



# Interconnected and Interdependent

**Anticipating Infectious Disease Risks  
in an Increasingly Mobile World**

ACRP Insight Event  
March 6<sup>th</sup> 2018

**Kamran Khan MD, MPH**

Division of Infectious Diseases  
St. Michael's Hospital

Associate Professor  
Faculty of Medicine  
Dalla Lana School of Public Health  
University of Toronto

Founder, BlueDot

# SARS CLINIC PATIENTS

PLEASE USE ENTRANCE DOOR TO LEFT

← 非典型肺炎診所病人請用左門

except  
• Expectant  
 Mothers/partners  
• Mothers &  
 Fathers of High  
 Risk Babies

All  
Scheduled  
Clinics  
CANCELLED



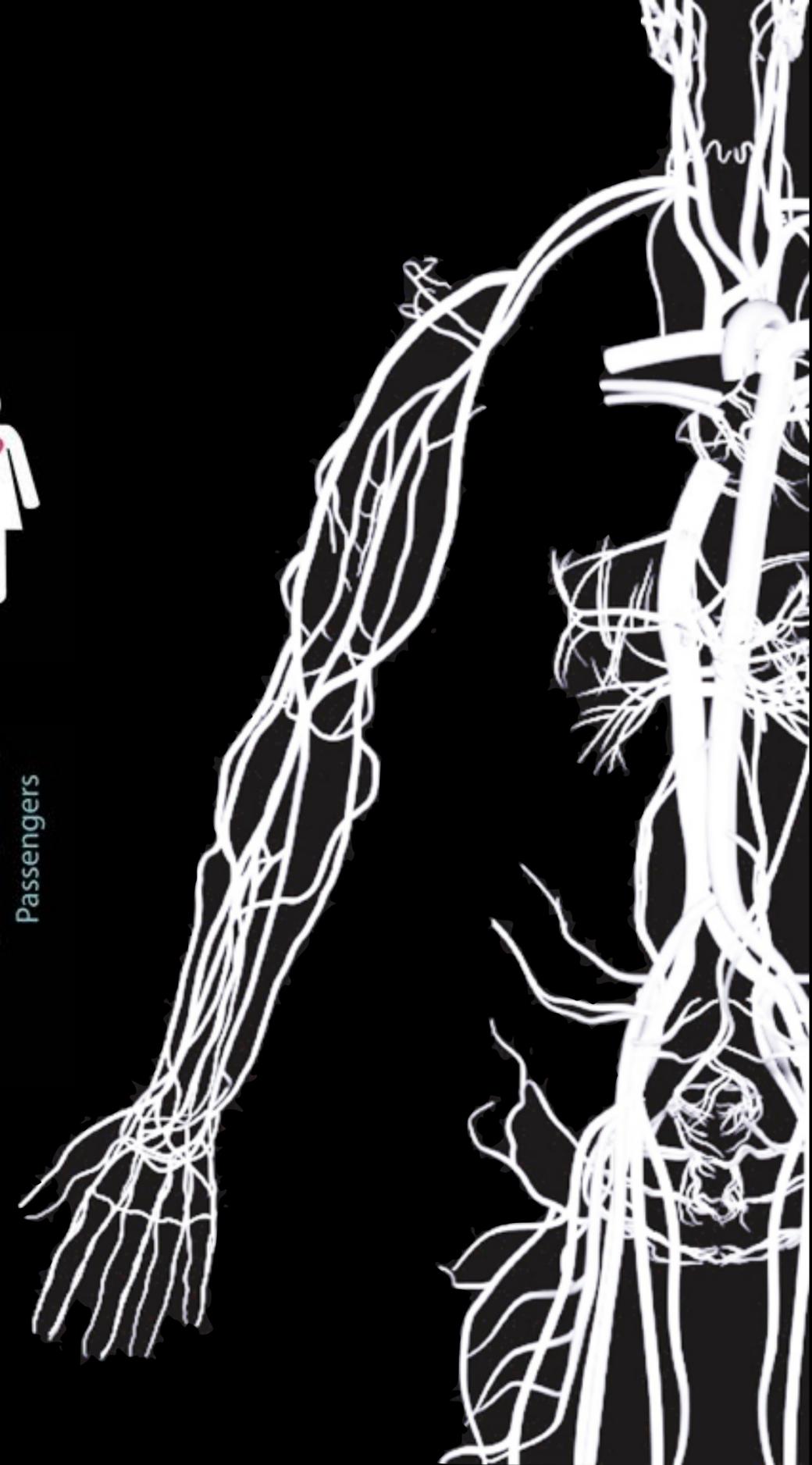




**YVR**  
Vancouver

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

1,000,000  
800,000  
600,000  
Passengers







6 751 393 674 603 KM

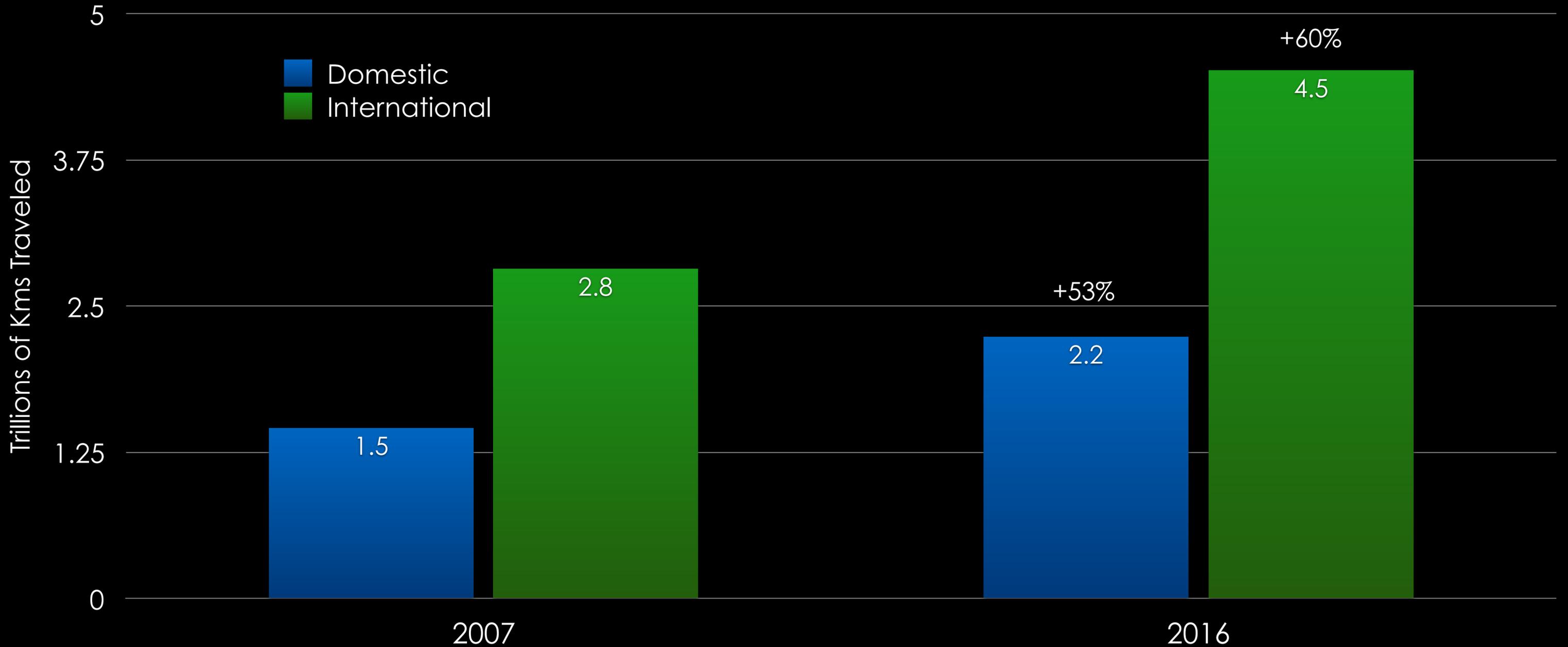


Earth

22 000+ Round Trips

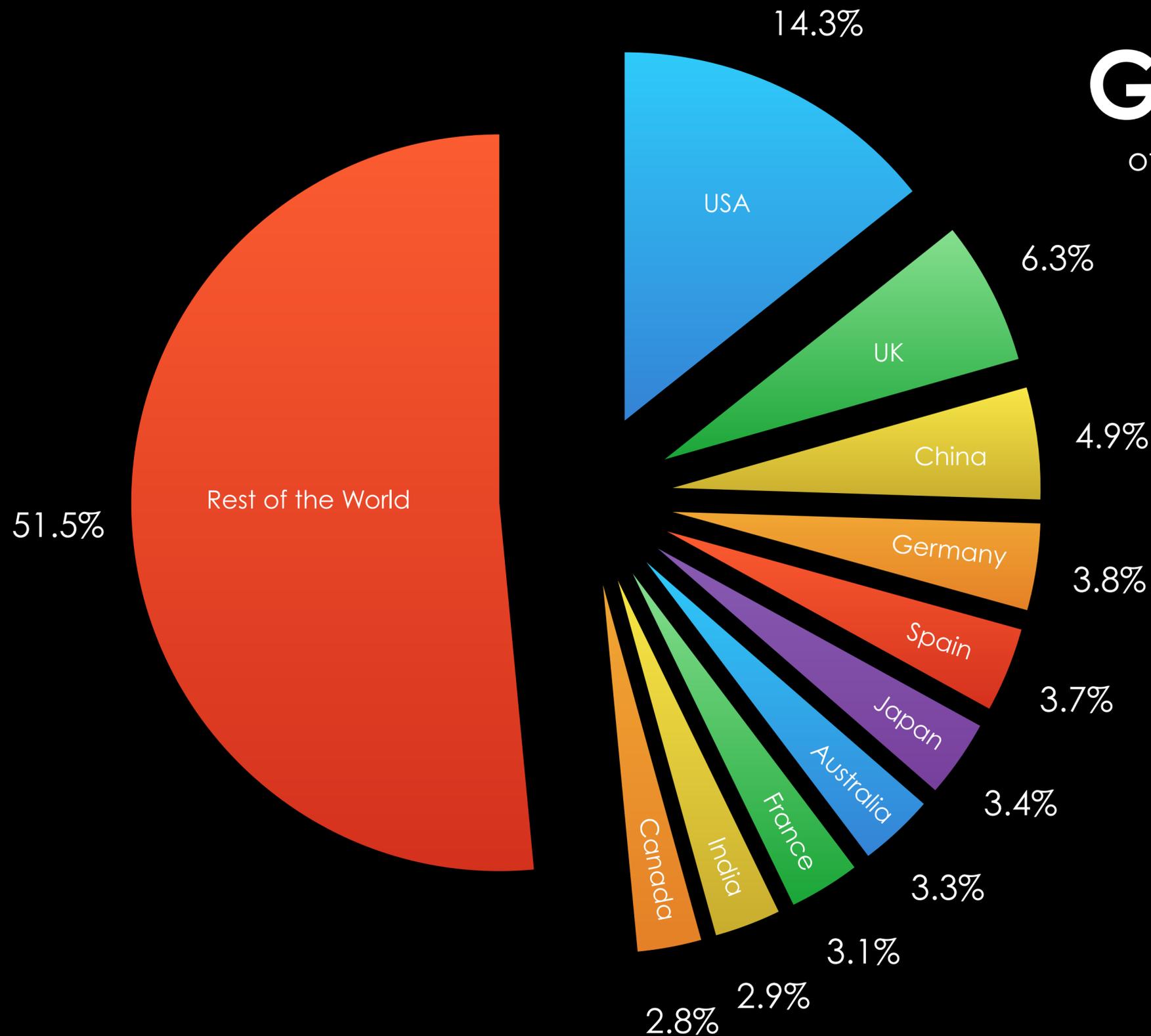
# Trends in Global Air Travel

Distance Traveled Worldwide via Commercial Flights



# Global Share

of International Km Traveled in 2016



25% of the world's mobility via air comes from just **three** countries

Nearly 50% of the world's mobility via air comes from just **ten** countries

