



Royal Veterinary College
University of London



Convention on
Biological Diversity



World Health
Organization

Suomi
Finland
100

One Health perspectives on zoonotic and vector-borne diseases

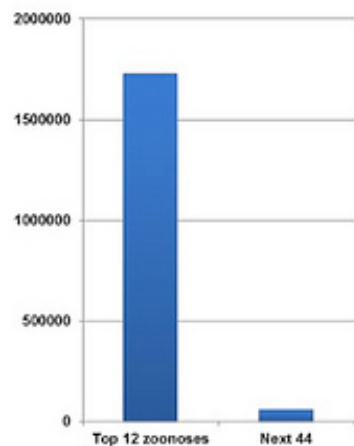
**REGIONAL WORKSHOP ON THE LINKAGES BETWEEN
BIODIVERSITY AND HEALTH IN THE EUROPEAN REGION**

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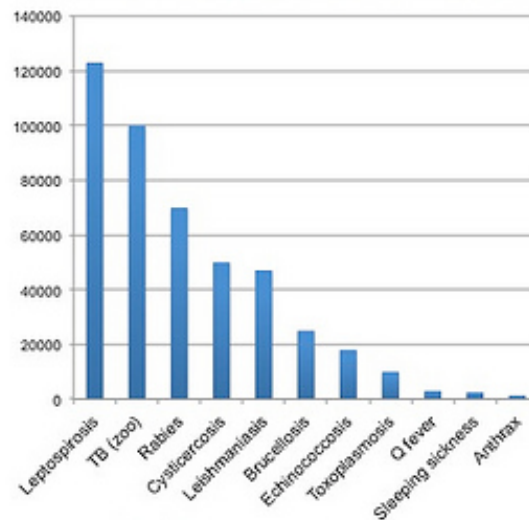


Lets get real! Human health..

Annual deaths from *all* zoonoses



Annual deaths from *single-agent* zoonoses



Almost all losses are in developing countries



Household air pollution

4.3 million deaths every year as a result of exposure to indoor smoke from cooking fuels

3 million deaths every year as a result of exposure to fine particulate matter

Chemicals

2004 at least 4.9 million deaths (8.3% of all deaths) were due to environmental exposure to selected chemicals

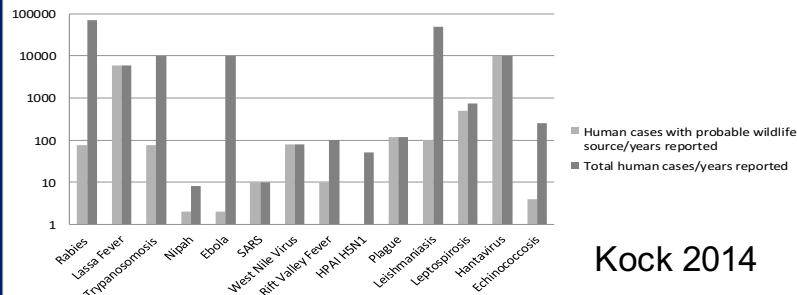
Non Communicable Diseases

40 million of the 56 million global deaths in 2015 were due to NCDs

Suicide

800 000 die from suicide globally each year (one death every 40 seconds)

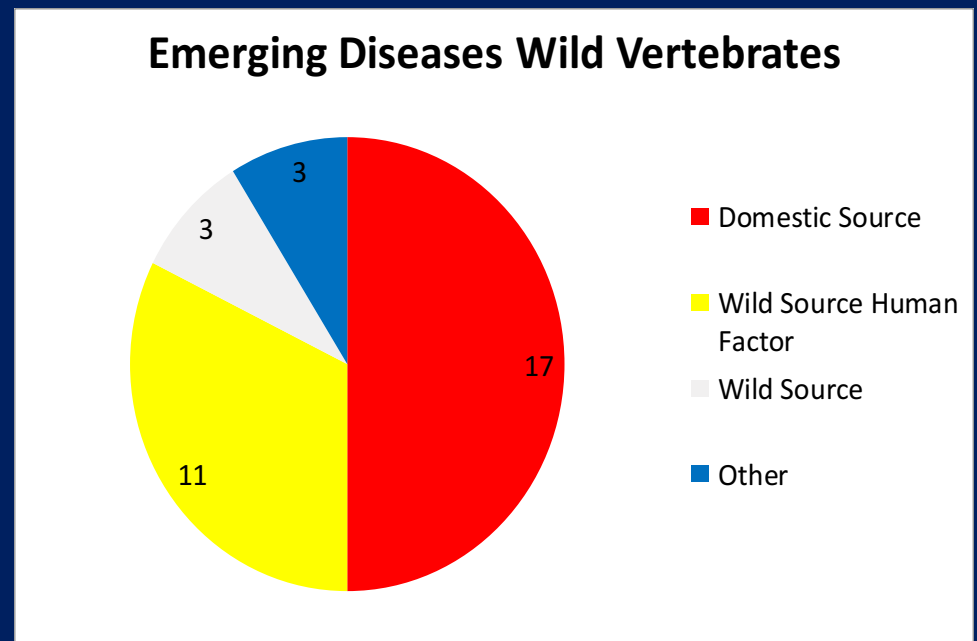
Estimated Global Mortality Burden Selected Wildlife Zoonoses (Log scale)



