lightningtalks

WIGGINS MEMORIAL LIBRARY

Informal, fast-paced presentations
by Campbell faculty

MON **NOV 14**
2:00 PM

lightningtalks

WIGGINS MEMORIAL LIBRARY

Dr. Emily Bailey

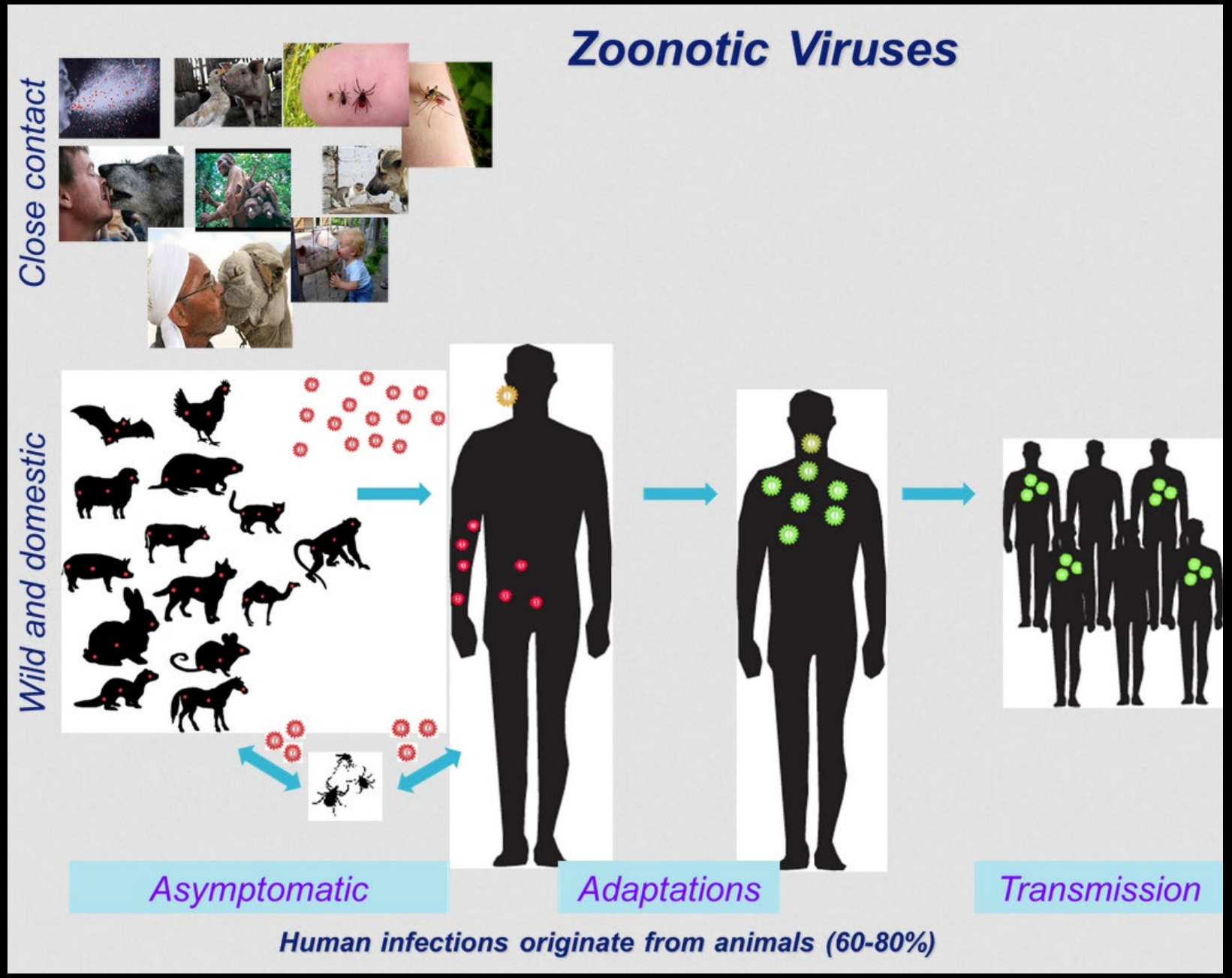
Public Health

Environmental Pathogens and Risk Assessment

Emily S. Bailey, PhD

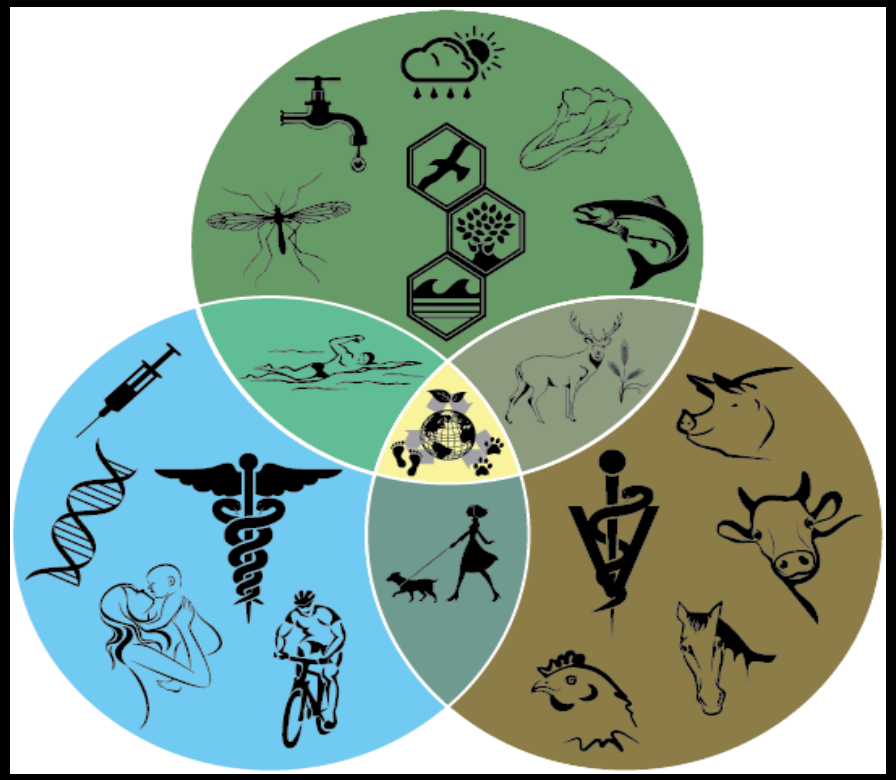
November 4, 2022


PANDEMIC
TOKYO
INFECTION RATE
2 2 2 3 3 4 4
OUTBREAKS
0 1 2 4 5 6 7
CURED DISEASES/FLIP TOKEN IF ERADICATED
BAGHDAD
PLAY
1.Do 4 actions
2.Draw 2 cards
•Resolve any epidemics
•Discard to 7 cards
3.Infect cities
SAN FRANCISCO
CHICAGO
MONTREAL
NEW YORK
WASHINGTON
LONDON
ESSEN
PARIS
MADRID
ATLANTA
LOS ANGELES
MEXICO CITY
MIAMI
BOGOTA
LIMA
SÃO PAULO
BUENOS AIRES
SANTIAGO
ALGIERS
CAIRO
ISTANBUL
MILAN
ST. PETERSBURG
LAGOS
KHARTOUM
KINSHASA
JOHANNESBURG
MOSCOW
BAGHDAD
RIYADH
TEHRAN
KARACHI
DELHI
MUMBAI
CHENNAI
KOLKATA
BANGKOK
