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ESTABLISHING THE **NORTH AMERICAN DISEASE DEFENSE SHIELD (NADDS)** AT THE **PANAMA-COLOMBIA BORDER**

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INTRODUCTION

The COVID-19 pandemic has demonstrated the devastating impact infectious diseases can have on human health, social orders, economies, and political systems. Throughout human history, pandemics have remade governments and economies. The extensive reach of infectious disease, combined with global vulnerability to rapidly spread due to globalization, makes it vital that the U.S. learns lessons from COVID-19 and previous pandemics in order to reduce the damage that can be caused by future outbreaks.

In early 2019, prior to COVID-19, the World Health Organization (WHO) listed the top 10 global health threats, five of which involved the spread of infectious disease. These included: a) an influenza pandemic; b) Ebola and other high-threat pathogens; c) vaccine hesitancy; d) dengue; and e) HIV (WHO, 2019). Respiratory viruses, like SARS-CoV-2 and influenza, do not recognize national borders nor import and export protocols, meaning that an outbreak anywhere can quickly turn into a global threat. Additionally, the global spread of animal diseases can have a devastating impact on the livestock industry in the U.S. and the American economy as a whole.

At the same time, the world is now entering a period of Great Power rivalry where the nation-state – and thus geographic imperatives – will assume increased importance in analyzing the threats the U.S. faces and the appropriate response. While geography should be an analyzing principle in the case of infectious disease, national borders are not necessarily the most logical mechanism for containing disease. In the case of the U.S., the Mexican-American border – which is 1,954 miles long – is not the only, or the most effective, frontline defense against certain categories of disease. Policymakers should launch an effort with Canada, Central American countries and Mexico to implement a frontline of defense against infectious disease at the Panama-Colombia border, such as surveillance and prevention programs. Most of the undocumented migration from South America, and other continents, to the US passes

via the Darien Gap, a dangerous route through the jungle between Colombia and Panama. Given rising temperatures in Canada, tropical diseases, which spread in warmer climates, may become a threat to our neighbor to the north, so Canada should be included in any disease control efforts.

In mid-August 2021, the Foreign Minister of Panama, Erika Mouynes, held a summit for countries in the region to discuss the massive increase in migration through the Darien Gap in 2021. While close to 20,000 people cross through the Gap in most years, Panama reports 50,000 migrants passed through in the first seven months alone of 2021, and of that, 10,000 people moved through in June and 20,000 in July. Many of these migrants originate from Haiti prior to the earthquake; however, as many as 40 countries from around the world are represented in this migration (DEVEX, 2021). Panama is overwhelmed with this increase and is having trouble caring for this rising population migration. The Darien Gap is a wild, unsettled, insecure, and dangerous jungle. Migrants are forced to navigate mountainous terrain that lacks roads and contains wildlife, insects, and drug cartels. Many migrants die along the way, either from natural causes, affected by the lack of water, food, and healthcare, or from violence (UNICEF, 2021). Upon exiting the jungle, migrants stay in camps made up of tents or prefabricated buildings, such as San Vicente or Laja Blanca, before making their way north out of Panama. Protecting these people from infectious diseases during this migration makes great sense from a purely public health, humanitarian and ethical perspective, but also in terms of the public health of the receiving countries.

The Panama-Colombia border stretches 211 miles wide and offers numerous opportunities to contain infectious disease before it reaches the U.S.-Mexico border, as well as the possibility of establishing public health and laboratory training programs for countries throughout Central America. This disease containment program, which I have termed the North American Disease Defense System (NADDS), should follow the successful models of the Border Infectious Disease Surveillance (BIDS) program and the North American screwworm eradication program. It should seek to push the disease containment zone southward until it reaches the Panama-Colombia border. This does not mean abandoning the existing U.S.-Mexico border disease surveillance program, particularly since it will take a couple of decades to put NADDS into place. Surveillance along the U.S.-Mexico border is necessary for disease containment north of Panama.

What should be self-evident in this case is that establishing a shield against infectious diseases in general – but vector-borne diseases in particular – is more viable along a 211-mile border than along a nearly 2000-mile border.