Kock 2014

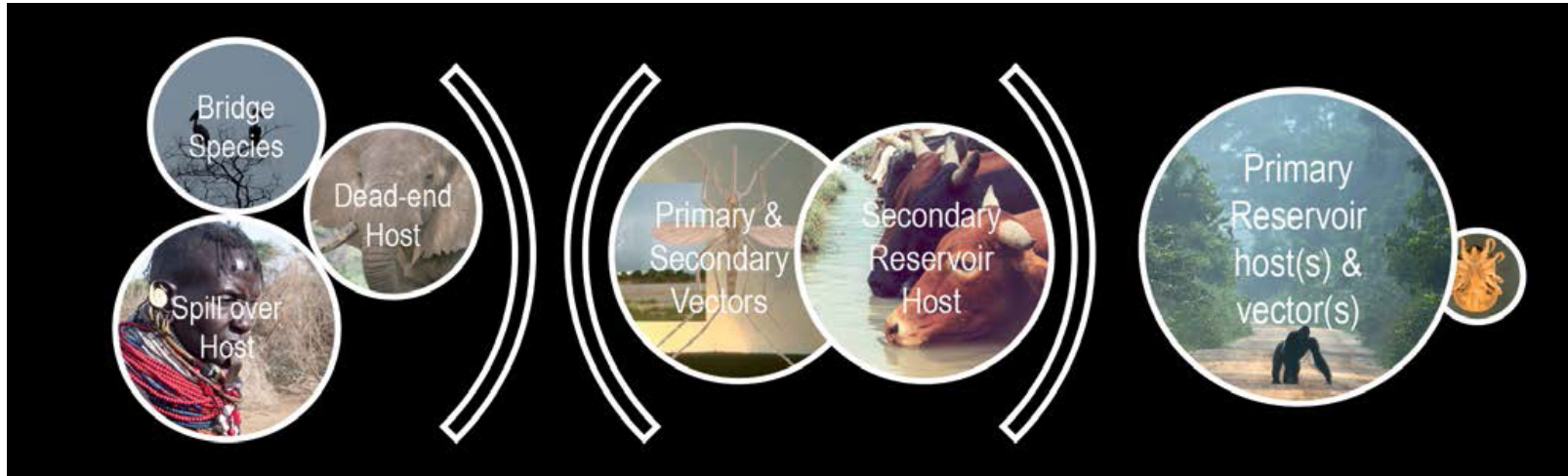
Perceptions Flawed?

60.3% EIDs zoonoses & 71.8 % of these wildlife origin *Jones et al 2008* but where else would the genetic material for evolution come from...what is much more worrying is....