# Connected Cities



Billions of KM traveled on international flights in 2016

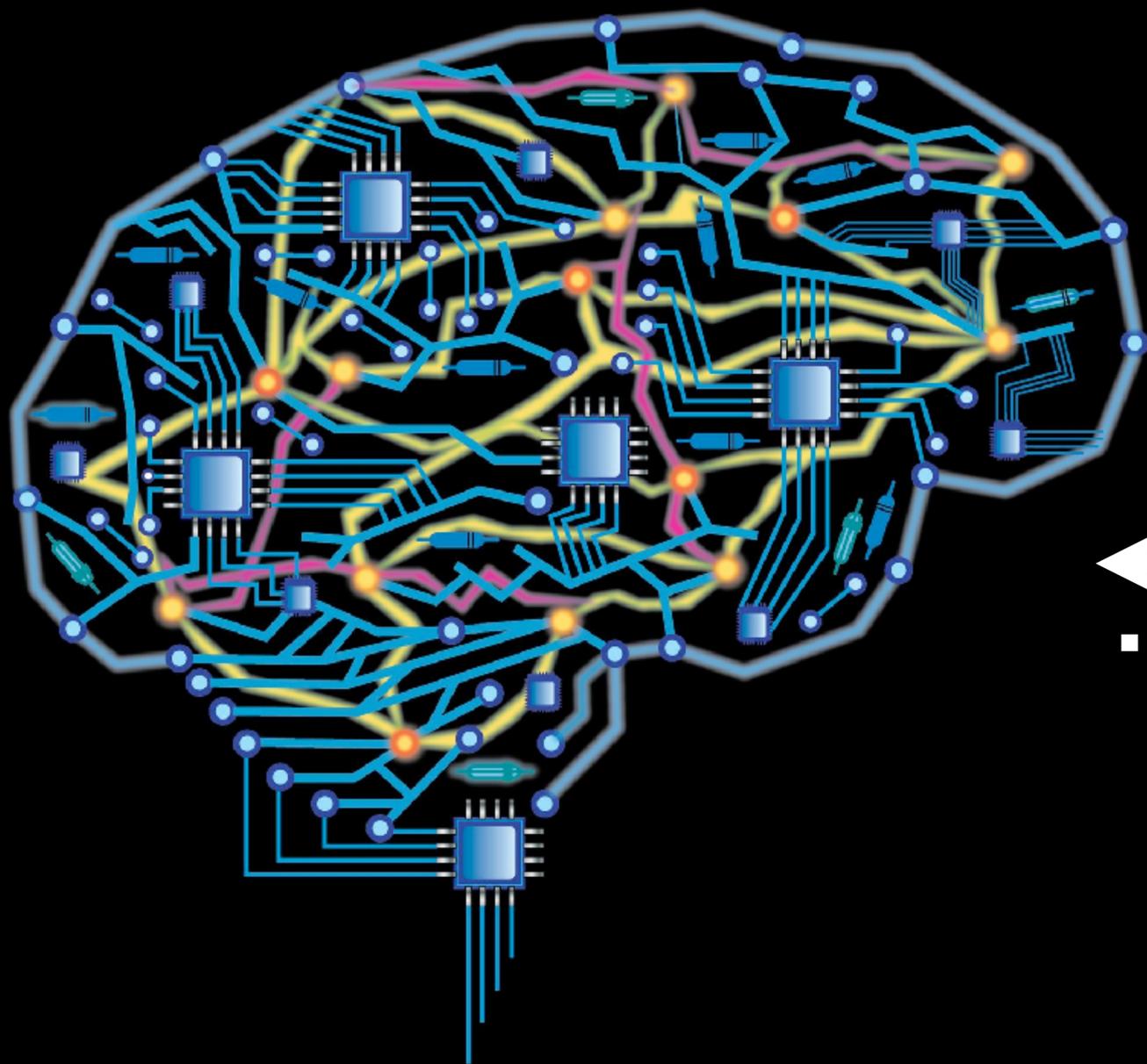
1	London	398
<b>2</b>	<b>New York</b>	<b>261</b>
3	Paris	212
4	Tokyo	181
5	Bangkok	169
6	Hong Kong	162
<b>7</b>	<b>Los Angeles</b>	<b>162</b>
8	Seoul	156
9	Singapore	151
10	Dubai	138
11	Shanghai	131
12	Sydney	115
13	Beijing	110
14	Frankfurt	105
<b>15</b>	<b>San Francisco</b>	<b>102</b>
16	Amsterdam	97
<b>17</b>	<b>Toronto</b>	<b>93</b>
18	Taipei	91
19	Manila	90
20	Madrid	86

These **20 cities** account for **one-third** of the international distance traveled worldwide in 2016

