

# HAPPEN STANCE

## POLICY BRIEF

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### THE FIGHT AGAINST OUTBREAK: EMERGING INFECTIOUS DISEASES AND PUBLIC HEALTH POLICIES WITH DR. MOHAMED KARMALI

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#### HIGHLIGHTS SUMMARY

We live in an infection-prone era due to urbanization, increasing population density, globalization, climate change, and increasing antimicrobial resistance from unregulated use of antibiotics

The Canadian government and international health agencies fight against infectious diseases through promoting healthy living, implementing preventative programs, increasing surveillance and information sharing, and implementing international guidelines for all countries to follow

Nearly 75% of new infectious diseases emerge from animals and the environment; adopting the One Health approach converges human health, animal health, and the environment when studying and targeting the determinants of emerging infectious diseases

No “quick fix”, but with better health surveillance programs, free vaccinations, public education, and programs that incorporate the SDGs by addressing both social and environmental determinants, we are better armed to combat future outbreaks

#### INTRODUCTION

*New infectious diseases have been emerging at an alarming rate in the past few years. In light of the 2016 Zika virus outbreak and its destructive effects on the health of millions of people, this issue of the Happen Stance policy briefs covers an interview with Dr. Mohamed Karmali who provides deeper insight on the determinants of emerging infectious diseases and the policies which aim to combat future outbreaks.*

#### Q: INFECTIOUS DISEASES AND PUBLIC HEALTH IN CANADA - WHAT ARE THE LATEST DEVELOPMENTS?

Right now, the emerging infectious disease in most people’s minds is the Zika virus. Between 2015 and 2016, there have been over 3,000 cases of Zika confirmed in the United States and just under 300 in Canada. Most of these cases are travel-related, where people go to areas with Zika-infected mosquitoes and bring the disease back with them. The most worrying thing, however, is that in the US, around 50 of these cases are locally acquired either through locally infected mosquitoes, mother-to-fetus transmission, or sexual transmission. This means in some areas of the US, the Zika virus is already endemic.

In the past few months, the rates of Zika infections have declined, yet remain prevalent. Since November 2016, the World Health Organization no longer considers Zika as a global health emergency but instead as an ongoing health threat that will be here to stay, similar to malaria or yellow fever.

#### Q: HOW BIG OF AN ISSUE ARE INFECTIOUS DISEASES AND WHAT HAS LED TO ITS PREVALENCE?

In the 1950s, some authorities in the US commented on the demise of infectious diseases due to the introduction of antibiotics and vaccines. However, over the past forty years or so, infectious diseases have come roaring back. On a global level, infectious diseases affect more people than cancer, injury, respiratory disease, cardiovascular disease, diabetes, and all other causes

We live in a very infection-prone era for a number of reasons:

- (1)** The population of cities throughout the world is increasing for many reasons including the movement of people from rural to urban areas. This results in higher population densities, which facilitate the transmission of infectious diseases from person-to person as well as via insect vectors.
- (2)** Globalization and air transportation facilitates the rapid spread of infections

internationally via people, foods, and goods. In the 19th century, steam navigation spread cholera, whereas more recently air transportation helped to spread SARS and H1N1

(3) Climate change has effected biospheres, ecosystems, and wildlife which in turn influenced emerging infectious diseases. For instance, heavier rainfall and higher humidity is closely linked with an increase in malaria due to mosquitoes being able to breed more readily. Deforestation of is also a problem because it facilitates spillover and spread of new infectious agents, such as Ebola virus, from wildlife to humans

(4) Heavy and unregulated use of antibiotics, especially in low and middle-income countries, has led to a dramatic increase in multiple antimicrobial resistance with the risk that antimicrobial agents to treat serious infections may no longer be available in the near future

“THERE IS NO “QUICK FIX” FOR EMERGING INFECTIOUS DISEASES BUT RATHER IT WILL BE NECESSARY TO MAINTAIN SUSTAINABLE RESEARCH, CONSTANT SURVEILLANCE, PREVENTATIVE MEASURES, AND ADEQUATE RESPONSES THAT INCORPORATE THE SOCIAL AND ENVIRONMENTAL DETERMINANTS OF PUBLIC HEALTH.”

### Q: WHAT IS THE POLICY FRAMEWORK THAT CANADA EMPLOYS TO DEAL WITH PUBLIC HEALTH THREATS OF INFECTIOUS DISEASE?

The Public Health Agency of Canada have outlined their detailed approach to dealing with public health issues in their Strategic Horizons 2013-2018 report. There are several main priorities relevant to infectious diseases:

**Promoting healthy living.** To reduce the number of outbreaks and minimize the impact of infectious diseases, the population as a whole should lead a healthy lifestyle and adhere to guidelines to prevent the spread of infectious diseases.

**Prevent and control persistent and emerging infectious diseases through targeted prevention initiatives.** Key activities include educating the public about antimicrobial resistant organisms and food-borne illnesses, improving response preparedness policies, and continuing support for innovative research to develop vaccines and new antibiotics.

**Strengthen public health surveillance and information sharing.** Working in tandem with provincial and territorial health agencies through the Public Health Network, the Public Health Agency aims to strengthen national surveillance, share research, and establish active notifications of outbreaks so that all levels of government across Canada can coordinate effective responses to emerging threats.

### Q: WHAT ARE THE FRAMEWORKS THAT INTERNATIONAL ACTORS EMPLOY TO DEAL WITH BOTH EPIDEMIC AND PANDEMIC PUBLIC HEALTH THREATS?

The biggest and most prominent international actor is the World Health Organization (WHO), which coordinates international efforts to prevent diseases and promote health. The WHO runs a number of programs to incentivize countries to provide universal health coverage, ensure the availability of affordable medical treatment, respond quickly to health emergencies, and target the social determinants of health including socioeconomic development.

