

Infectious Disease Highlights and Lowlights in 2018, and What to Expect in 2019
Dr. Larry Madoff, ProMED and International Society for Infectious Diseases
A Webber Training Teleclass



**Infectious Disease Highlights and Lowlights
in 2018, and What to Expect in 2019**

Larry Madoff, MD
ProMED
International Society for Infectious Diseases


Hosted by Paul Webber
paul@webbertraining.com



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INTERNATIONAL SOCIETY
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www.webbertraining.com December 5, 2018

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“Of all the things that could kill more than 10 million people around the world, the most likely is an epidemic stemming from either natural causes or bioterrorism.”

-Bill Gates



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IMED 2018
International Meeting
on Emerging Diseases
and Surveillance

VIENNA, AUSTRIA
NOVEMBER 9-12, 2018
Hilton Hotel, Vienna



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Vienna's "Plague column" or *Pestsäule*
Built after the plague of 1679



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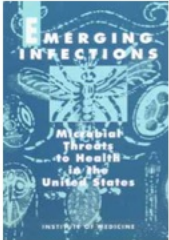


Ignaz Philipp Semmelweis
1818-1865

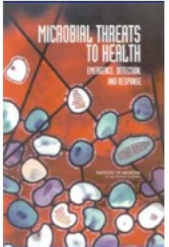


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1992



2003

“Microbes are ranked among the most numerous and diverse of organisms on the planet; pathogenic microbes can be resilient, dangerous foes. Although it is impossible to predict their individual emergence in time and place, we can be confident that new microbial disease will emerge.”

-Institute of Medicine, 1992



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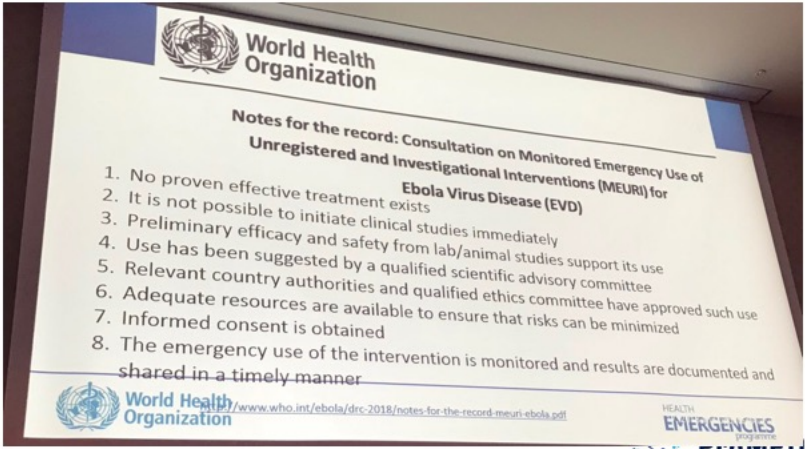
**Session 1: Keynote
Plenary Session:
100th Anniversary of
the 1918 Influenza
Pandemic – Preventing
and Stopping Epidemics
in 2018**

Chair: Marc Mendelson
(South Africa)
President, ISID



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Janet Diaz, WHO
Direct from DR Congo
**"New interventions for Outbreak Response:
Ebola in DRC":**



World Health Organization

Notes for the record: Consultation on Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) for Ebola Virus Disease (EVD)

1. No proven effective treatment exists
2. It is not possible to initiate clinical studies immediately
3. Preliminary efficacy and safety from lab/animal studies support its use
4. Use has been suggested by a qualified scientific advisory committee
5. Relevant country authorities and qualified ethics committee have approved such use
6. Adequate resources are available to ensure that risks can be minimized
7. Informed consent is obtained
8. The emergency use of the intervention is monitored and results are documented and shared in a timely manner.

World Health Organization [/www.who.int/ebola/drc-2018/notes-for-the-record-meuri-ebola.pdf](http://www.who.int/ebola/drc-2018/notes-for-the-record-meuri-ebola.pdf)

HEALTH EMERGENCIES PROGRAMS
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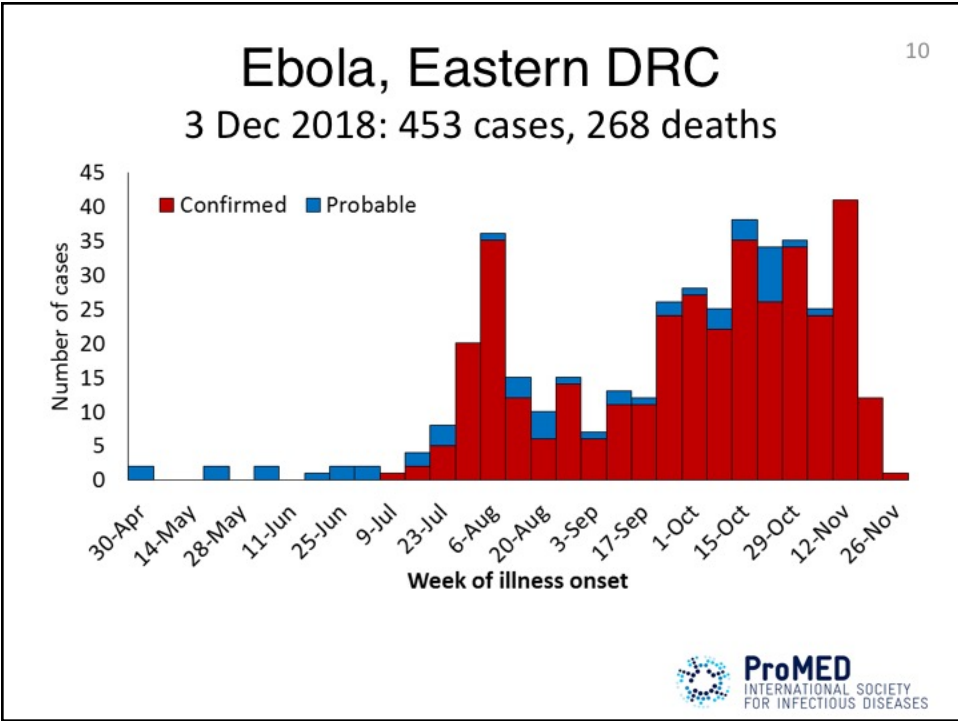
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Janet Diaz (2)