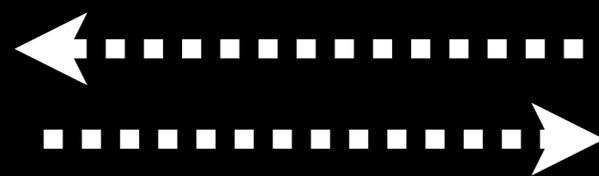


**Diseases Spread Fast.  
Insights Can Spread Faster.**

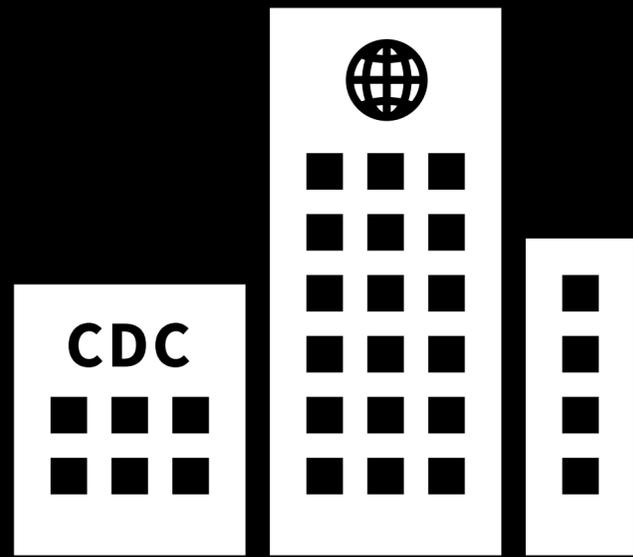




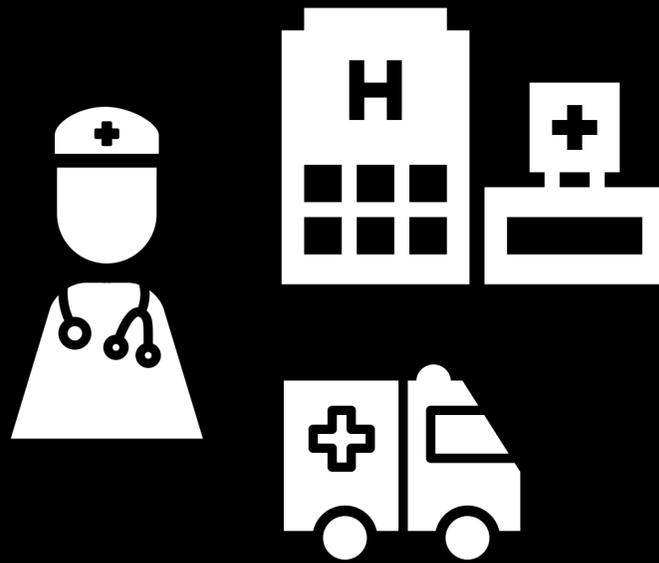
Artificial Intelligence



Human Intelligence



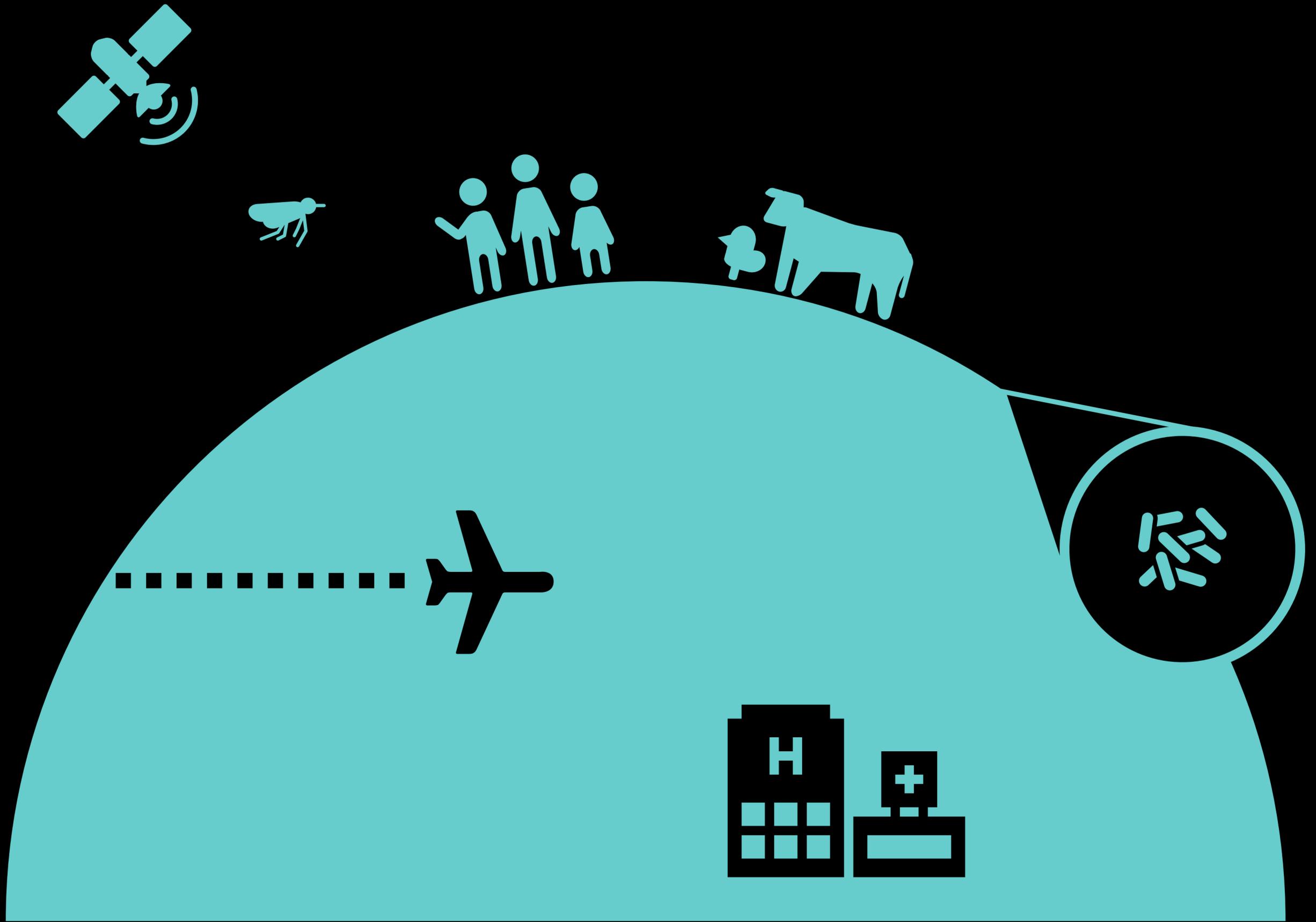
Public Health



Healthcare

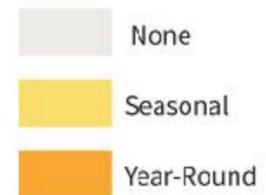


The Public