Pandemic preparedness and response is larger than simply a public health issue. While public health is certainly at the heart of it, it is truly a national security issue. The economic, social and political consequences of COVID-19 for the U.S. and the rest world should convince policymakers that infectious disease is too important and too much of a threat to leave to doctors and other scientists alone. The lack of effective pandemic preparedness and response has the potential to destroy economies, lives, and overall well-being. To protect both American health and national security, it is necessary to address disease threats before they reach the U.S. border. To prevent the spread of diseases with pandemic potential, along with endemic diseases such as those classified as neglected tropical diseases and vector-borne diseases, action should be taken by nations in North, Central and South America to increase eradication and containment efforts. Migrants crossing the border into Panama should be immunized in a systematic way for any communicable diseases, and anyone who has contracted a disease should be treated. Migrants also need to be tested, and treated, for intestinal parasites. Additionally, vector control is necessary to stop the spread of disease from vectors, such as mosquitos, flies, and ticks. Unlike U.S. counter-narcotic programs and efforts to slow or end illegal immigration across the U.S. southern border, which can often get caught up in domestic political debates, infectious disease prevention programs do not face similar opposition, making this an issue that can attract broad bipartisan support. This paper will discuss how the BIDS program and the screwworm eradication program can be used as models to establish a zone of disease surveillance and prevention along the Panama-Colombia border. *Such an effort should also involve a major campaign to eliminate these diseases in all Central American countries and Mexico over the course of the next two decades.*

EXPANDING THE **BIDS PROGRAM**

In 1999, the Centers for Disease Control and Prevention (CDC) and the Mexican *Secretariat de Salud*, with the support of the U.S. Congress, established the BIDS program to strengthen surveillance of infectious diseases in the border region. BIDS relies on local, state, and federal collaboration in conducting infectious disease surveillance, building epidemiology and laboratory capacity in the U.S.-Mexico border region, and strengthening binational communication networks to improve disease surveillance and prevention (CDC, 2014). There are BIDS sites located in 10 border states – four in the U.S. and six in Mexico – that focus on population-level surveillance projects (CDC, 2014). BIDS also uses laboratory testing to customize surveillance, focus on special populations, detect potential outbreaks early, offer interventions in public health, and build up data sharing and communication networks. The primary goals of the program – to detect, report, and prevent infectious disease outbreaks in the border region – have become increasingly difficult in a globalized world.

Over the last several decades, BIDS has expanded and contracted in relation to the amount of funds provided for its projects and diseases of concern. For example, during the height of the Zika pandemic in 2016, some of the primary BIDS activities included Zika virus monitoring, respiratory illness surveillance, swift notification of binational disease events and outbreaks, yearly public health preparedness drills, and development and implementation of operational protocols and guidelines for bilateral coordination and communication (CDC, 2014).

The main challenges associated with the BIDS program include inefficiencies inherent with different cultures and primary languages, inconsistencies across health and regulatory systems, and the sustainability of the program and its funding streams (Waterman et al.,

2009; Ortwine, Ferran, & Iniguez-Stevens, 2013). Despite these challenges, BIDS has had several successes and should be used as a model for establishing the NADDS disease shield.

The Importance of Panama

Panama serves as a crucial link between the Global North and South. Panama is a major hub in the international trade system and an indispensable element of the U.S. trade economy. Approximately five percent of all globally-traded products go through the Panama Canal, and over 122 million tons of goods, originating from the U.S., passed through the Canal in 2020 (Canal de Panama, 2021). The U.S. is either the origin or destination for 68 percent of the cargo that moves through the Canal. The three main trade routes that funnel through the Panama Canal and include the U.S. are: the East Coast of the U.S. and Asia (Far East); East Coast of U.S. and West Coast of South America (WCSA); and East Coast of the U.S. and West Coast of Central America (WCCA) (Georgia Tech, 2019; Canal de Panama, 2021).

The movement of goods, particularly organic materials such as animals and plants for food and medicine, can contribute to the dissemination of infectious diseases like H5N1 influenza and bovine spongiform encephalopathy (BSE), commonly known as "Mad Cow." In turn, the impact of new disease outbreaks inhibits the ability to import unfinished components and export final products, thereby disrupting the domestic and global value chain and markets.

The 2016 expansion of the Panama Canal offers greater opportunities for the world economy, but it also poses an increased risk for the introduction of invasive species (Muirhead et al., 2014). Organisms can be transported from countries around the world through the Panama Canal and into the U.S. and Canada in cargo or on the surface of the ships themselves. The newly completed expansion of the Panama Canal with the construction of a second, parallel canal allows for the passage of more and larger ships, in turn, increasing the risk of introduction of non-indigenous organisms to the U.S. Simulations by Muirhead et al. (2014) indicate that the risk will increase two to five times from pre-expansion levels. Detecting organisms and other diseases at this chokepoint would increase the security of the U.S. against infectious disease outbreaks.