Treatment	Recommendation
ZMAPP	The available data provide the highest quality support for use under MEURI. Panel → Benefits > Risks
Remdesivir (GS-5734)	The available data support use under MEURI, however should be studied in clinical trials
REGN-EB3	Very promising data and support its use under MEURI where ZMAPP or Remdesivir are not available
mAb114	Currently in the very early stages of development. Limited early data look potentially promising but more data are needed before recommending its use under MEURI*
Favipiravir	Considerable uncertainty whether it provides benefits. May be considered in situations where other therapies are unavailable

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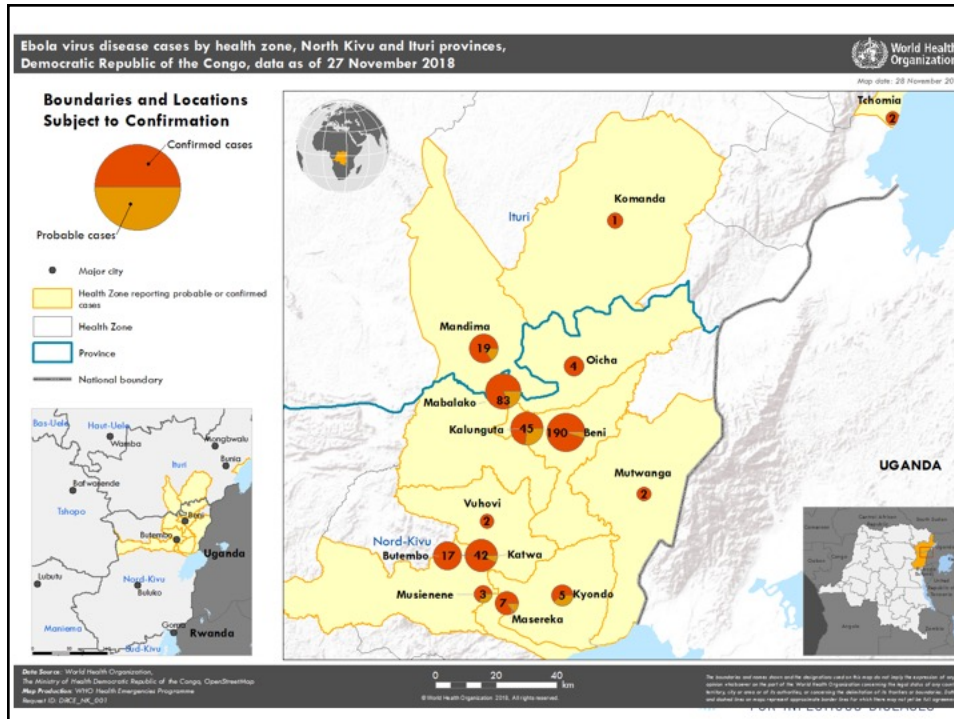


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Nipah outbreak, Kerala India 2018

Dr. Jon Epstein

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Kerala, India
May 2-Jun 10, 2018

- May 3 index case 27 yr old male presented w fever and myalgia; encephalitis
- Father, brother & aunt took care of him
- Transferred to H2 and died (May 5)
- Father, brother, aunt develop symptoms (fever, myalgia & vomiting)
- Physician alerts MCVR, Manipal Univ.
- Samples (blood, urine, oropharyngeal swab or endotracheal aspirate and CSF) sent to Manipal
- May 18th Nipah Virus detected in 3 patients (RT qPCR).
- May 19th samples to ICMR NIV Pune for confirmation
- May 20th Results confirmed; outbreak declared
- Rapid detection & response

EcoHealth Alliance

Arunkumar et al, JID 2018

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**"Rift Valley Fever in Kenya":
Peninah
Munyua, US
CDC (Kenya)**

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Recent RVF outbreaks in Kenya

December, 1997

- Garissa
- Est 27,500 RVF infections and 170 deaths
- RVF reported in 22/69 districts

December 2006

700 cases; 158 deaths

June 2018

106 cases; 10 deaths

Confirmed and Probable Rift Valley Fever Cases, Kenya 2006/07 (N=340)

- Early detection
 - Surveillance and diagnostics
- Early and better coordinated responses
 - Reduced human mortality

; April 10, 1998/47(13); 261-264; Wood et al. J EID 8(2); Nguku et al; AJTMH 83(2) 5-13; et al, 2011; Epidemiol Inf 139(3)

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Africa Centres for Disease Control and Prevention - Improving Prevention, Detection, and Response to Infectious Disease Threats Across Africa

Philip Onyebujoh (Zimbabwe)

Dr. **Onyebujoh**, is the Senior Technical Advisor for Strategy and Policy to the Director of **Africa Centres for Disease Control and Prevention (Africa CDC)**, a specialized institution of the **Africa Union** charged with the responsibility of managing and mitigating outbreaks and emergencies on the African continent.