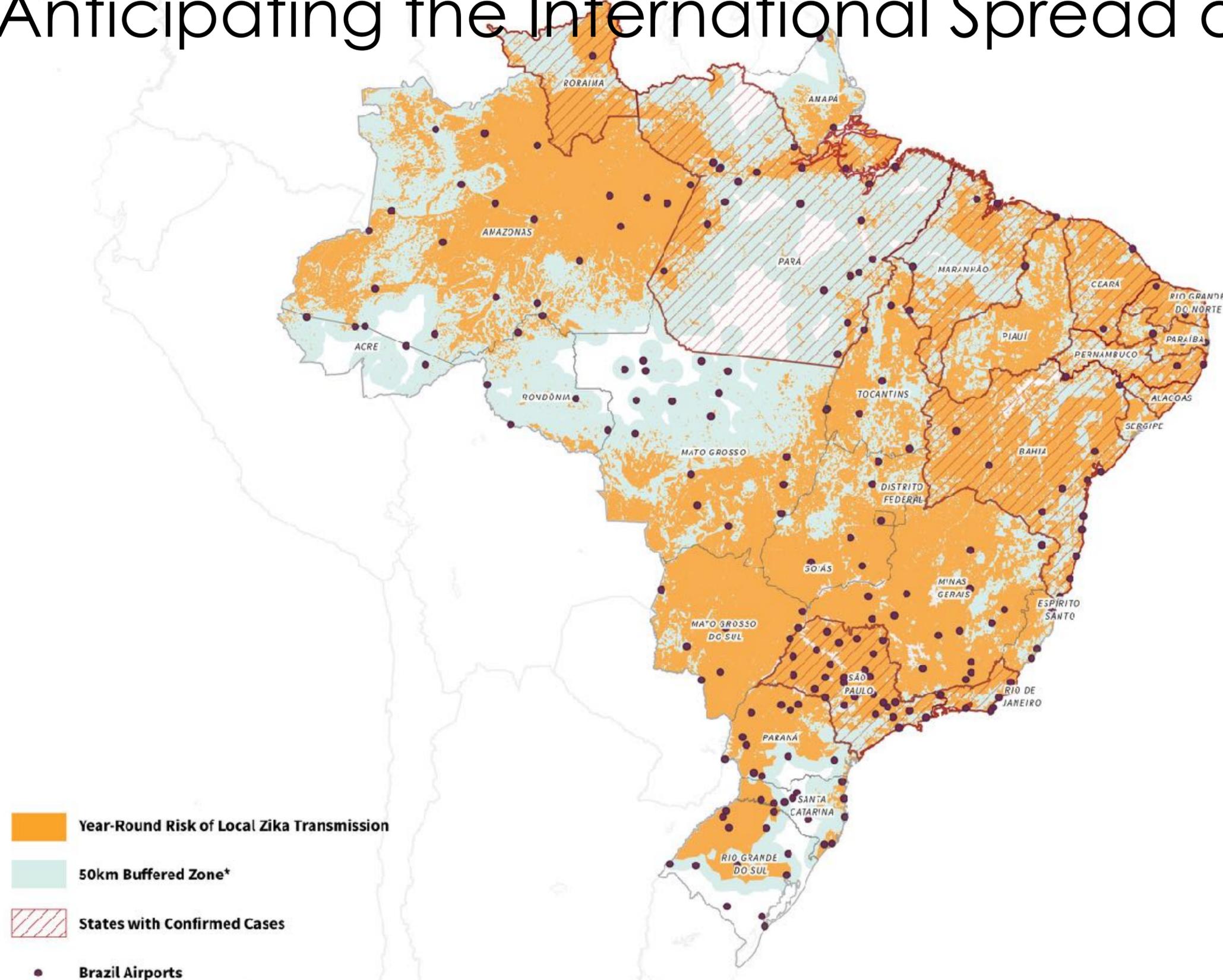


# Anticipating the International Spread of Zika

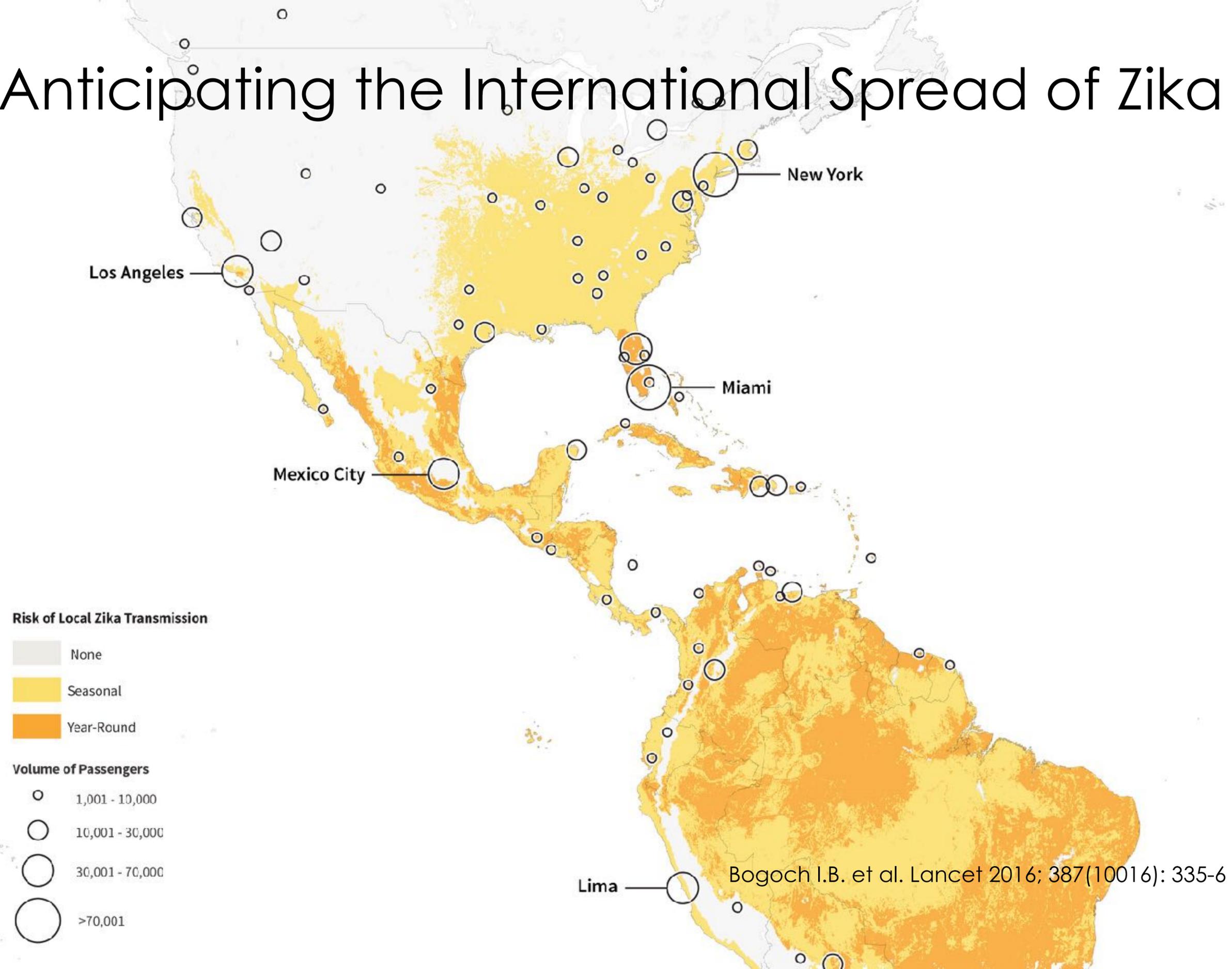
## Risk of Local Zika Transmission



# Anticipating the International Spread of Zika



# Anticipating the International Spread of Zika



Bogoch I.B. et al. Lancet 2016; 387(10016): 335-6

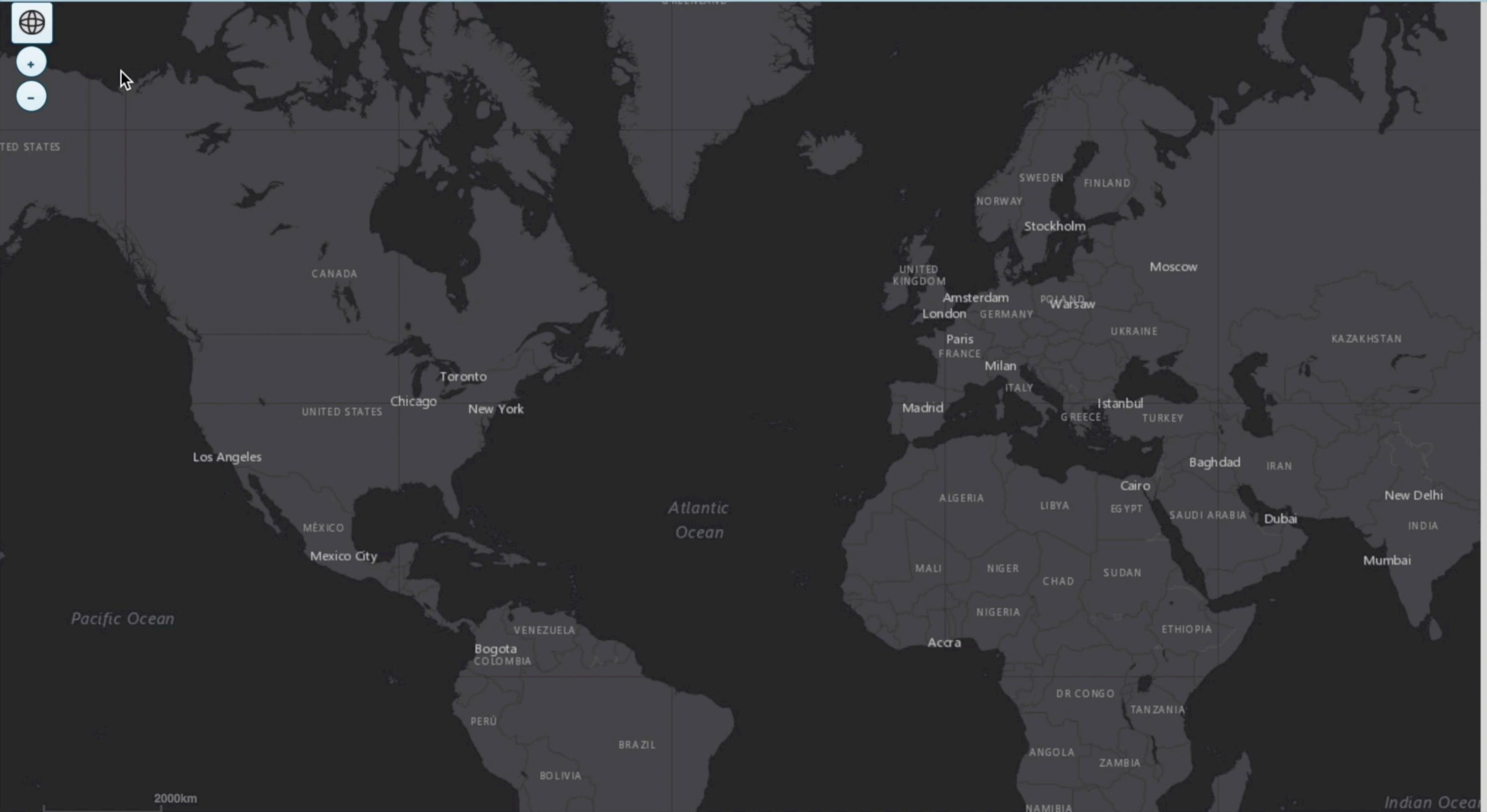
PUBLISHING



# Zika Moves Quickly, and Scientists Fear That Journals Aren't Keeping Pace

*By Paul Basken* | AUGUST 10, 2016  PREMIUM CONTENT FOR SUBSCRIBERS. **SUBSCRIBE TODAY**

It typically takes months to shepherd a piece through the peer-review process at top publications. What should scholars do when their work examines how an outbreak might spread within days?