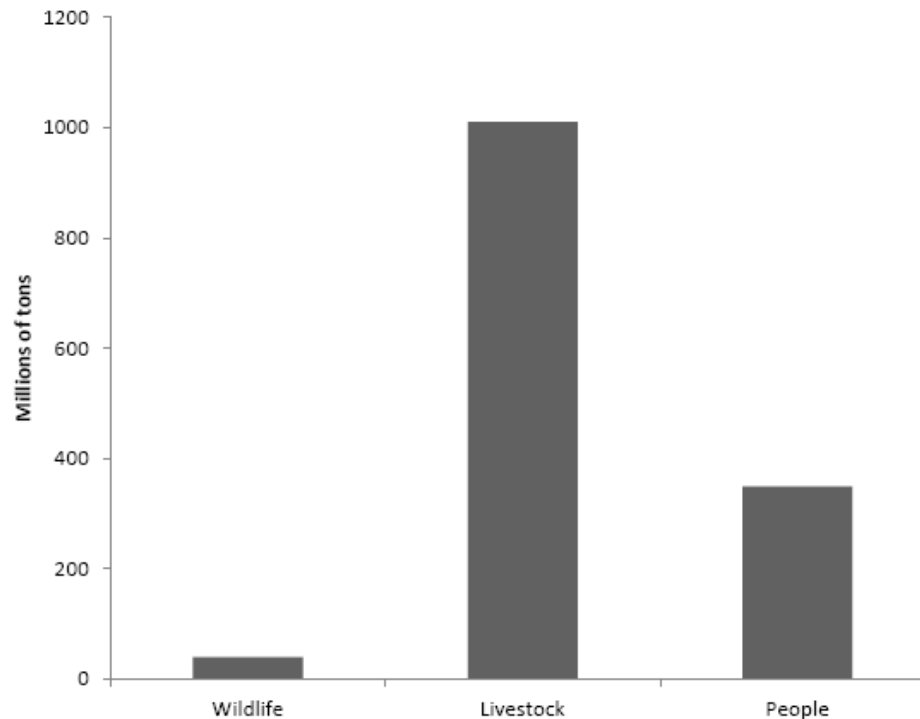


Tompkins et al 2015

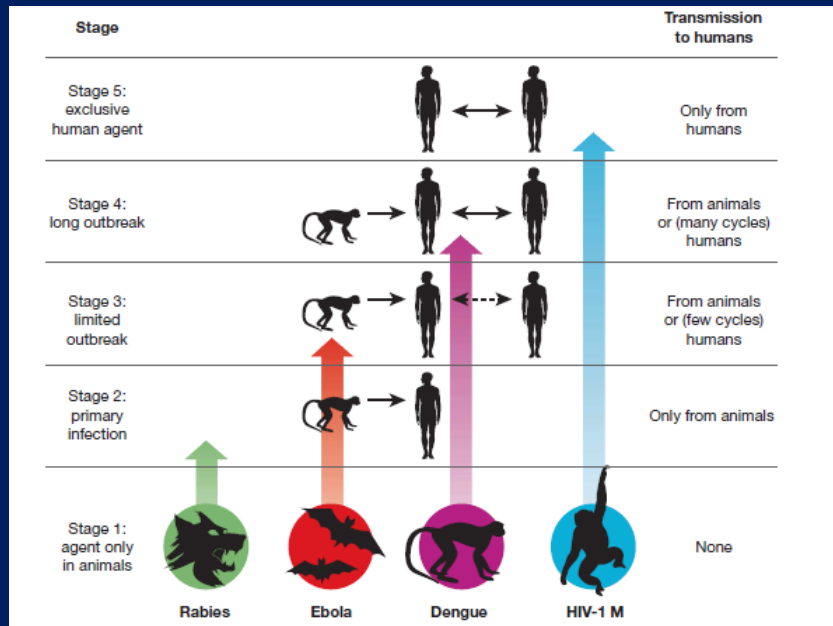
Zoonotic Threat



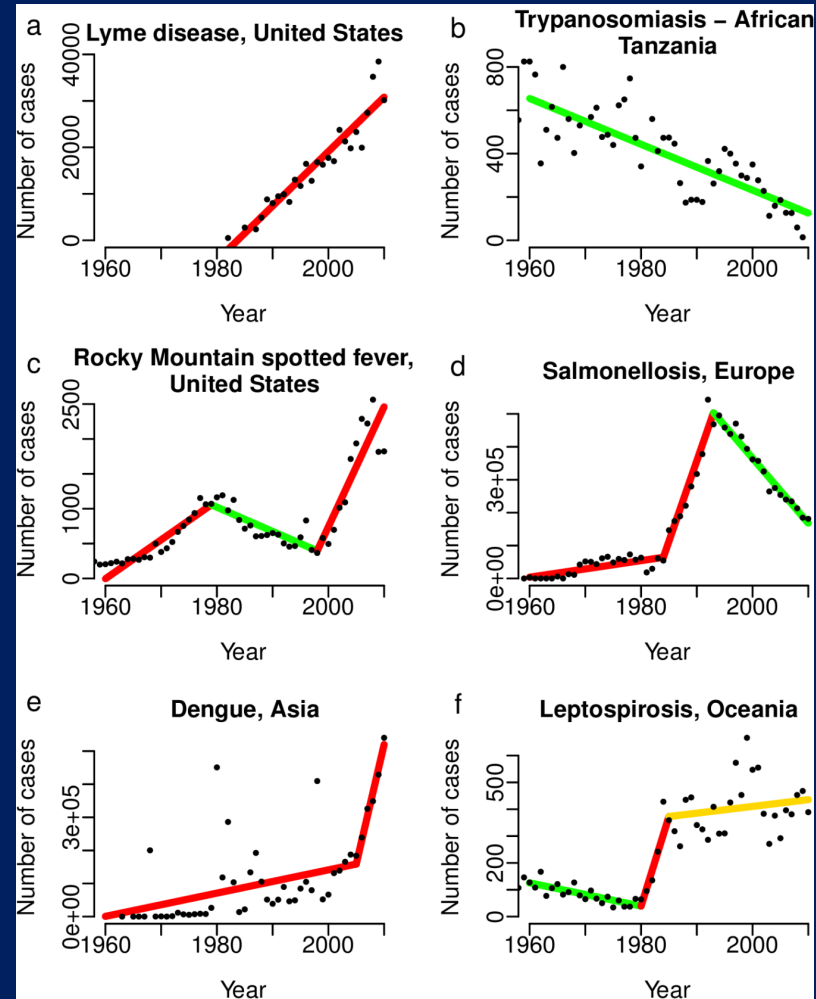