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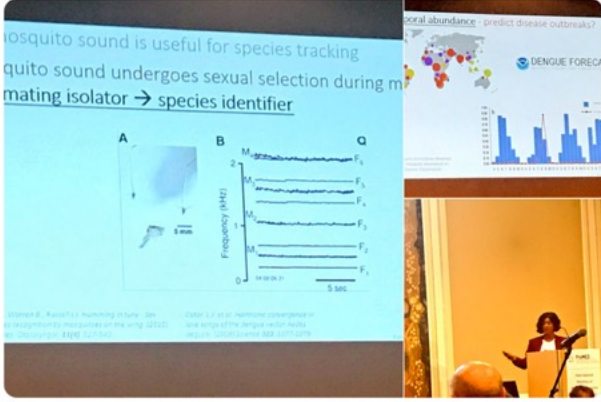
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 **Larry Madoff**
@lmadoff

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Shazam for mosquitoes @PrakashLab
"secret sauce of great modeling is great data" automate mosquito surveillance using buzz of mosquitoes #IMED2018

Haripriya Mukundarajan (USA)
Mechanical engineering PhD
student at Stanford



9:22 AM - 10 Nov 2018

14 Retweets 37 Likes



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"Middle East Respiratory Syndrome
Coronavirus (MERS-CoV): Current
Understanding": Jaffar Al-Tawfiq
(Saudi Arabia)



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ProMED MERS reports

- As of 30 Oct 2018, there has been a global total of 2266 cases of laboratory confirmed MERS-CoV infection reported to WHO
- 804 associated deaths (reported case fatality rate of 35.5 percent).



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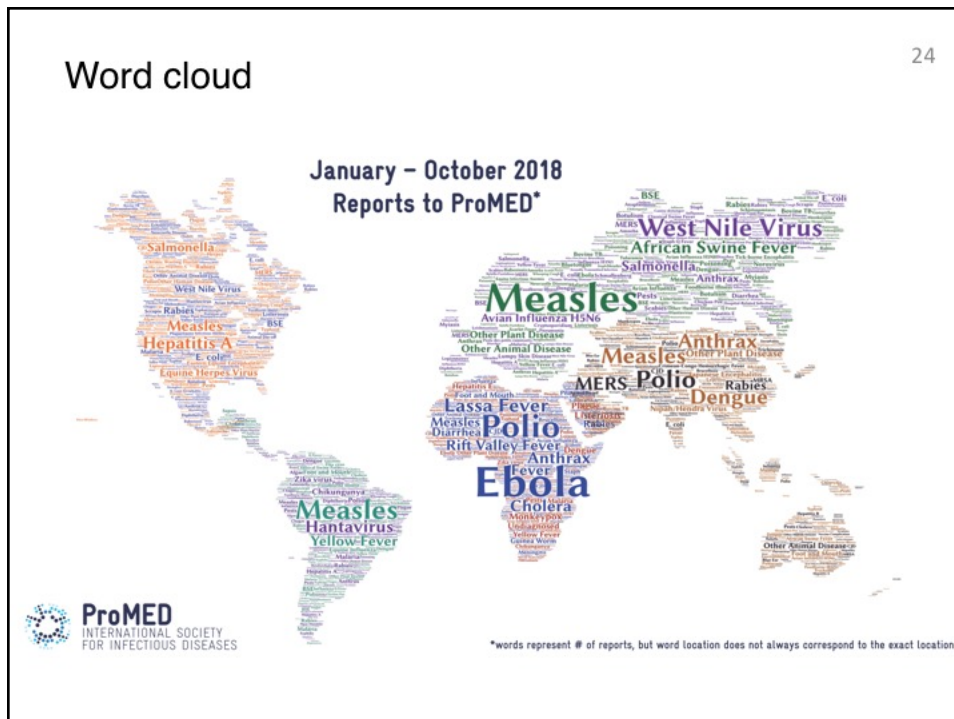
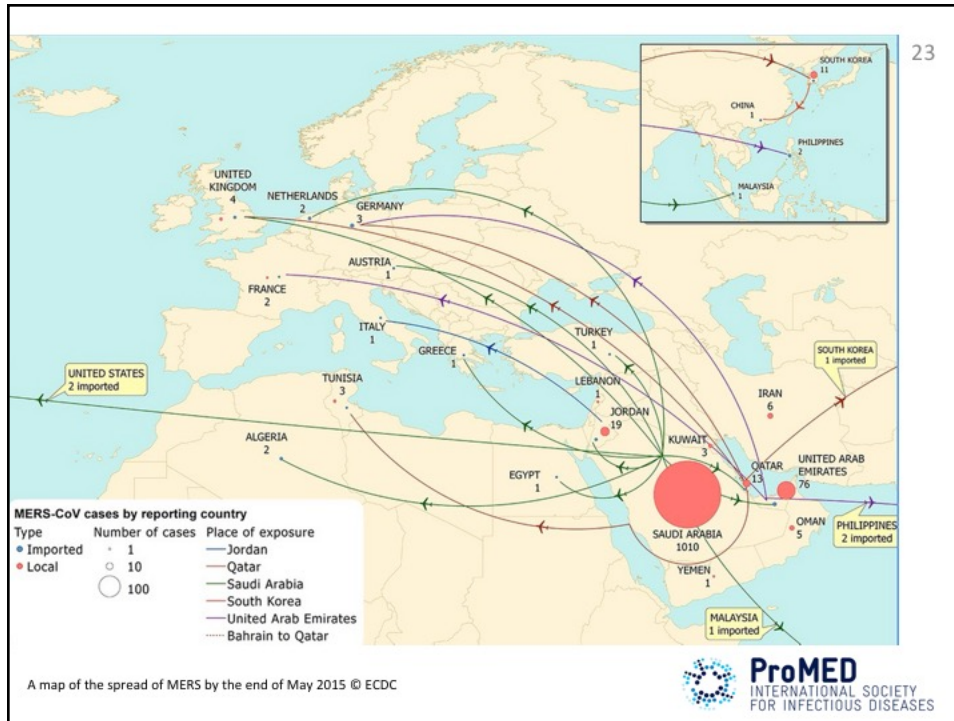