HONG KONG
SHANGHAI
BEIJING
SEOUL
TOKYO
OSAKA
TAIPEI
MANILA
HO CHI MINH CITY
JAKARTA
SYDNEY



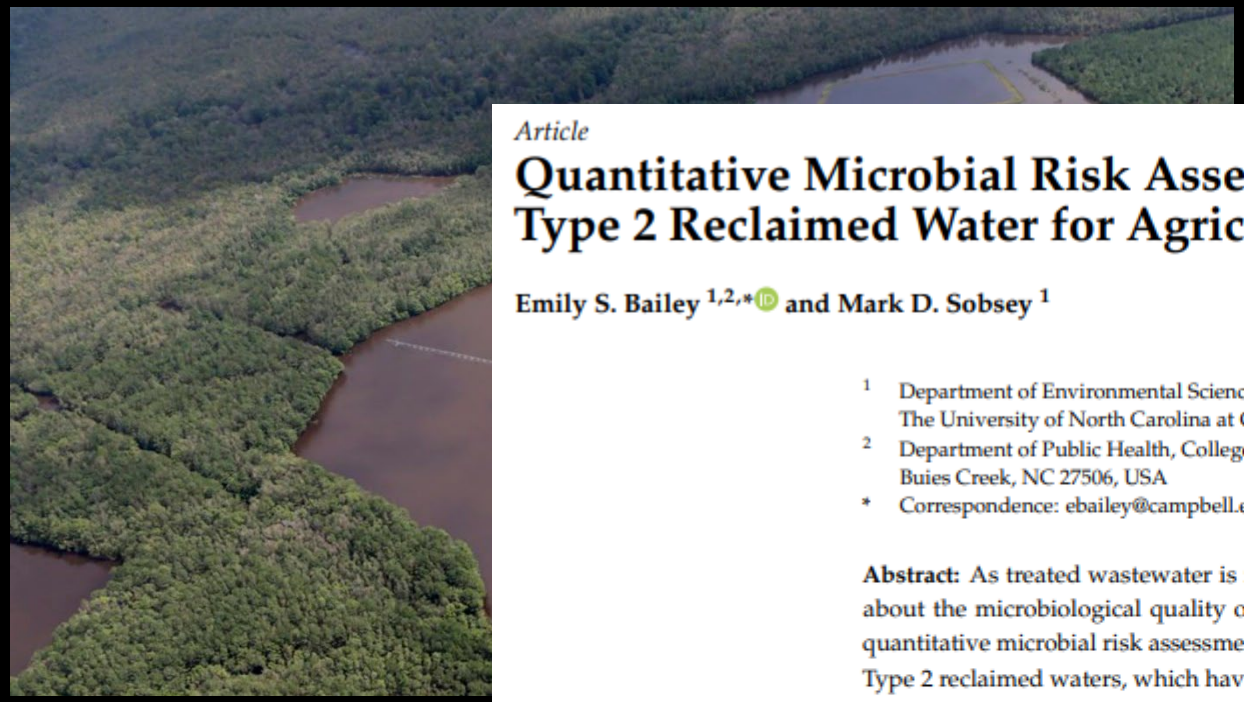
From http://www.iisertvm.ac.in/faculties/stalin/research_areas.phpx

One Health



"The integrative effort of multiple disciplines working locally, nationally, and globally to attain optimal health for people, animals, and the environment" -AVMA

Small Family Farm



Article

Quantitative Microbial Risk Assessment of North Carolina Type 2 Reclaimed Water for Agricultural Reuse

Emily S. Bailey [1,2,*] and Mark D. Sobsey [1]

[1] Department of Environmental Sciences and Engineering, Gillings School of Global Public Health, The University of North Carolina at Chapel Hill, Chapel Hill, NC 27599, USA
[2] Department of Public Health, College of Pharmacy & Health Sciences, Campbell University, Buies Creek, NC 27506, USA
* Correspondence: ebailey@campbell.edu