Additionally, the economic impacts of the Panama Canal are significant. A disruption in traffic through the Canal due to an infectious disease outbreak could cost tens of billions of dollars. For example, the blockage of the Suez Canal in 2021 is estimated to have cost $6-10 billion per week – the Canal was blocked for six days (Russon, 2021). The economic impacts of this blockage also extend to delays in hundreds of ships that were behind the blockage waiting for the Canal to reopen (Neuman & Northam, 2021). Thus, shutdown of major trading routes like the Suez or Panama Canal have significant economic and national security consequences. A shutdown of the Canal would also separate the U.S. Navy's Atlantic and Pacific fleets which, during a major war, could have serious strategic consequences. A potential shutdown due to a severe infectious disease outbreak would likely last much longer than six days, making disease control along the Panama Canal particularly important.

In addition to the importance of the Canal, Panama serves as a significant academic and scientific center for infectious disease learning and prevention. The Gorgas Institute in Panama, named after U.S. General William Crawford Gorgas whose work led to the elimination of yellow fever and malaria in Panama and allowed the Panama Canal to be constructed, serves as one of the premier tropical medicine institutes in Latin America.

The Gorgas Institute also provides opportunities for physicians and scientists from around the world to learn about dangerous tropical diseases firsthand. Such understanding of these diseases can increase the ability to prepare for and respond to their outbreaks, and the existence of the Gorgas Institute in Panama would contribute to the success of a NADDS program at the Panama-Colombia border.

The establishment of NADDS would be aided by efforts to develop Panama, and specifically the Gorgas Institute, into a central hub for public health, infectious disease, and laboratory training. The Gorgas Institute has extensive expertise and resources that, with additional support from the U.S. government, can assist in strengthening infectious disease capabilities along the Panama-Colombia border and throughout Central America.

Due to the importance of Panama to trade and the prevention of animal and plant diseases, it is logical to expand disease surveillance and prevention efforts for human health into the Panama-Colombia border region. In order to develop NADDS, the U.S. Agency for International Development (USAID) and the U.S. Center for Disease Control (CDC) should work with Panama's Ministry of Health to establish the system. This would also require opening a new USAID mission in Panama (the former USAID mission closed in 2012 because the country had "graduated" to middle income status) that would engage with the Ministry of Health, the Ministry of Agriculture, and the private sector to assist in monitoring and mitigating infectious diseases. This new mission would have one focus – public health – and would be distinct from traditional USAID missions in that its single mission would be disease eradication. However, the soft power importance of USAID could assist local, state, and national authorities, along with CDC personnel in creating a strong and sustainable program. Public health-based USAID missions would also need to be established in both Belize and Nicaragua, despite ideological differences between Nicaragua and the U.S. USAID is one of the leading U.S. government agencies or departments creating public private alliances, called the Global Development Alliance, which has integrated foreign aid funding with private corporation and foundation funding for new innovative programs (Natsios, 2009). Creating NADDS to operate as an infectious disease defense shield – for animal and human diseases – for all countries north of the Panama-Colombia border is clearly in the interest of the U.S. Additionally, USAID and the CDC should form a working commission similar to the U.S.-Mexico Border Health Commission. This commission should work collaboratively with representatives from Panama and Colombia to develop and implement NADDS.

NADDS should have features like the current BIDS program, which encourages binational communication, training, and the sharing of data and laboratory specimens. Local health departments along the border in Panama and Colombia should meet and communicate at least quarterly to share information about infectious disease concerns and outbreaks. The U.S. will maintain support for the existing BIDS program and local health departments through the previously mentioned working commission. Lastly, disease containment programs should be prioritized so that disease outbreaks are controlled rapidly, perhaps using the DART (Disaster Assistance Response Teams) emergency response capabilities within USAID's Bureau of Humanitarian Assistance. The establishment of NADDS Commission will help prevent the northward movement of infectious diseases, particularly vector-borne diseases, and provide greater health security for the U.S.