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- The ProMED-mail electronic outbreak reporting system began in August 1994 to monitor emerging infectious diseases globally
- Moderated e-mail lists, website, social media
- Early warning system for emerging disease outbreaks
- Emphasis on rapid reporting
 - Posts are vetted by SMEs but not “peer reviewed”
 - Standard for <24 hour turnaround
 - Requests for Information (RFIs) for unconfirmed reports



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- Free subscription
- 90,000 subscribers in > 180 countries
- All reports are screened and commented upon by expert Moderators before posting
- Average of 8 reports per day
- Emphasis on “One Health”
- Regional network system

<http://promedmail.org>



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The screenshot shows the ProMED website interface. At the top, there's a navigation bar with 'SUBMIT INFO', 'MAKE A DONATION', and 'SUBSCRIBE'. Below that, a secondary navigation bar includes 'About ProMED', 'Announcements', 'Links', 'Calendar of Events', and 'Supporters'. A third bar lists regional categories: ProMED-mail, Portuguese, Español, Pycckè, Mekong Basin, Afrique Francophone, Anglophone Africa, South Asia, and Middle East/North Africa.

The main content area features a 'ProMED-mail' section with a 'Latest Posts on ProMED-mail' list. The primary article is titled 'AFRICAN SWINE FEVER - ASIA (33): CHINA, DOMESTIC SWINE, SPREAD, CONTROL, FAO'. It includes a 'Published Date' of 2018-11-30 21:22:16, a 'Subject' line, and an 'Archive Number'. The article text discusses the confirmation of an ASF outbreak in Liaoning Province, China, on 3 Aug 2018, and details the government's response, including the establishment of an epidemic zone and a buffer zone, and the suspension of live pig markets and transport.

The slide is titled 'Staff Locations' and features a world map with blue star icons indicating the locations of ProMED staff. The map shows a high concentration of staff in Europe and Asia, with smaller numbers in North America, Africa, and South America. The text '59 staff in 37 countries' is displayed below the map. The ProMED logo and name are visible in the bottom right corner of the slide.

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What's next?



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"It's tough to make predictions,
especially about the future."

- Yogi Berra



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Bacteria, parasite, virus...

- Cholera
- Plague
- Malaria



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HOME | CURRENT ISSUE | ARCHIVES | ALERTS | ABOUT ASM | CONTACT US | TECH SUPPORT |

A Strategy To Estimate Unknown Viral Diversity in Mammals

Simon J. Anthony^{a,b}, Jonathan H. Epstein^b, Kris A. Murray^b,
Isamara Navarrete-Macias^a, Carlos M. Zambrana-Torrel^b,
Alexander Solovoyov^a, Rafael Ojeda-Flores^a, Nicole C. Arrigo^a, Ariful Islam^b,
Shahneaz Ali Khan^a, Parvaz Hosseini^b, Tiffany L. Bogich^{c,d}, Kevin J. Olival^b,
Maria D. Sanchez-Leon^{a,b}, William B. Kares^b, Tracey Goldstein^e,
Stephen P. Luby^b, Stephen S. Morse^{b,j}, Jonna A. K. Mazet^g, Peter Daszak^b,
W. Ian Lipkin^h