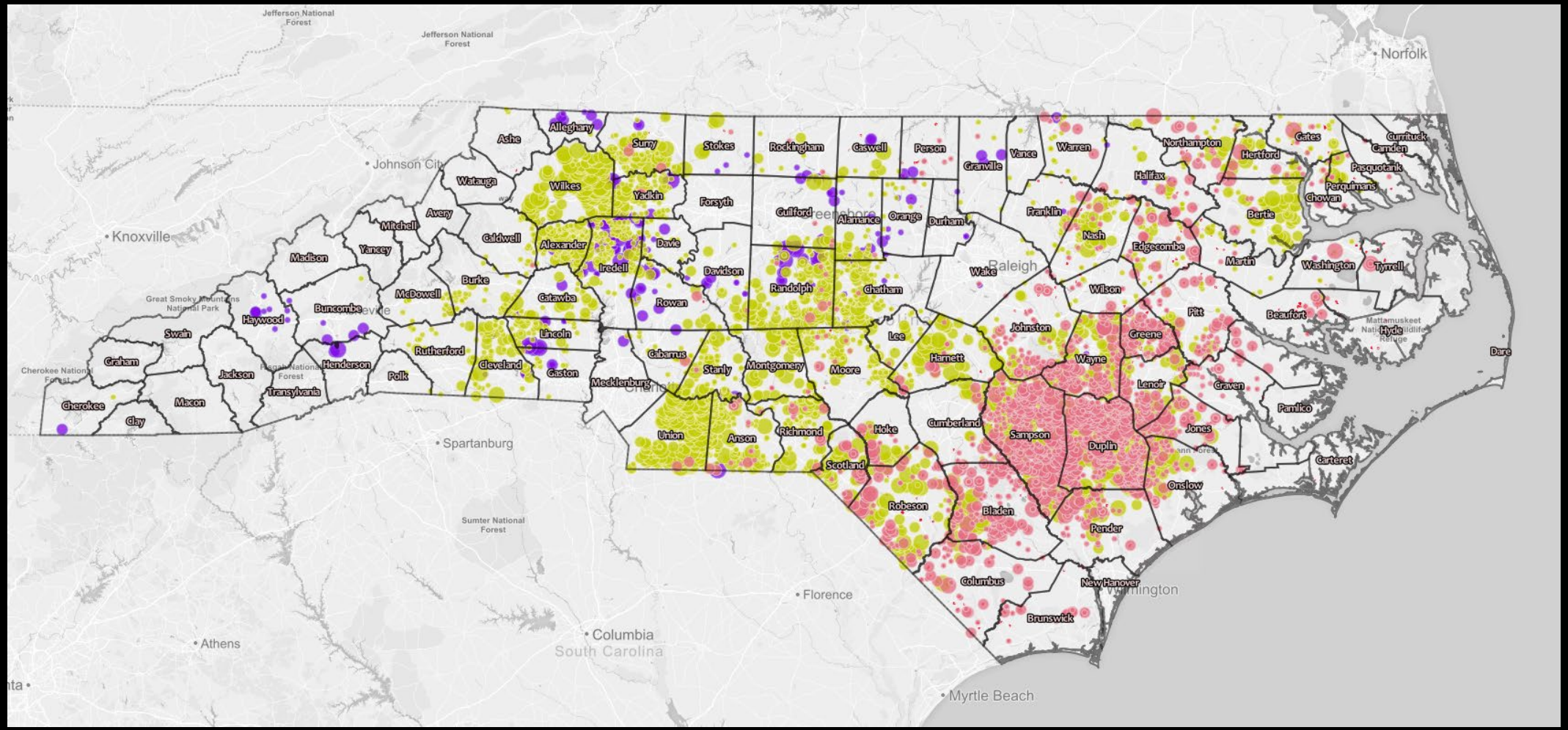
Abstract: As treated wastewater is increasingly used for agricultural purposes; questions remain about the microbiological quality of produce irrigated by these waters. This study conducted a quantitative microbial risk assessment (QMRA) using microbial data collected from North Carolina Type 2 reclaimed waters, which have been proposed as supplemental irrigation waters. Reclaimed waters were collected from four different water reclamation facilities located in central North Carolina and evaluated for five representative pathogens from the three groups of microorganisms (bacteria, virus, and protozoan parasites). Using these data, produce consumption scenarios were evaluated using a variety of irrigation techniques, including spray irrigation, drip irrigation, and subsurface drip irrigation, and the disability adjusted life years (DALYs) that result from illness by each pathogen as a result of produce consumption were compared to the acceptable level set by the World Health Organization. Based on the types of crop irrigation examined in this study using NC Type 2 reclaimed water, there were irrigation conditions and certain pathogens for which the annual risk of infection was not always reduced below the acceptable DALY risk level of $<1 \times 10^{-6}$ set by the WHO. The risks of viral infection by adenoviruses groups A–F were below the acceptable risk level; however, for *Salmonella* spp., *Cryptosporidium*, and *Giardia*, the annual risk of infection was sometimes greater than would be considered acceptable.

Keywords: reclaimed water; water reuse; water-supply systems; agro-wastewater; risk assessment

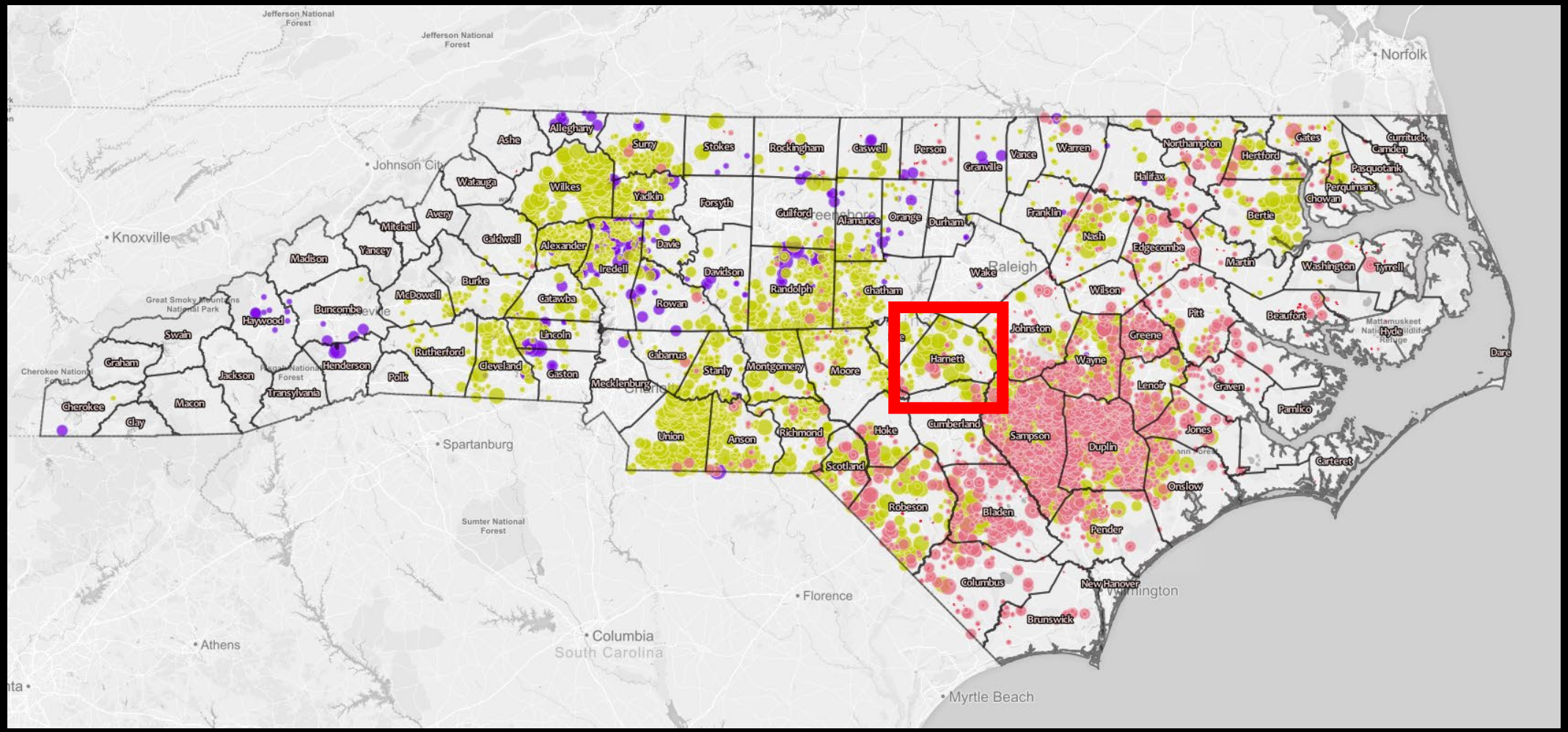
Citation: Bailey, E.S.; Sobsey, M.D. Quantitative Microbial Risk Assessment of North Carolina Type 2 Reclaimed Water for Agricultural Reuse. *Appl. Sci.* **2022**, *12*, 10159. https://doi.org/10.3390/