In terms of infectious diseases, one of the big international collaborations is the International Health Regulations (IHR), which entered into force in 2007 and to which most countries are signatories. The IHR sets up a number of alert, response, and capacity building mechanisms for the member states to develop and follow, including supporting surveillance and reporting of potentially pandemic infectious diseases.

### Q: WITHIN THE EPIDEMIOLOGICAL RESEARCH COMMUNITY, THERE HAS BEEN THE RISING IDEA OF “ONE HEALTH.” WHAT IS IT?

About 75% of all new infectious diseases, including major outbreaks, have emerged from animals and the environment. The most prominent examples are SARS, Ebola, E. coli, Mad Cow diseases, influenza, and the H1N1 swine flu. Traditional public health approaches tend to be reactive rather than proactive, whereas the “One Health” approach requires that we prevent the infectious agent emerging from animals and the environment before it causes human illness.

Although humans living in the developed world experience relatively good living conditions, food animals such as cattle, pigs, and chickens are all raised in extremely overcrowded conditions which facilitates the spread and emergence of agents such as Verotoxin-producing E. coli. Furthermore, climate change and environmental factors play huge roles in facilitating the emergence of novel infectious agents. Deforestation causes wild animals such as bats to leave their previous habitats and more often come in contact with humans, while warmer temperatures mean areas where mosquitoes would have previously died in the winter time now can survive.

By converging human health, animal health, and the environment, One Health is an approach that studies and targets the main determinants of emerging infectious agents in a holistic and preventative manner before they cause human outbreaks.

## Q: HAS THE ONE HEALTH APPROACH BEEN USED AS A FRAMEWORK FOR ANY POLICY CHANGES?

Yes! In Canada, I led a program that researched emerging infectious diseases through a program that oversaw the merging and blurring of lines between the health and agriculture sectors. Also, the federal government department that studies, overlooks, and creates policies regarding animal health, the Canada Food Inspections Agency, which was formerly a part of the Ministry of Agriculture, has recently been brought into the Ministry of Health to better develop policies to protect against diseases that arise from the human-animal-environment interface.

On the global level, taking a look at the United Nations' Sustainable Development Goals (SDGs), the successor to the Millennium Development Goals, many of the goals focus on providing a platform for an integrated approach across human health, animal health, economic, social, and environmental pillars of development to address emerging infectious diseases. The indicators of SDGs are still being developed and will evolve over time. In using these indicators, countries will be better able to see their progress in addressing SDGs to improve health and prevent disease in their populations.

## Q: WHAT ARE SOME POLICY RECOMMENDATIONS YOU WOULD SUGGEST?

Oftentimes when public health policies go well, infectious disease incidence is reduced and therefore not noticed. It is important to maintain support and funding for public health even when the effects are not necessarily obvious. These recommendations of strengthening public health to combat and prevent emerging infectious diseases are applicable to both developed and developing countries. Core programs that must be supported include:

**(1) Effective health surveillance programs.** This would require strong research infrastructure with laboratories, workforce capacity, information data systems, proper testing for illnesses and credible expertise to map out where cases are emerging and address the social, environmental, and other factors that promote the spread of disease.

**(2) Free vaccinations, particularly in the developing world.** Both the WHO and the better funded countries have the capacity to aid the developing world in funding universal immunization from many diseases that have mostly been eradicated in the developed countries. Furthermore, developed countries have the interest to prevent outbreaks from occurring in other countries so that it lowers any risk of the infectious disease spreading.

**(3) Public education on emerging infectious diseases and how to safeguard against outbreaks or further contagion.** The WHO have a large number of committees, policies, and programs aimed at educating the general public about emerging infectious diseases. This information must be made accessible to everyone and individual governments who don't have their own body of experts can refer to the internationally ratified WHO guidelines or ask for consultants from the WHO.

**(4) Programs that address the social determinants of public health. Infectious diseases are especially prone in areas with poor living conditions.** Armed conflict, high poverty rates, lack of access to clean water and food, and heavily polluted air quality are just a glimpse of the many problems that these areas face. By targeting these key drivers of disease emergence, we can improve living standards and as a result reduce the prevalence and impact of infectious diseases.

**(5) Programs that address the environmental determinants of emerging infectious diseases.** Changing climate conditions, increasing antibiotic resistance, and other environmental factors have and will continue to exacerbate issues stemming from infectious diseases. Advocating for policies that incorporate a One Health approach and address the Sustainable Development Goals ensure a more comprehensive and sustainable approach in fighting outbreaks.

Underlying these three recommendations are international cooperation and the strengthening of public health. We have learned a lot of lessons from all the emerging infectious diseases that have hit us one after another. However, there will be more to come. With the constant evolution, adaptation, and changing of microbes, governments need to recognize that there is no "quick fix" for emerging infectious diseases but rather it will be necessary to maintain sustainable research, constant surveillance, preventative measures, and adequate responses that incorporate the social and environmental determinants of public health.



### DR. MOHAMED KARMALI

*was the IHSP Public Servant in Residence from 2015-2016. As a medical doctor specializing in infectious diseases and microbiology, he was previously the head of the Department of Microbiology at the SickKids Hospital in Toronto and the Director-General of the Laboratory for Foodborne Zoonoses at the Public Health Agency of Canada. His research at the IHSP focused on the impact of healthy urban living and climate change on risks of vector-borne diseases in Canadian cities.*

### FOR MORE INFORMATION, SEE:

Public Health Agency of Canada: Strategic Horizons 2013-2018

World Health Organization: International Health Regulations

World Health Organization: World Health Report 2013