Author Affiliations

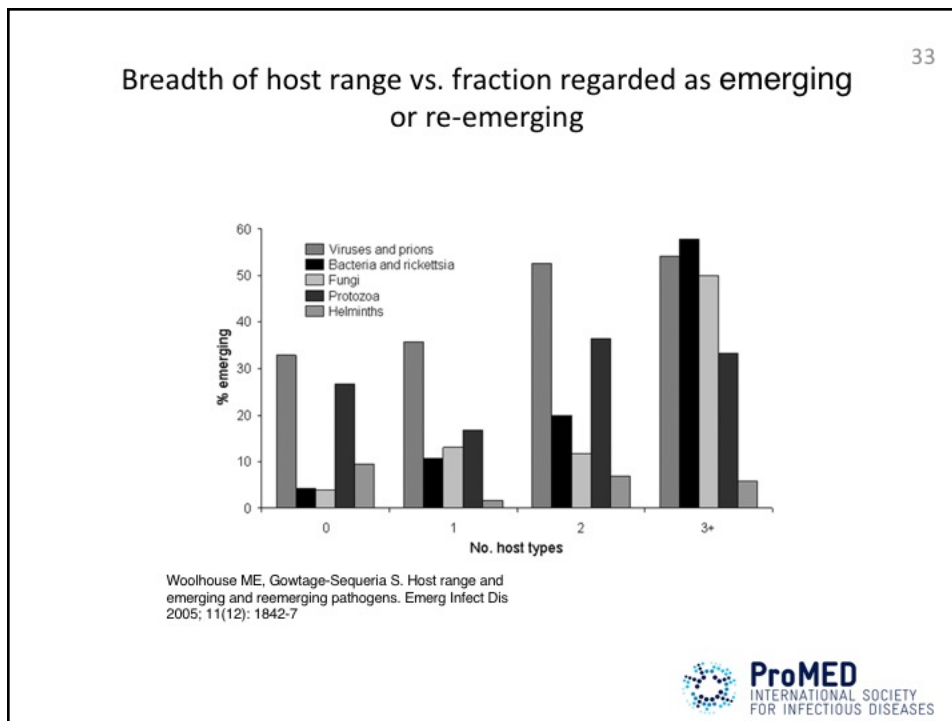
“We used a simple extrapolation to estimate that there are a minimum of 320,000 mammalian viruses awaiting discovery...”




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- ## “Big” outbreaks
- Size of population affected
 - Geographic spread
 - Morbidity and mortality
 - Social disruption, “fear factor”
 - Economic impacts
- 
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“Big” outbreaks

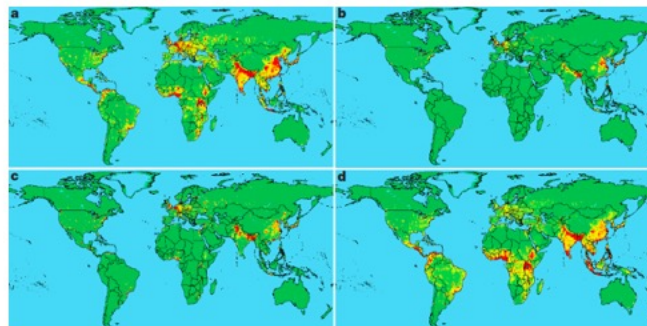
- Plague - Historical context, literary impact
- Influenza – Historical, recurrent
- Cholera – Historical, recurrent
 - Haiti
 - Yemen
- Smallpox - Eradication
- HIV - Global impact
- SARS – First pandemic of the 21st century
- MERS - 2nd novel coronavirus, zoonosis, peculiar geography
- Ebola – Dramatic mortality, social impact
- Yellow fever – highlighting vaccine shortage
- Zika – unexpected fetal impacts



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[Global trends in emerging infectious diseases](#)

Kate E. Jones, Nikkita G. Patel, Marc A. Levy, Adam Storeygard, Deborah Balk, John L. Gittleman & Peter Daszak
Nature **451**, 990-993(21 February 2008).



Maps are derived for EID events caused by **a**, zoonotic pathogens from wildlife, **b**, zoonotic pathogens from non-wildlife, **c**, drug-resistant pathogens and **d**, vector-borne pathogens.



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The usual suspects...

- Nipah-like virus (Contagion)
- Novel coronavirus (Dale Fisher)
- CCHF
- Rift valley fever
- SFTS
- Novel flavivirus



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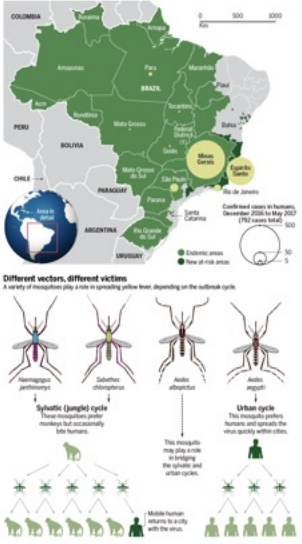
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Different vectors, different victims
 A variety of mosquitoes play a role in spreading yellow fever, depending on the outbreak cycle.

Sylvatic (jungle) cycle
 These mosquitoes prefer monkeys but occasionally bite humans.

Urban cycle
 The mosquito prefers humans and spreads the virus quickly within cities.

This mosquito may play a role in bridging the sylvatic and urban cycles.

Multiple human contacts to entry with the virus.


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International Journal of Infectious Diseases 48 (2016) 96–97

Contents lists available at ScienceDirect



International Journal of Infectious Diseases

Journal homepage: www.elsevier.com/locate/ijid




Editorial

Why is the yellow fever outbreak in Angola a 'threat to the entire world'? 