pons in North Carolina have either
at imminent risk of doing so

After Florence. Yes, That's ...
either released pig waste into the environment or are at imminent risk of doing so, according to state offi...
nytimes.com



Waterkeeper Alliance and the Environmental Working Group used public data to create maps of CAFO locations in North Carolina in 2016. For more information and interactive maps, visit https://www.ewg.org/interactive-maps/2016_north_carolina_animal_feeding_operations.php#.W6KBLPZReUk.



Waterkeeper Alliance and the Environmental Working Group used public data to create maps of CAFO locations in North Carolina in 2016. For more information and interactive maps, visit https://www.ewg.org/interactive-maps/2016_north_carolina_animal_feeding_operations.php#.W6KBLPZReUk.

Current Surveillance

- Disadvantages:
  - Disrupts production
  - Undue stress on animals
  - Compromises biosecurity
  - Fear of economic backlash
  - Expensive
  - Humans often serve as sentinels for novel diseases

Surveillance methods that <u>are less invasive</u> and more <u>readily accepted</u> by production managers are needed

SCIENTIFIC REPORTS
nature research

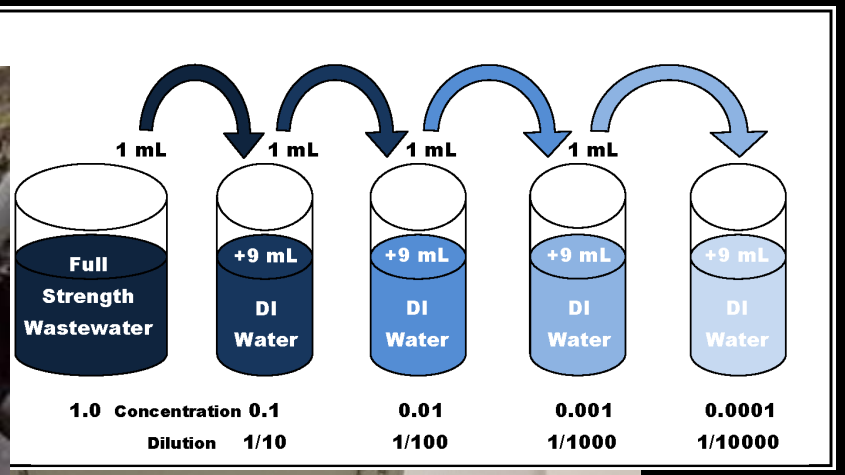
OPEN

A feasibility study of conducting surveillance for swine pathogens in slurry from North Carolina swine farms

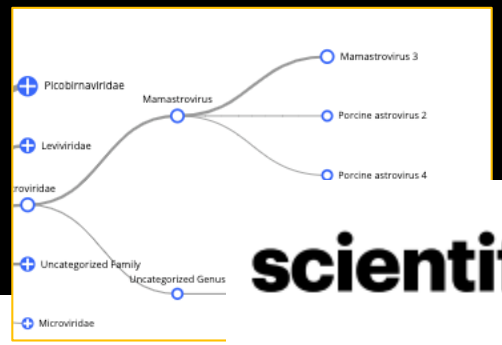
Emily S. Bailey[1,2,3]✉, Laura K. Borkenhagen[1,2], Jessica Y. Choi[1,2], Annette E. Greer[4], Marie R. Culhane[5] & Gregory C. Gray[1,2,6,7]

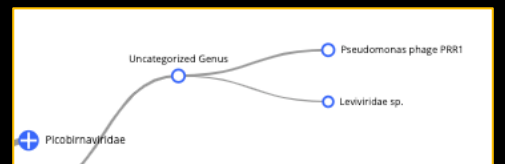
Despite close contact between humans and animals on large scale farms, little to no infectious disease research is conducted at this interface. Our goal in this preliminary study was to explore if we could