BUILDING OFF THE MODEL OF SCREWWORM ERADICATION

In the early 1900s, screwworm was endemic in the U.S. and throughout most of North America (Wyss, 2000). Screwworms are the larvae of some types of fly species that feed on the tissue of living animals (CFSPH, 2006). Once animals become infected with screwworm, they can die within 7 to 14 days if not treated (CFSPH, 2006). When screwworm was endemic in the U.S., it caused large-scale loss of livestock (Wyss, 2000). The economic losses caused by screwworm led the U.S. to implement an eradication program in 1957 (Wyss, 2000). The program relied heavily on insect sterilization in order to eliminate the screwworm population (Scott et al., 2017). Due to the effort of this program, screwworm was eradicated in the U.S. in 1966 (Tokarz, 2020).

In combination with their domestic eradication efforts, the U.S. Congress authorized the U.S. Department of Agriculture (USDA) to enter into cooperative agreements with other countries for the purpose of eradicating screwworm in those countries as well. In the 1960s and 1970s, the U.S. worked in collaboration with Mexico to eliminate screwworm from Mexico, but even as the eradication program in Mexico expanded, it did not prevent reinfection events from occurring in the U.S. (Wyss, 2000). The incidences of reinfection prompted the U.S. to continue extending the eradication program southward.

Slowly, the Mexico-U.S. Commission for the Eradication of Screwworms entered into agreements with Guatemala and Belize, and eventually implemented cooperative agreements with El Salvador, Honduras, Nicaragua, and Costa Rica (Wyss, 2000). The program used aerial dispersal of sterilized flies to ultimately

eradicate screwworm in every country up to the Panama-Colombia border. Now that eradication has been accomplished, the biggest task is maintaining eradication through the regular release of sterile flies in the Darien Gap (Scott et al., 2017). These regular releases maintain the barrier zone along the southern Panama border.

The success of the screwworm eradication program offers a model for the eradication of numerous vector-borne diseases. Some of the most concerning diseases today are Chagas disease, dengue, leishmaniasis, Zika, and Chikungunya. Mosquito-borne diseases, in particular, could be eradicated using the same model as screwworm eradication: i.e., the release of sterile insects. Gene drive technology has led to significant scientific progress in creating sterile mosquitoes (Scudellari, 2019), though there is the question within the scientific community about the broader ecological impacts of eliminating mosquitos (David et al., 2013) as well as ethical concerns among the general public about human-made genetic modifications that can be passed down to offspring. Focusing on vector-borne diseases would provide the greatest chance for success (in comparison to focusing on airborne or respiratory diseases) because elimination or modification of the vector would disrupt the cycle of transmission and provide a chance of eliminating the disease in the region.

Another important strategic consideration that should be part of any discussion on the establishment of such a disease shield: the growing influence of China in Central America, and Panama in particular. In 2018, Panama considered signing a contract with a Chinese firm to manage the Panama Canal, until U.S. Secretary of State Michael Pompeo made a visit to Panama City to convince leaders it would strain Panamanian-American relations. The Chinese have established a widening beachhead – in business, in development programs, and in diplomacy – in Latin America, and particularly in Panama, because of the erratic and short-sighted relationship the U.S. has had with Panama. When I visited Panama several years ago, senior Panamanian officials complained about this erratic historic relationship with the U.S. When the U.S. wants something, they engage, but when the threat or crisis recedes, it loses interest in Panama. That is something the Chinese will not do; they will make sustained commitment and follow through on it over decades. The establishment of a long-term US effort to create NADDS, in partnership with the countries throughout Central America, would counter growing Chinese influence.

CONCLUSION

The BIDS program and the screwworm eradication program have demonstrated the potential for disease surveillance, prevention, and control. Modern-day efforts along the U.S.-Mexico border have seen much success, but they are not as effective in protecting the health security of the U.S. to the extent necessary. To address this shortfall, the U.S. must consider pushing these efforts southward to the Panama-Colombia border. This program should be enshrined in enabling legislation that includes the establishment of a permanent USAID Mission in Panama, one that is not opened and closed depending on which party is in control of the White House and U.S. Congress or pressures from the U.S. Office of Management and Budget. Implementing the North American Disease Defense System along the Panama-Colombia border, which integrates disease surveillance, vector-borne disease eradication, and training programs to create a strong regional disease prevention system, would not only strengthen health security and further protect the American public, but would also protect our North and Central American neighbors.

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— Lt. Gen. Brent Scowcroft, USAF (Ret.)

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Brent Scowcroft
(March 19, 1925 - August 6, 2020)

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