in Wuhan, a city with a population of 11 million has been placed under an extremely strict house-arrest, which is known as the largest quarantine event in history (2). While quarantine has been proven an effective method of containing and measuring the spread of communicable diseases, it often causes controversy because it raises ethical concerns. Civil rights activists have

voiced their uneasiness, claiming that “quarantining somebody is an extraordinary deprivation of their liberties” (Price 2). Second, quarantine can be influenced by fear instead of science, which would lead to the overall detriment of those affected. An example of the harm that stemmed from irrational fear is the 2014 Ebola outbreak, which led state officials to enforce quarantine without Federal approval. Price, a professor of global health at Emory University, observed that healthcare workers returning from West Africa were detained and quarantined, despite research showing that Ebola is not transmissible unless the person displays symptoms of the virus (2). Rather than implementing isolation measures based on scientific research, state officials enforced quarantine on those who had been in West Africa - primarily due to their own irrational fears. Despite the controversies surrounding quarantine, this is regarded by authorities and healthcare professionals as an important tool for maintaining public health, when enforced with the support of scientific evidence. Contradicting those who disapprove of the utilization of quarantines, Feuer detects a positive correlation between China’s strict quarantine measures and the decreased contagion rates of Covid-19, while the states that have not set similar quarantine policies such as the United States and European countries, are experiencing a steady increase of cases over time (3). China has boasted that quarantine has worked so well that work and school have been allowed to resume as usual and life has returned to pre-pandemic norms. To break the transmission cycle of the Nebraska Virus, quarantine is an effective procedure to tackle this communicable disease while other actions towards treatment and prevention are being advanced.

In addition to genetically tracking the virus and imposing quarantine orders, additional public policy should be implemented to delegate the necessary resources to medical teams to support the treatment of those affected. Officials who have the authority to evaluate factors

related to transmissible diseases must use their power to positively influence public wellbeing. Substantial public health policies need to be backed by scientific research. Research fellow from the School of Public and Development Management of the University of Witwatersrand Mike Muller, states that productive public health policies can "appropriate federal funds to support the tools needed to collect and analyze the surveillance of infectious diseases through case investigations and laboratory analyses" (Muller 1). The data can then be disseminated from the local scale to the federal level. A case that reflects the necessity of authoritative public policy was the development of the West Nile Virus epidemic which shocked the United States and Europe. The West Nile Virus is an arbovirus discovered in the West Nile region of Uganda. It is transmitted via a vector, a mosquito that has fed on an infected bird, which subsequently transmits the virus to human hosts (White 4). In some cases, the West Nile Virus can lead to severe neurological detriments, inducing fear amongst the general public. To control the spread of this disease in the United States, the Integrated Mosquito Management (IMM) program was enacted. This program not only trained the public to eradicate possible breeding grounds for mosquitoes, such as sumping standing water in their backyards, but also implemented approaches that eliminated both larval and adult mosquitoes with pesticides. Additionally, more scientists were recruited to "conduct research on the adult mosquito populations to prevent them from developing resistance against insecticides" (Markowski 2). Constructive public policies, such as keeping the public as well as health professionals informed about the possible causes and treatments of the malady, are crucial in the process of initiating the necessary programs to prevent further spreading of a disease. Therefore, a government informed by research must apply

scientifically proven preventative measures to effectively face the Nebraska Virus pandemic in the short term while a more plausible and stable solution is still in the process of developing.

The development of vaccines is a crucial step in defeating infectious illnesses. A vaccination, used to develop herd immunity against the Nebraska Virus, is a practical and reliable method of preventing future infections. Generally, vaccines inject a weakened form of a virus into the body. Once exposed to the virus, immune cells will produce antibodies that attack the pathogen. After eradicating the viral form, immune cells will remember the viral antigens, activating when exposed to the same virus in the future, granting immunity (Gould 2). The important role of vaccines was portrayed in the fight against the poliomyelitis (polio) epidemic in the 1950s. Polio is a disabling and deadly disease caused by the poliovirus. This virus is spread via "person-to-person by nasal and oral fluids, as well as contact with contaminated stool" (Beaubien 3). The virus enters the body orally, multiplying as it travels through the digestive tract, destroying the diaphragm and muscles, and inducing paralysis (4). Since children have little concern regarding personal hygiene, they are more likely to contract the disease. Statistically, Beaubien notes that "nearly 60,000 children were infected with the virus; thousands were paralyzed, and more than 3,000 died" in 1952. (1). The development of the first successful polio vaccination, and its widespread use across the country, quickly decreased the spread of the disease and ultimately eradicated poliomyelitis in the United States. The polio vaccine saved thousands of children from contracting the disease, and these children were able to avoid suffering from paralysis and even death. Similarly to how polio was eliminated in the United States, researchers must develop a vaccine to help people develop immunity against the Nebraska Virus. This way, transmission and mortality rates of the Nebraska Virus could be

lowered, eventually leading to the total eradication of the virus. While a vaccine does not cure infected victims, it hinders the spread of the disease by enabling those most at risk to develop immunity, making it a prominent tool in the medical community. To prevent the spread of the Nebraska Virus, the government, as well as the public, should emphasize on the accessibility of vaccinations in an effort to build the overall immunity of the population against similar deadly and devastating illnesses.

With the Nebraska Virus continuing to spread across the globe, public health officials and the medical community are scrambling to resolve the pandemic. The process of addressing the disease begins with charting the spread of the virus, determining its method of transmission and contamination rates. Public health officials must work with policymakers to implement sound public policies to mitigate the effects of this transmissible disease on the community. Contagious diseases are a prominent factor which disrupt ordinary life on an individual, national, and global scale. Unless an effective vaccination is developed, populations will continue to lack the necessary antibodies to combat the virus, resulting in widespread medical, economic, and political devastation. The recent expansion of globalization means the world is more interconnected than ever. National boundaries are easily transcended as international travel becomes more accessible, creating highways for viruses to hitchhike across the globe. Utilizing lessons from previous cases of infectious diseases and pandemics, it is vital for governments to develop effective strategies on a medical and political level to enable mankind to move past the present epidemic or pandemic, such as the Nebraska Virus, and to prepare global citizens for future transmissible maladies.

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