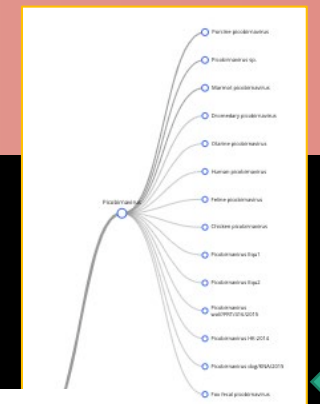
Slurry Sampling



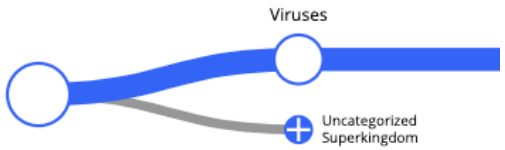
Viral breakdown







Fanning shape hints at new viral strain



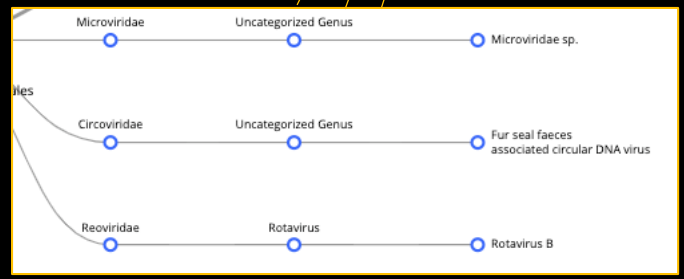
scientific reports

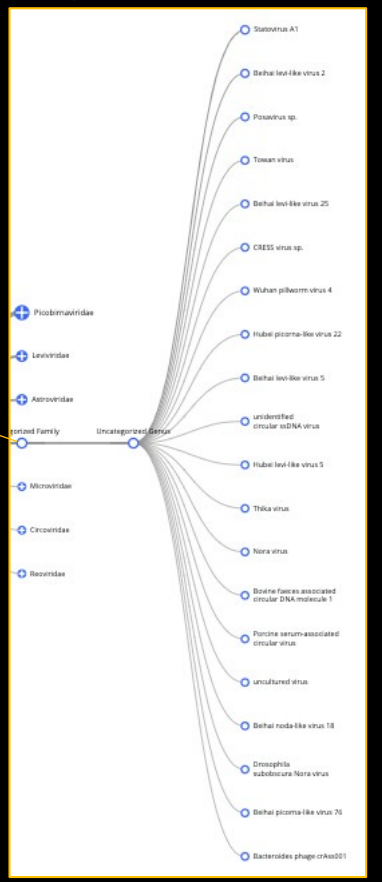
Check for updates

OPEN

Metagenomic characterization of swine slurry in a North American swine farm operation

Akshaya Ramesh[1,2,4,12], Emily S. Bailey[3,4,12]✉, Vida Ahyong[5], Charles Langelier[5,6], Maira Phelps[5], Norma Neff[5], Rene Sit[5], Cristina Tato[5], Joseph L. DeRisi[5,7], Annette G. Greer[8] & Gregory C. Gray[3,9,10,11]





frontiers in Public Health

MINI REVIEW
published: 09 April 2018
doi: 10.3389/fpubh.2018.00104

A Mini Review of the Zoonotic Threat Potential of Influenza Viruses, Coronaviruses, Adenoviruses, and Enteroviruses

Emily S. Bailey[1,2], Jane K. Fieldhouse[1,2], Jessica Y. Choi[1,2] and Gregory C. Gray[1,2,3,4]*

[1] Duke Global Health Institute, Duke University, Durham, NC, United States, [2] Division of Infectious Diseases, Duke University School of Medicine, Durham, NC, United States, [3] Global Health Research Center, Duke-Kunshan University, Kunshan, China, [4] Emerging Infectious Diseases Program, Duke-NUS Medical School, Singapore

During the last two decades, scientists have grown increasingly aware that viruses are emerging from the human–animal interface. In particular, respiratory infections are problematic; in early 2003, World Health Organization issued a worldwide alert for a previously unrecognized illness that was subsequently found to be caused by a novel coronavirus [severe acute respiratory syndrome (SARS) virus]. In addition to SARS, other respiratory pathogens have also emerged recently, contributing to the high burden of respiratory tract infection-related morbidity and mortality. Among the recently emerged respiratory pathogens are influenza viruses, coronaviruses, enteroviruses, and adenoviruses. As the genesis of these emerging viruses is not well understood and their detection normally occurs after they have crossed over and adapted to man, ideally, strategies for such novel virus detection should include intensive surveillance at the human–animal interface, particularly if one believes the paradigm that many novel emerging zoonotic viruses first circulate in animal populations and occasionally infect man before they fully adapt to man; early detection at the human–animal interface will provide earlier warning. Here, we review recent emerging virus treats for these four groups of viruses.

OPEN ACCESS

Edited by:
Margaret Ip,
The Chinese University of Hong Kong, China

Reviewed by:
Peng Yang,
Beijing Center for Disease Prevention and Control, China
Sergey Eremin,
World Health Organization (Switzerland), Switzerland

