

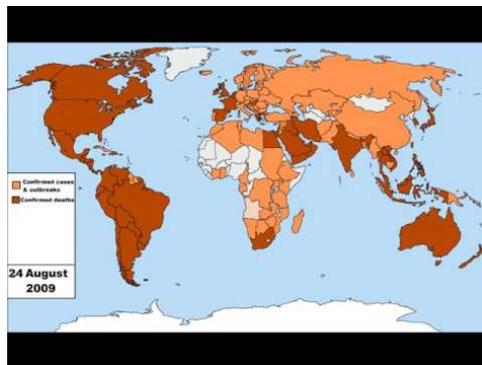
STANDARD DEVIATIONS: Location, Location, Location

Greetings,

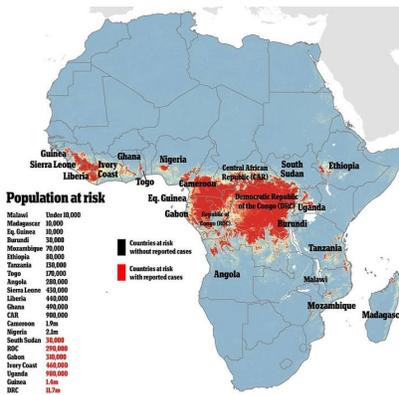
The three most important words in realty might well apply to pathogens. Location as a place. Location as a point in time. Location in our labs.

Where in the world we find an emerging pathogen tells us a lot about organisms, diseases, and consequences. Some pathogens are ubiquitous in the world and some are isolated in tiny, remote geographic enclaves. The places we find these bugs gives us an idea of the risk they pose.

Influenza roams the entire planet, spending its free time in the most scenic and populous areas, hobnobbing with royalty and peasantry alike. Other but more lethal pathogens, like Ebola, are highly selective in their domains with little ability or willfulness to venture out. The movement of these diseases may be related to environment, vectors, or the lack of mobility in a population. Which poses more risk?



{2009 H1N1 model 2 min.}

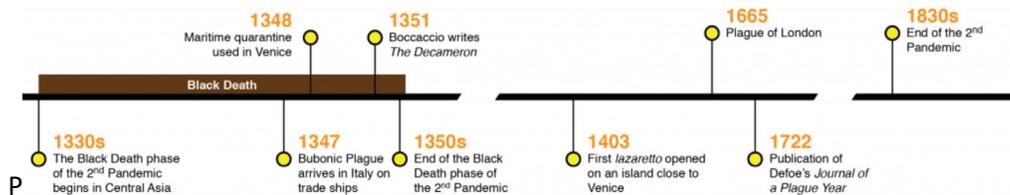


{The smaller realm of Ebola}



Where in time we see disease becomes a signature of any pathogen. The point in a timeline where a disease becomes significant often defines pathogenicity. Understanding when disease emerges in a population positions that outbreak event in history.

Bubonic plague, The Black Death, is an easily treatable bacterial infection now. In the middle ages the Black Death spread without regard to place or person. The point in time where the plague wreaked havoc accounts for the widespread mortality and distribution of disease. The timing of novel, emerging disease finds us like strangers in a strange land where our science and immune systems don't yet speak a language that can address these organisms.



{Time and location – Plague}

Our understanding of time and events allows us to look into the future with respect to disease evolution. Understanding when a pathogen may emerge gives us a place to begin response.

Perhaps **the most critical location** is that 6-inch space between our ears. Our ability to identify and understand a pathogen is a critical parameter to the outcome of its effects.

In laboratory locations across the world, we're researching and testing with new, fast, cutting-edge technologies and methods that improve the response to outbreak. We're increasing the area of understanding and mapping the terrain of discovery that positions us to anticipate and deal with established and emerging disease.

“We've come a long way.” That expression implies a change in location, but it's really our place in understanding and time that changed. We moved to a better position to deal with emerging pathogens as we move forward in our technologies and capabilities for response. But novel pathogens continue to emerge in sometimes the worst locations. The problems happen at difficult or obscure physical locations, unexpected moments in time and outside our understanding.

The current outbreak of a novel coronavirus in Wuhan City, China exemplifies the importance of location, location, location. The outbreak is happening in a city of 11 million people at a place in time where the movement of a transmissible pathogen makes the planet susceptible in a matter of hours. This type of outbreak is what we fear in a pandemic; and yet the virus genome has already been sequenced and CDC and others are already formulating testing protocols and methods.

Our capability for rapid diagnosis and response is the result of **where our science is** at today. We are able to rapidly establish a global database of understanding accessible to healthcare workers around the world.



As news and our understanding of the new pathogen in Wuhan City develop, we'll get a better idea of where we are in preparedness for this outbreak. Soon the things we learn will be seen in the lab as new tests, and perhaps closer to your location than you'd like.

Location, location, location. Where will the next pandemic occur? Will it be a disease that reaches every corner of the world, killing untold millions? Will it occur at a place in history that finds us vulnerable? And will our science be positioned to respond?

Endemicity, chronology, and pathology are the coordinates that permit healthcare to map and mitigate emerging pathogens. No matter where we are in responding to emerging pathogens, we should be working to move humanity to a better, safer place.

Have a great week and be safe,

Bryan