The short answer to the World Health Organization (WHO) declaration is because yellow fever has spread throughout the country, causing probably thousands of cases and hundreds of deaths, and the world has run out of vaccine. This is very bad because cases so far have been imported into the Democratic Republic of the Congo (DRC), Mauritania, Kenya, and even China, the first time in history that cases have been confirmed in Asia. In fact, more travelers infected with yellow fever have now been seen than in the last 50 years, each one with the potential to spread it on arrival and still further to more countries worldwide via international airlines. This will require more vaccine; but supplies cannot be rapidly boosted.

Angola discovered its first urban cases in December 2015, and is struggling to complete vaccination of the capital, Luanda.

outbreak was recorded (1905, n = 8399 cases). These outbreaks brought terrible social and economic disruptions. Between 1897 and 1906, 4000 European immigrants died in Rio de Janeiro, Brazil from yellow fever. Extrapolating these death rates to the current size of those cities gives some idea of the threat.

In Europe, Spanish ports in and in 1821, Barcelona report the inhabitants) and more in from Cuba. Other outbreaks occurred in Italy (1804 Livorno, n=650 f; Lisbon), the UK (1852 and 186 n=1183 fatal). The last outbreak over 100 years ago in Gibraltar back.

Every day that goes by now, people are dying from yellow fever. The clock is ticking.

J.P. Woodall^{a,*}
T.M. Yuill^b

^aProMED, International Society for Infectious Diseases, Brookline, Massachusetts, USA

^bDepartment of Pathobiological Sciences and of Forest and Wildlife Ecology, University of Wisconsin-Madison, Madison, Wisconsin, USA

E-mail address: jackwoodall13@gmail.com (J.P. Woodall).

Accepted 3 May 2016




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International Journal of Infectious Diseases 48 (2016) 98–103

Contents lists available at ScienceDirect




International Journal of Infectious Diseases

Journal homepage: www.elsevier.com/locate/ijid

Review

Yellow fever cases in Asia: primed for an epidemic 

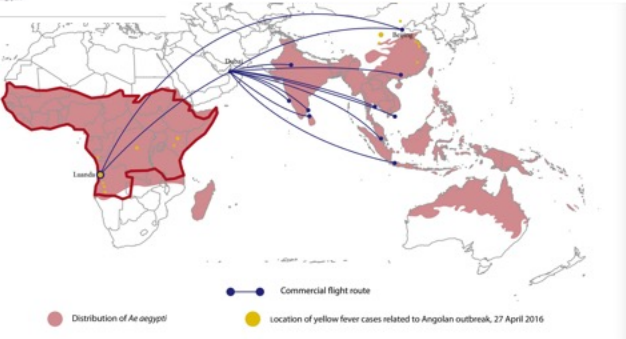
Sean Wasserman^{a,*}, Paul Anantharajah Tambyah^b, Poh Lian Lim^{c,d}

^aDivision of Infectious Diseases and HIV Medicine, Department of Medicine, University of Cape Town, Cape Town, South Africa


^bCentre for Infectious Diseases, National University of Singapore, Singapore

^cDepartment of Infectious Diseases, Institute of Infectious Diseases and Epidemiology, Tan Tock Seng Hospital, Singapore

^dLee Kong Chian School of Medicine, Nanyang Technological University, Singapore



● Distribution of *Ae. aegypti* ● Commercial flight route
● location of yellow fever cases related to Angolan outbreak, 27 April 2016



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Why hasn't it happened yet?
Is there a barrier to YF introduction
in Asia?



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The big one will be:



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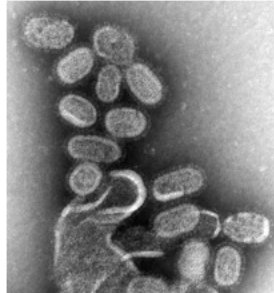
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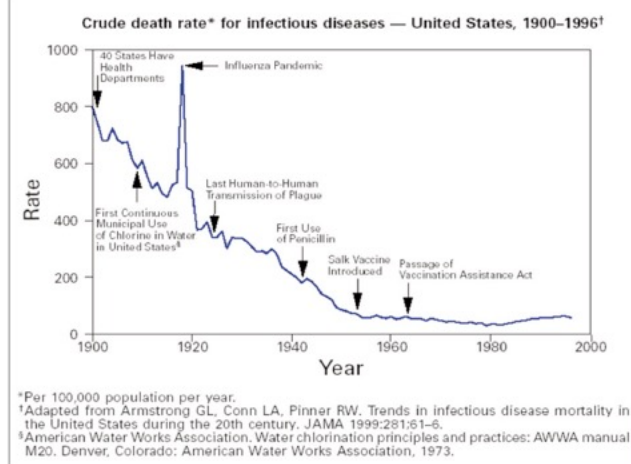
The big one will be:

- Influenza A



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FIGURE 1. Crude death rate for infectious diseases—United States, 1900-1996
[Adapted by Rear Admiral Dr. Patrick O'Carroll, Regional Health Administrator, U.S. Public Health Service Region X]