****Correspondence:***
Emily S. Bailey
emily.bailey2@duke.edu

Specialty section:
This article was submitted

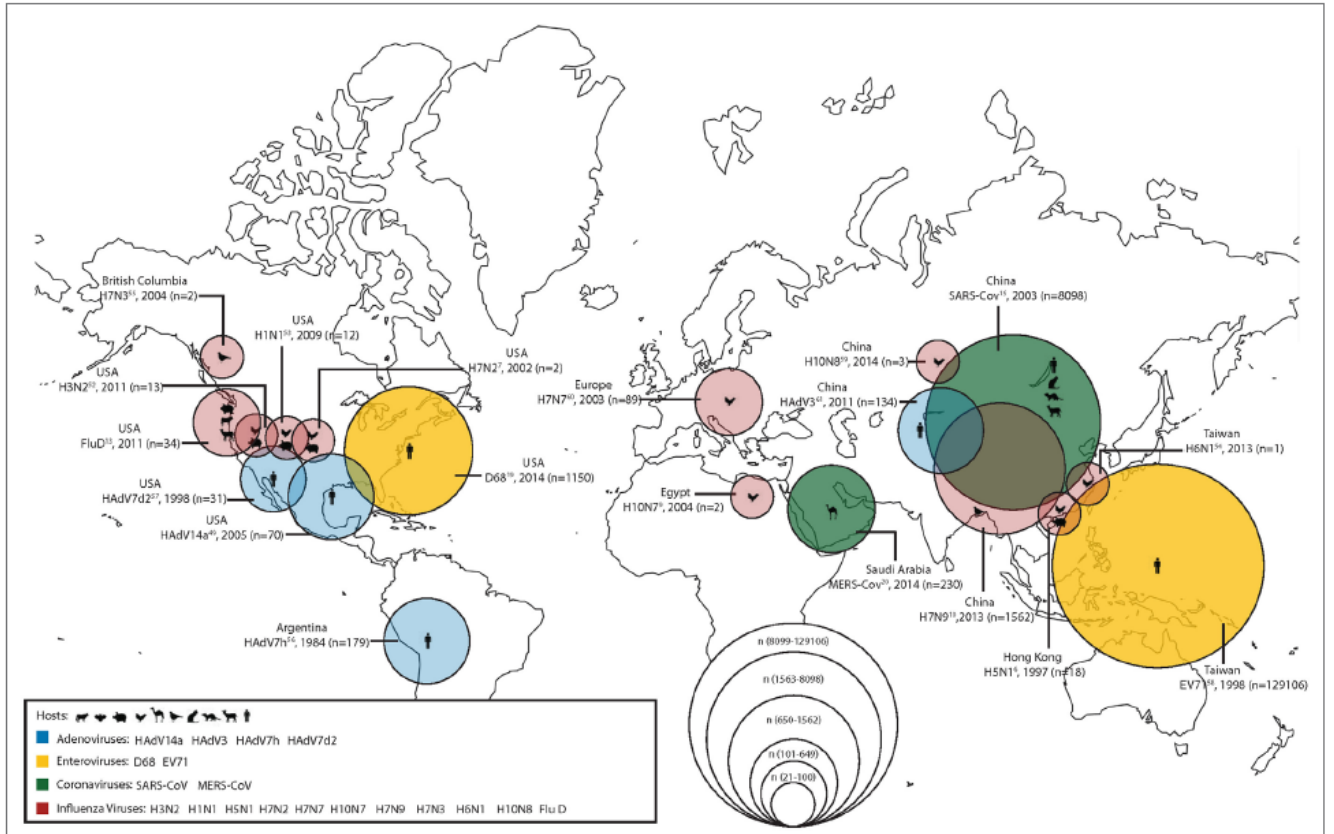


FIGURE 1 | The geographical location of first detections (with known reservoirs) for recently emerged adenoviruses (Ads), enteroviruses (EVs), coronaviruses, and influenza viruses. Zoonotic (coronaviruses and influenza viruses) and non-zoonotic viruses (Ads and EVs) are shown. For zoonotic viruses, the hosts range from cattle, bats, chickens, camels, wild birds, cats, ferrets, goats, and humans (from left to right). The different sizes of the circles represent the number of human cases during the first outbreaks of the emerging respiratory viruses. Human cases of adenoviral infections are shown in blue; human cases of enteroviral infections are shown in yellow; human cases of coronaviral infections are shown in green; and human cases of influenza viral infections are shown in red.

NDTV

LIVE TV LATEST INDIA COVID OPINION

Covid Virus May Survive For Refrigerated, Frozen Meat: S

The research, recently p
conducted using chicke
on SARS-CoV-2.

World | Press Trust of India | Updated:

TRENDING

Viral: Father Asks Toddler Son To Pay For Meal At Restaurant- Watch What Happens Next

"*Maaf Kijiyega*," Nitish Kumar Said At Tejashwi Yadav's Party

Nitish Kumar's Oath Today, Tejashwi Yadav To Be Deputy: 10 Facts

mint

Home / News / India / Coronavirus may survive for 30 days on meat, fish: Study

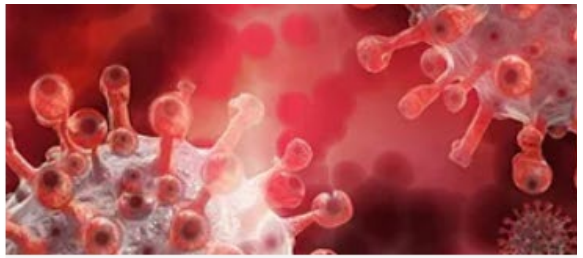
Lung Disease & Respiratory Health > Coronavirus > News >

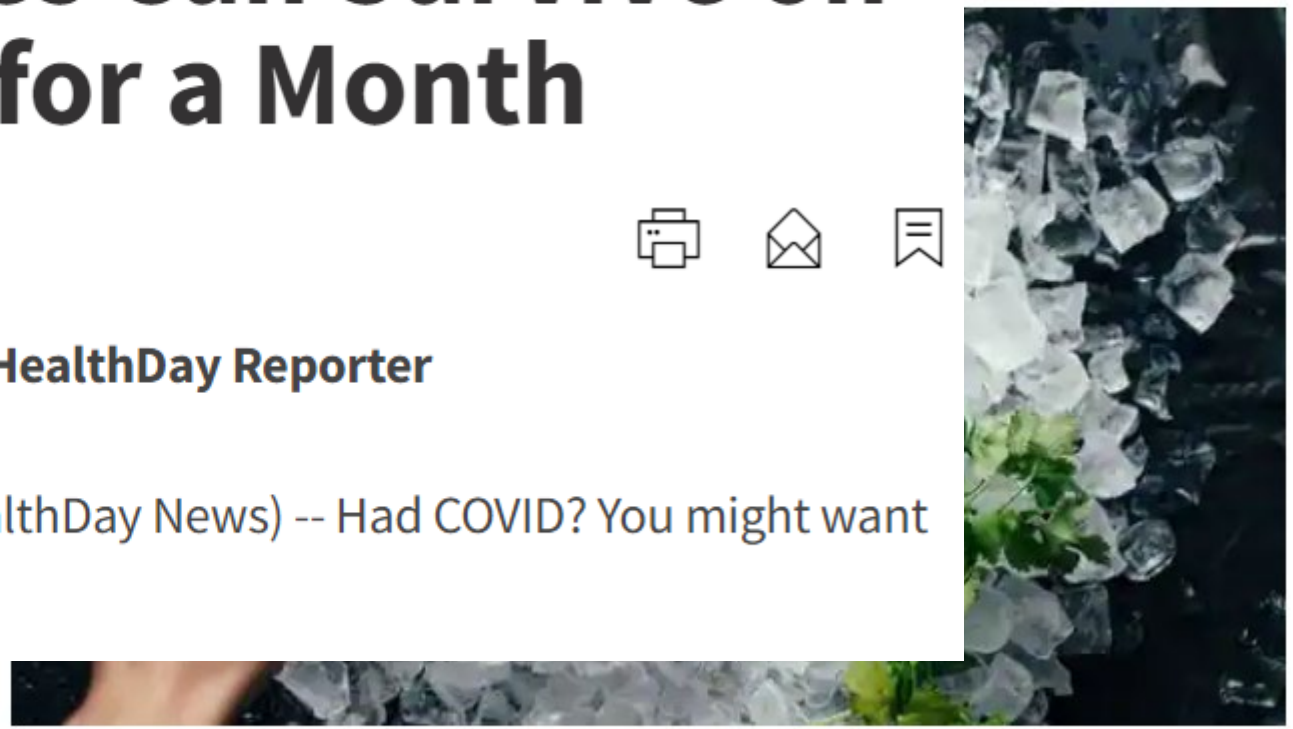
Coronaviruses Can Survive on Frozen Meat for a Month

By Ellie Quinlan Houghtaling HealthDay Reporter

HealthDay Reporter

WEDNESDAY, July 13, 2022 (HealthDay News) -- Had COVID? You might want to clean your freezer out.





COVID-19 virus may survive for 30 days on refrigerated, frozen meat and fish, the study says.