Analytics

TO GATES



Population in At-Risk Area

# Network Architecture and Flows

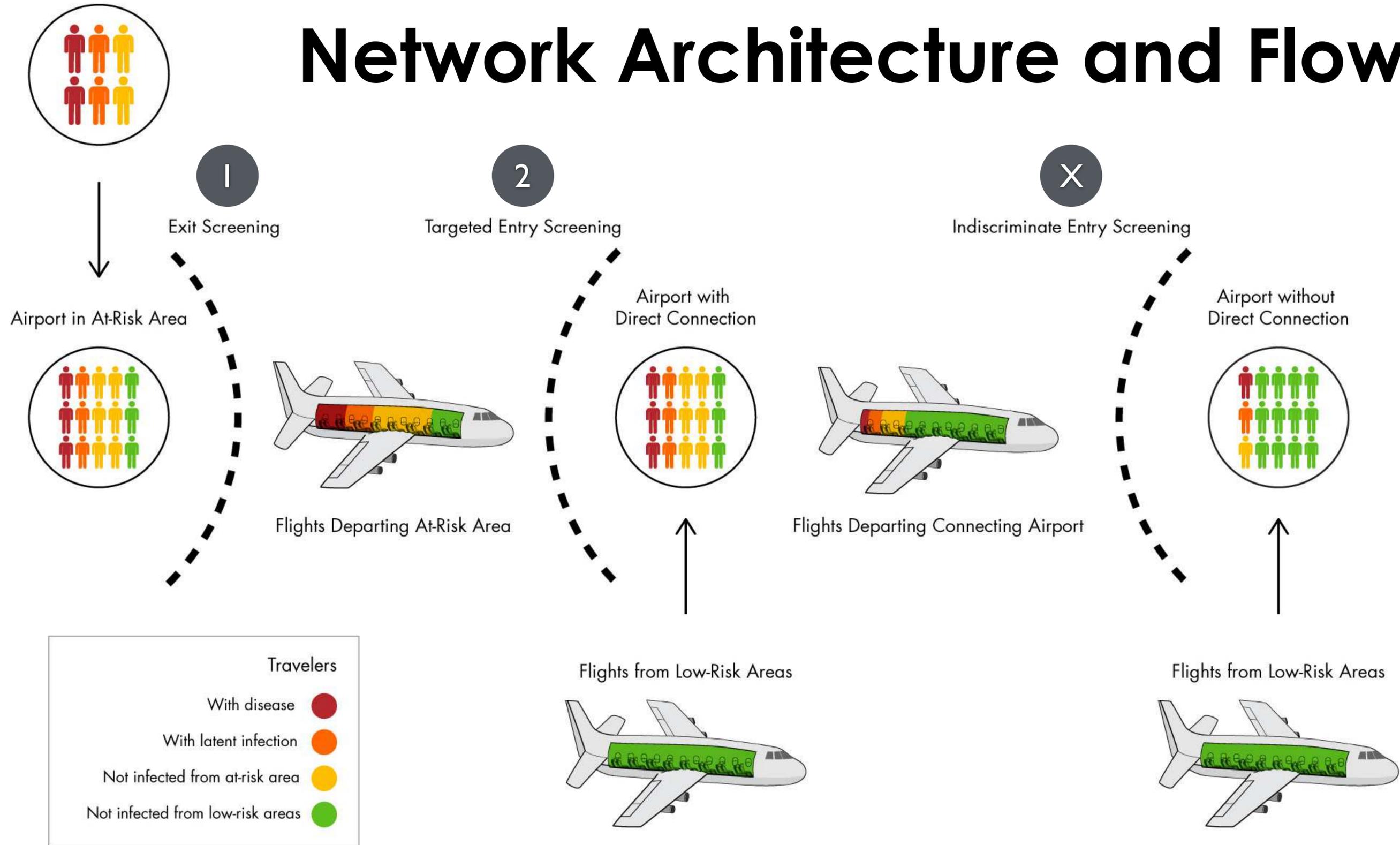
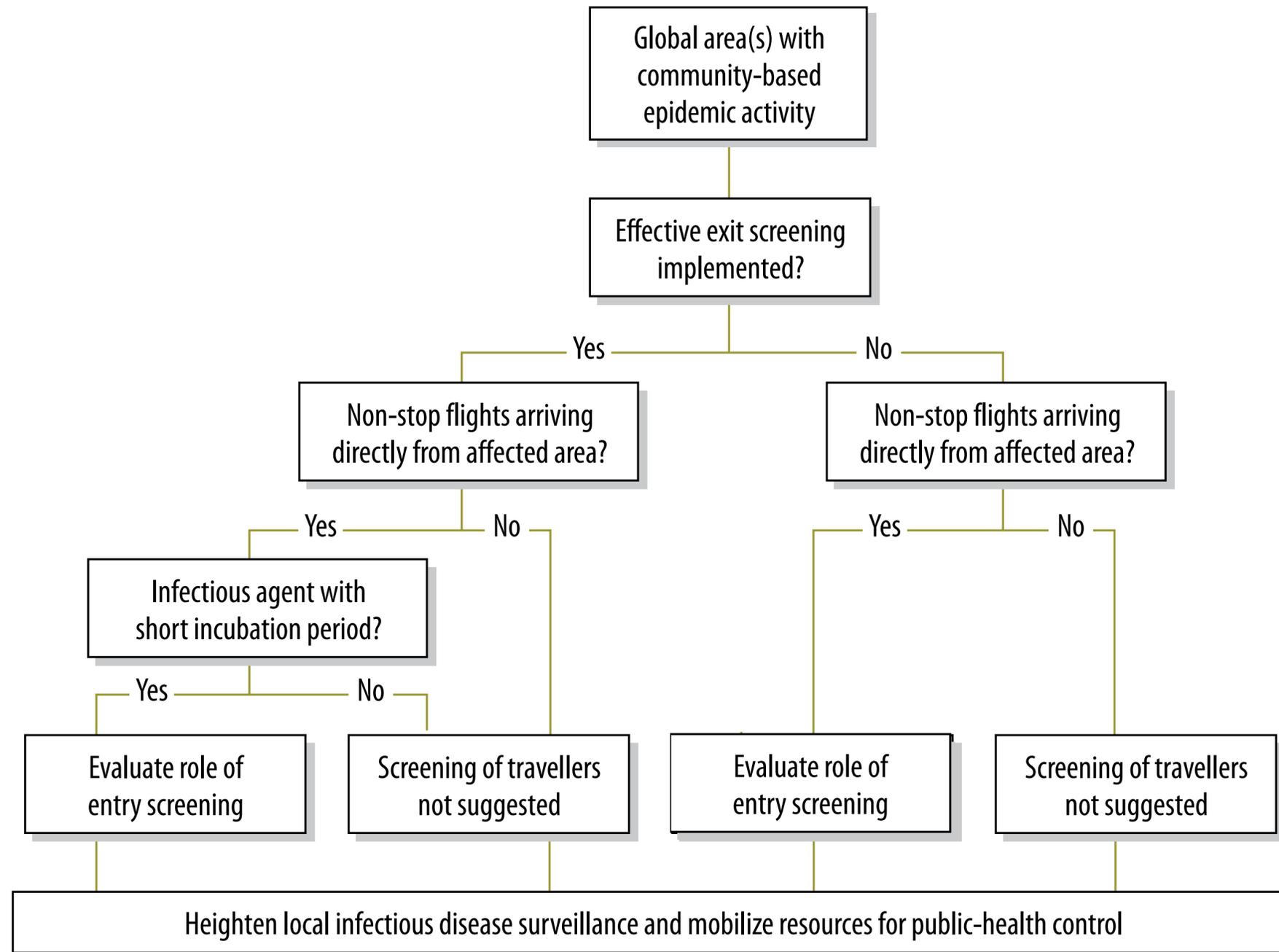
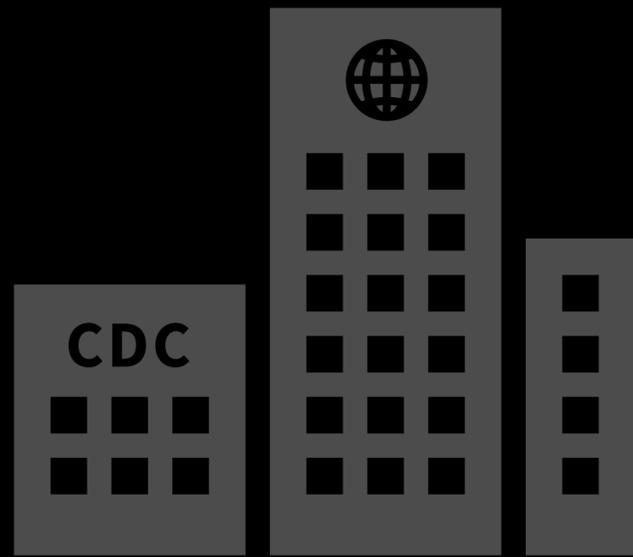
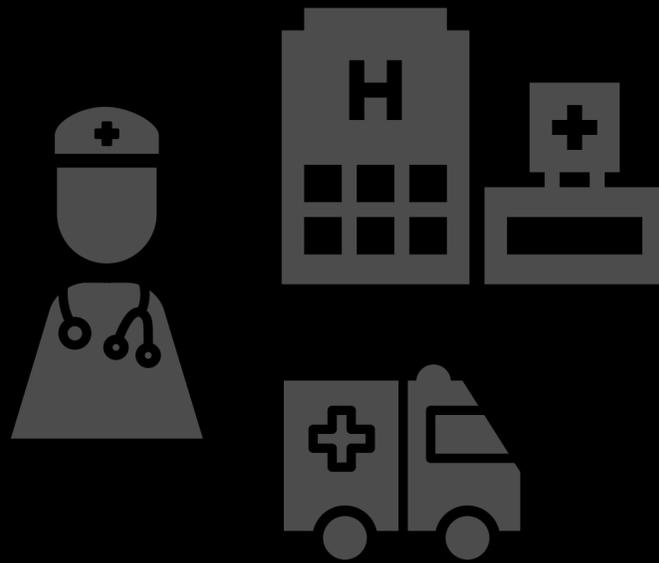