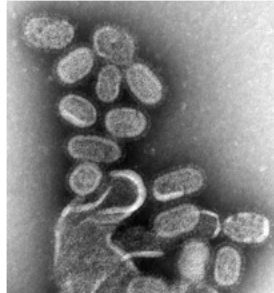


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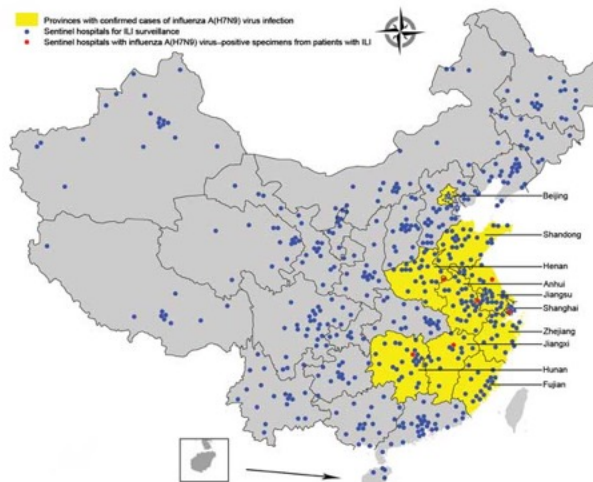
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The big one will be:

- Influenza A
– H7N9



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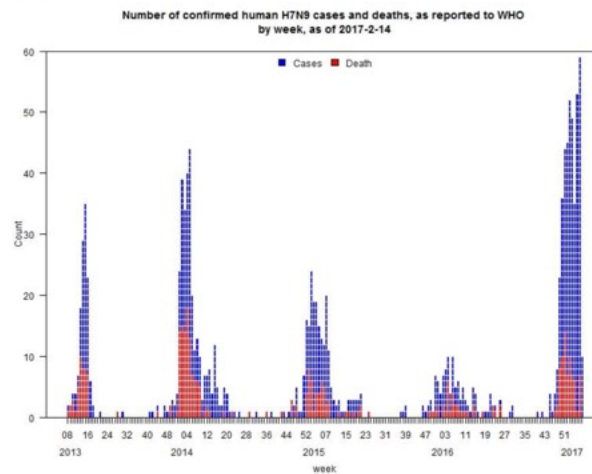
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Figure 1: Epidemiological curve of avian influenza A(H7N9) cases in humans by week of onset, 2013-2017



Source: WHO



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Figure 1. Distribution of confirmed A(H7N9) human cases by place of reporting in China or with recent travel history to China, week 7/2013 to week 25/2017 (N=1 548)




Source: ECDC July 2017



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Why flu?

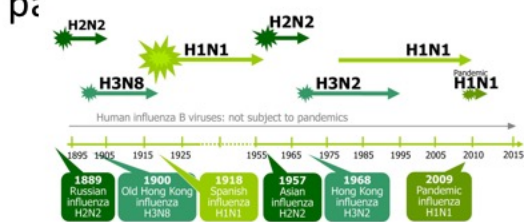


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Why flu?

- Track record of repeated pandemics



The diagram shows a timeline of influenza pandemics from 1889 to 2009. A horizontal axis represents years from 1895 to 2015. Above the axis, arrows indicate the timing and type of pandemics: H2N2 (1889), H3N8 (1900), H1N1 (1918), H2N2 (1957), H3N2 (1968), and H1N1 (2009). Below the axis, boxes provide details for each pandemic: 1889 Russian influenza (H2N2), 1900 Old Hong Kong influenza (H3N8), 1918 Spanish influenza (H1N1), 1957 Asian influenza (H2N2), 1968 Hong Kong influenza (H3N2), and 2009 Pandemic influenza (H1N1). A note states: 'Human influenza B viruses: not subject to pandemics'.




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Why flu?


- Track record of repeated pandemics
- Transmissible prior to symptom onset



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Why flu?

- Track record of repeated pandemics
- Transmissible prior to symptom onset
- High R_0 (1.5-3)



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Why flu?

- Track record of repeated pandemics
- Transmissible prior to symptom onset
- High R_0 (1.5-3)
- Long lag time for vaccine production