1 min read . Updated: 12 Jul 2022, 03:09 PM IST

China links seven COVID-19 outbreaks to food packaging

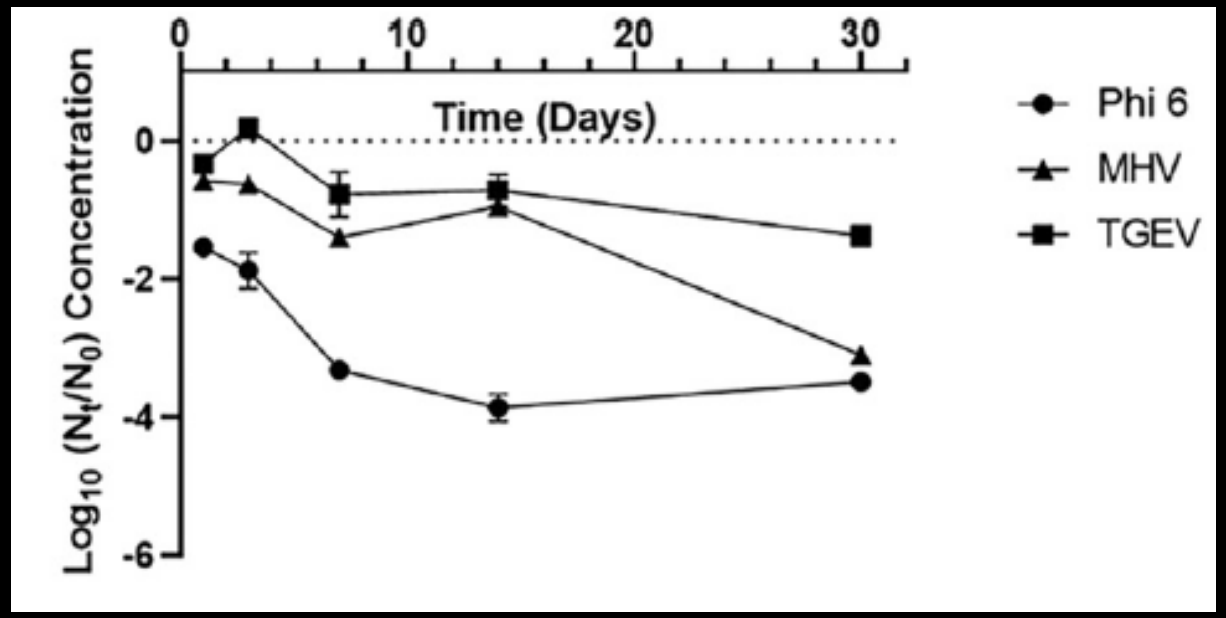
By News Desk on July 10, 2022

China has linked seven COVID-19 outbreaks and almost 700 cases to contaminated imported frozen food packaging materials.

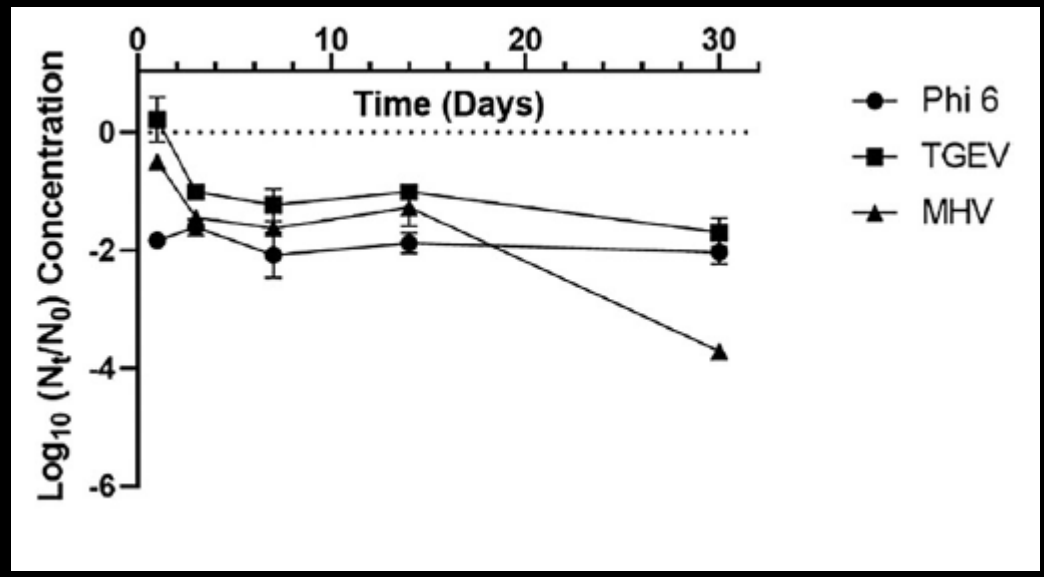
"Positive samples came from 11 European countries, six South American nations, nine Asian countries, two North American ones, and two African countries."

Salmon

Refrigerated (-4° C)