Fig. 5. **Evidence-based decision-support tool for cities at risk of the importation of a pathogen causing infectious disease**





Public Health

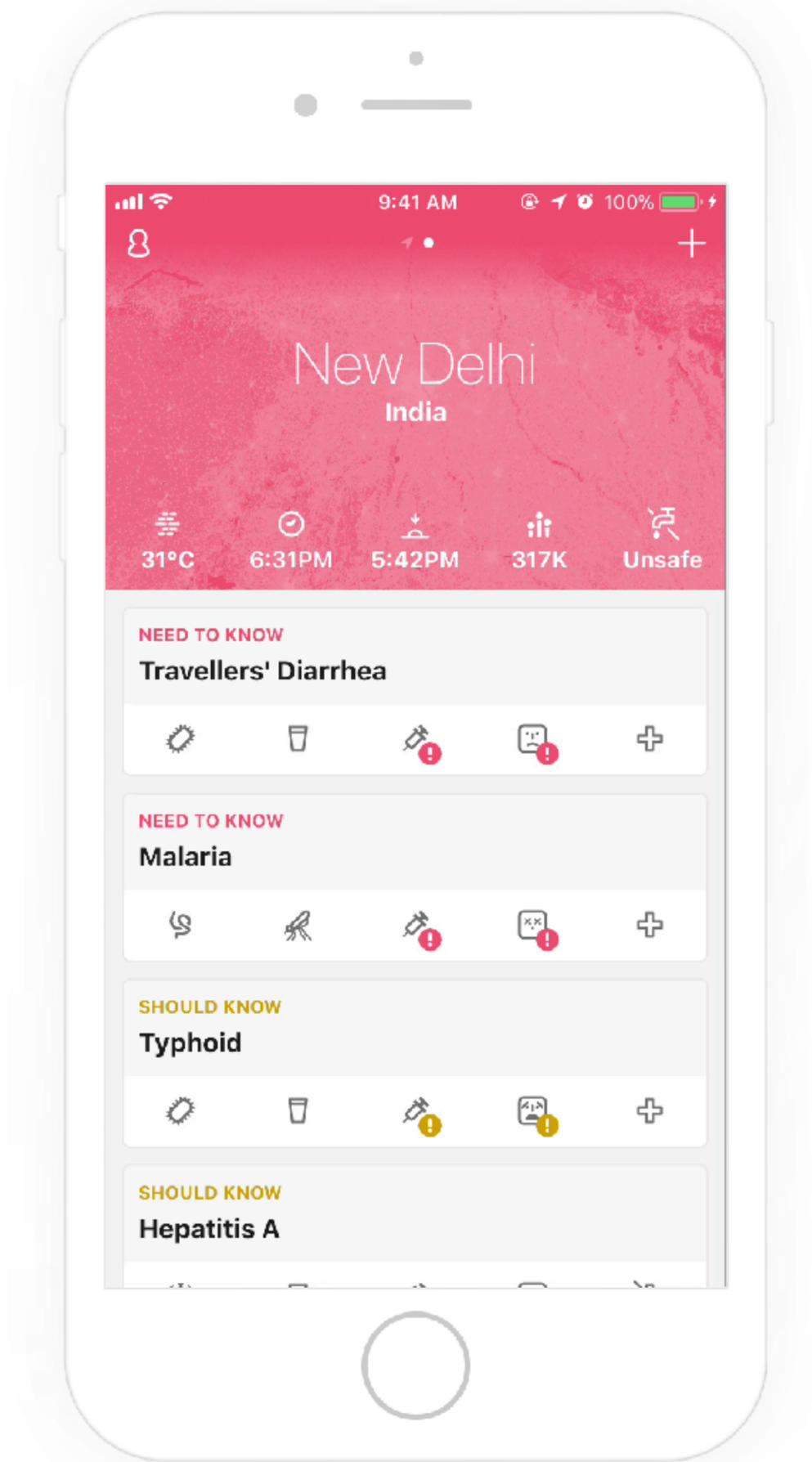


Healthcare



The Public





**Health Companion** for Travelers





# Thank You

**Kamran Khan MD, MPH**

Division of Infectious Diseases  
St. Michael's Hospital

Associate Professor  
Faculty of Medicine  
Dalla Lana School of Public Health  
University of Toronto

Founder, BlueDot