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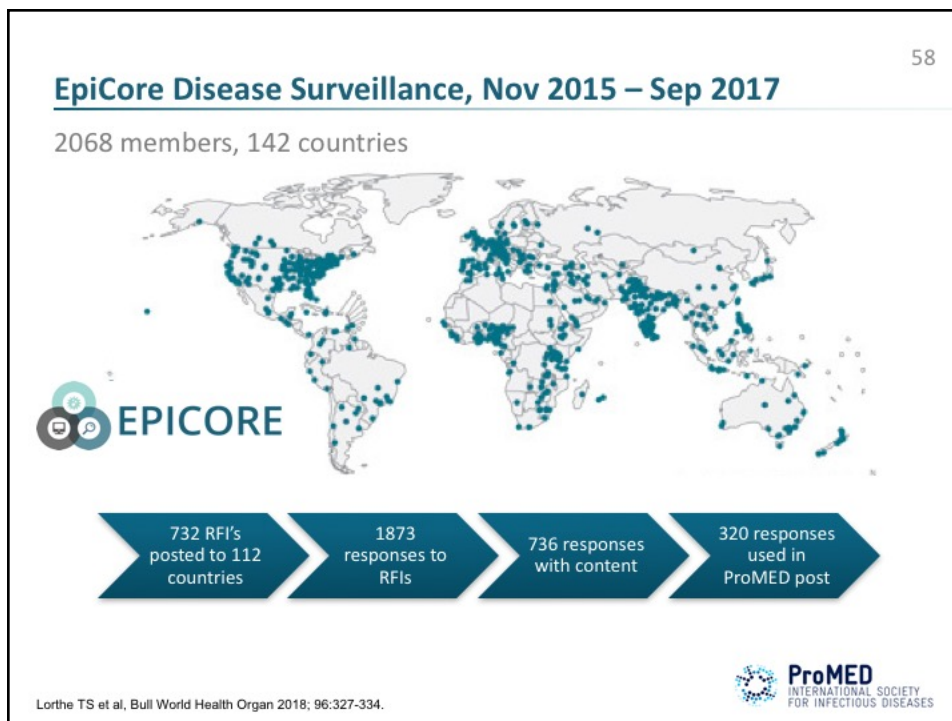
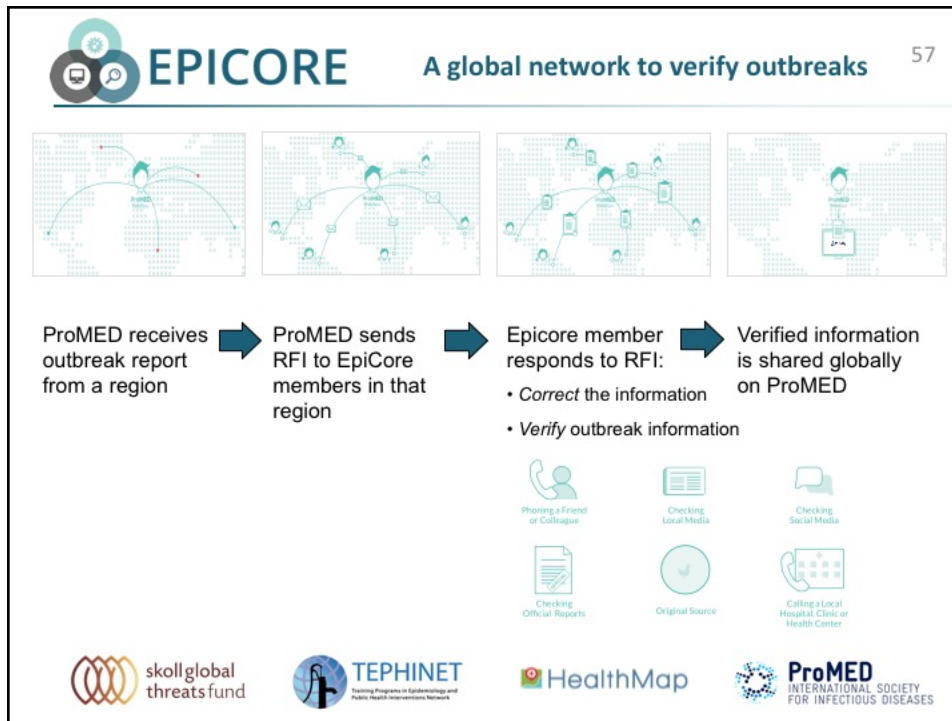
Why flu?

- Track record of repeated pandemics
- Transmissible prior to symptom onset
- High R_0 (1.5-3)
- Long lag time for vaccine production
- H7N9 has already mutated from LPAI to HPAI without apparent loss of human virulence

Infectious Disease Highlights and Lowlights in 2018, and What to Expect in 2019

Dr. Larry Madoff, ProMED and International Society for Infectious Diseases

A Webber Training Teleclass




Hosted by Paul Webber paul@webbertraining.com
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Waiting for the comet



Monsieur Barbinel prévenu par sa portière de la visite de la comète.
-Daumier



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FOR INFECTIOUS DISEASES

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Thank you

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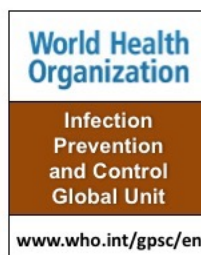
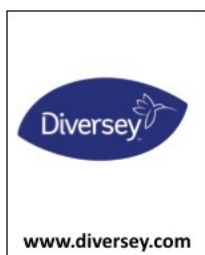


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www.webbertraining.com/schedulep1.php	
December 12, 2018	<p><i>(South Pacific Teleclass)</i> CONTROL OF CARBAPENEMASE-PRODUCING ENTEROBACTERIACEA IN AN ENDEMIC SETTING: DO CLASSICAL IPC METHODS WORK FOR NEW AGE BUGS? Speaker: Dr. Kalisvar Marimuthu, Tan Tock Seng Hospital, Singapore</p>
December 13, 2018	<p><i>(FREE Teleclass)</i> THE BEST WAYS TO GET YOUR HOSPITAL TO TALK ABOUT INFECTION CONTROL Speaker: Prof. Andreas Voss, Radboud University, The Netherlands Sponsored by Lonza (www.lonza.com)</p>
December 14, 2018	<p><i>(FREE ... WHO Teleclass - Europe)</i> NEW PERSPECTIVES ON INFECTION PREVENTION AND CONTROL PROGRAM ASSESSMENTS IN THE SPIRIT OF IMPROVEMENT Speaker: Prof. Benedetta Allegranzi, World Health Association Global Infection Prevention and Control Unit Sponsored by the World Health Association</p>
	<p><i>(FREE European Teleclass)</i> THE FALLOUT OF FAKE NEWS IN INFECTION PREVENTION, AND WHY</p>

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