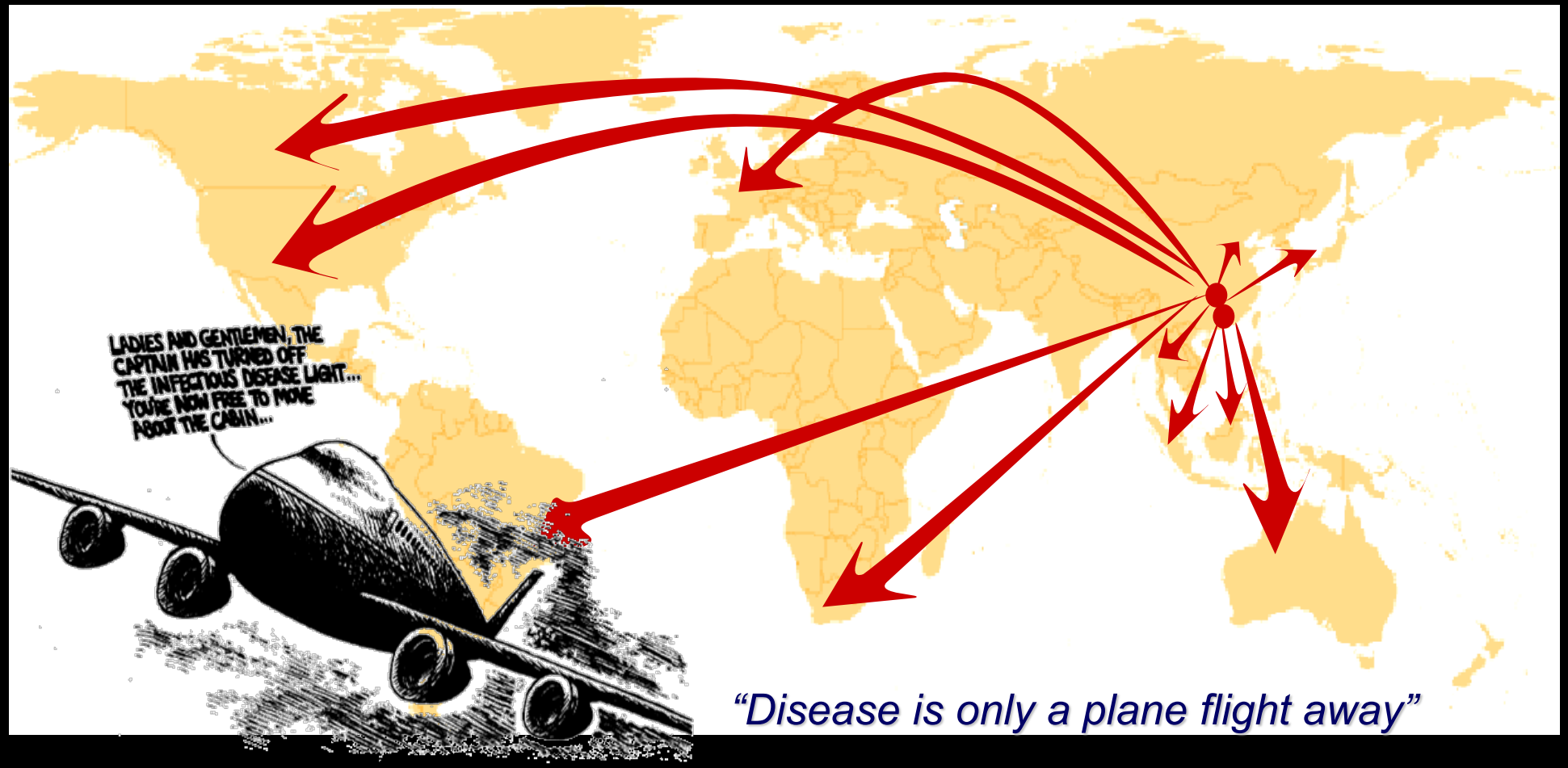


Frozen (-20° C)

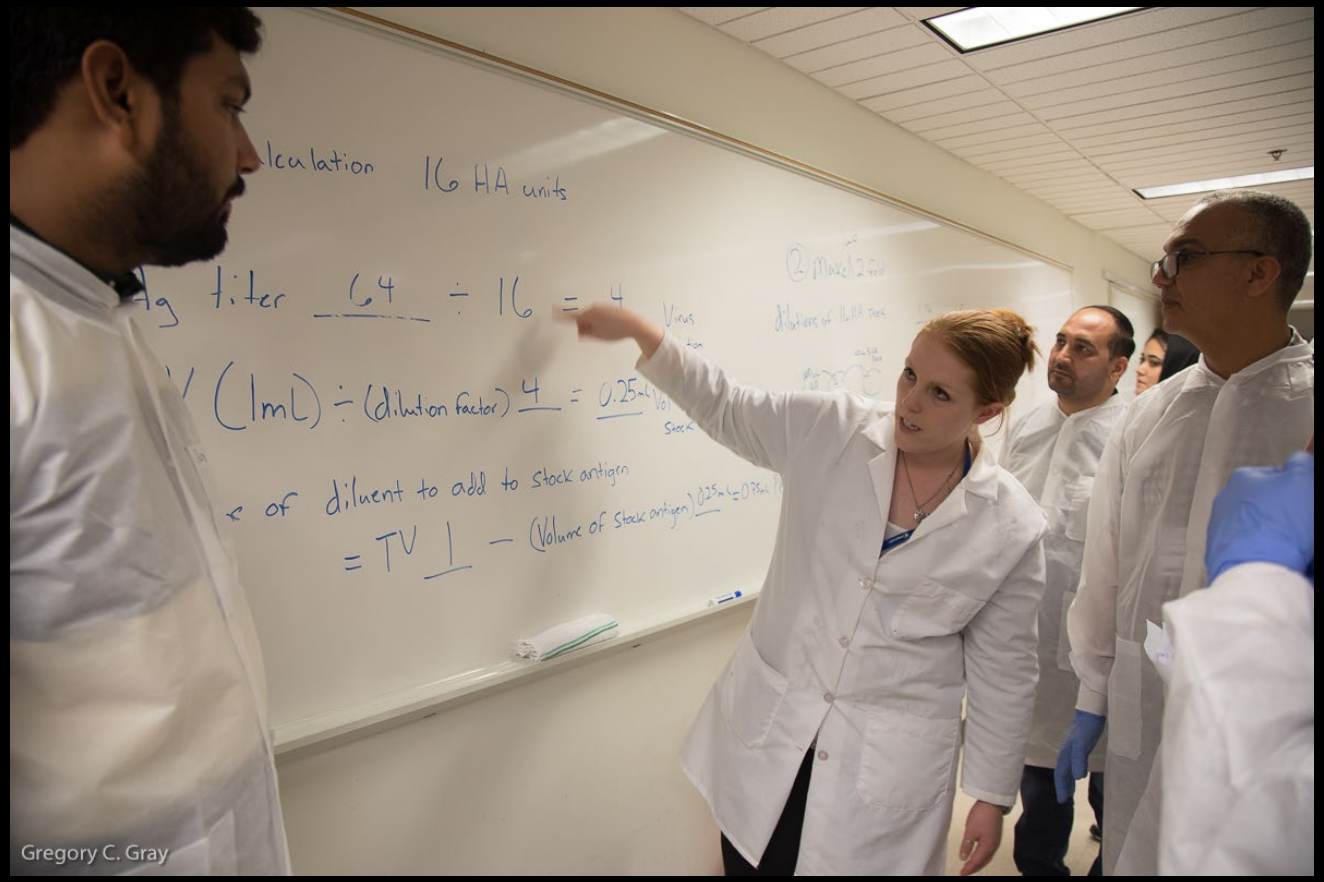


Why does it matter?

SARS OUTBREAK, 2003:
Rapid spread worldwide by movement of people



Questions?



https://sites.globalhealth.duke.edu/dukeonehealth/