Global animal biomass is now domestic



Patterns of disease emergence and decline



Wolfe 2007



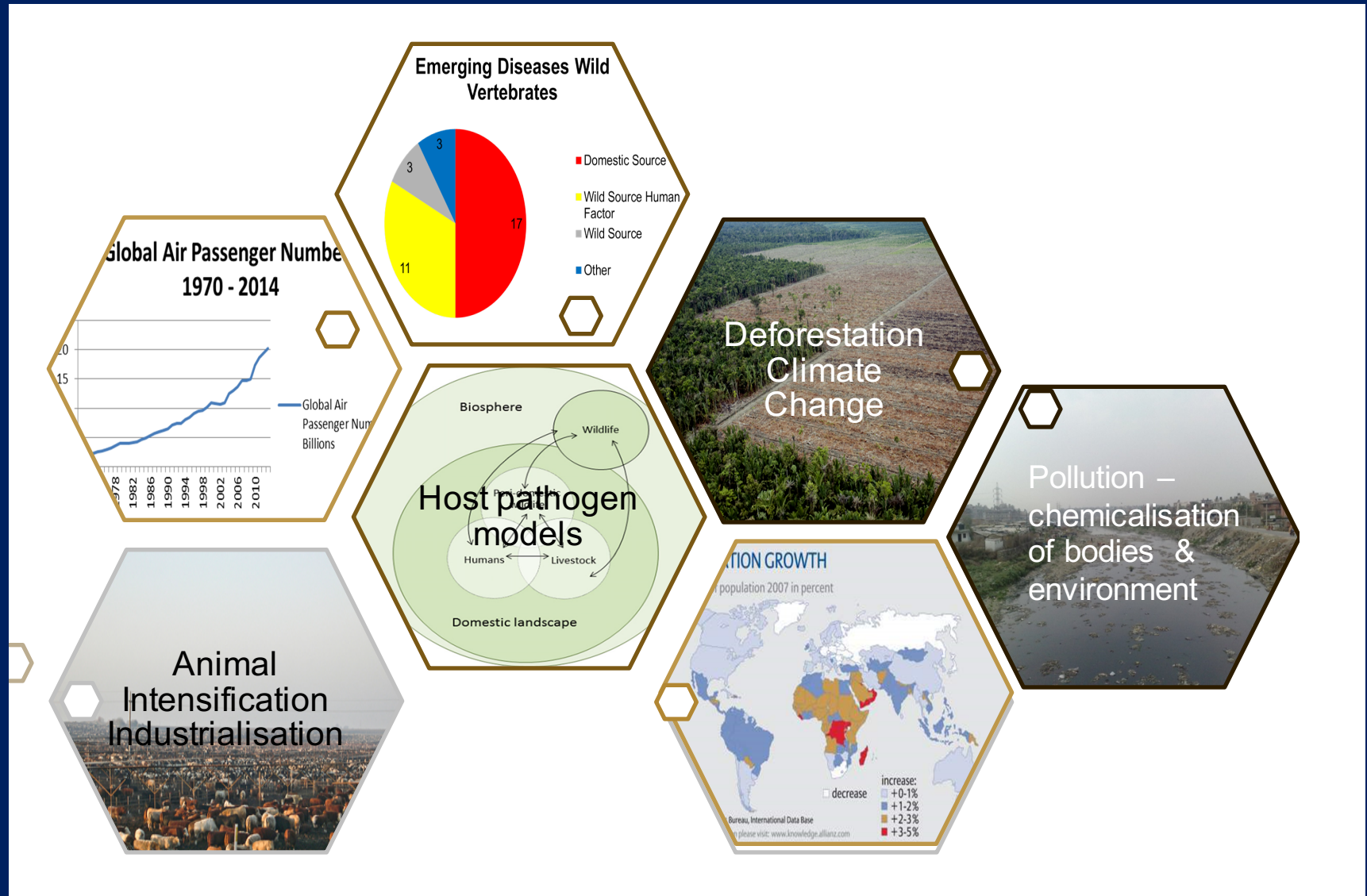
Funk et al 2013

Disease is Ecosystemic

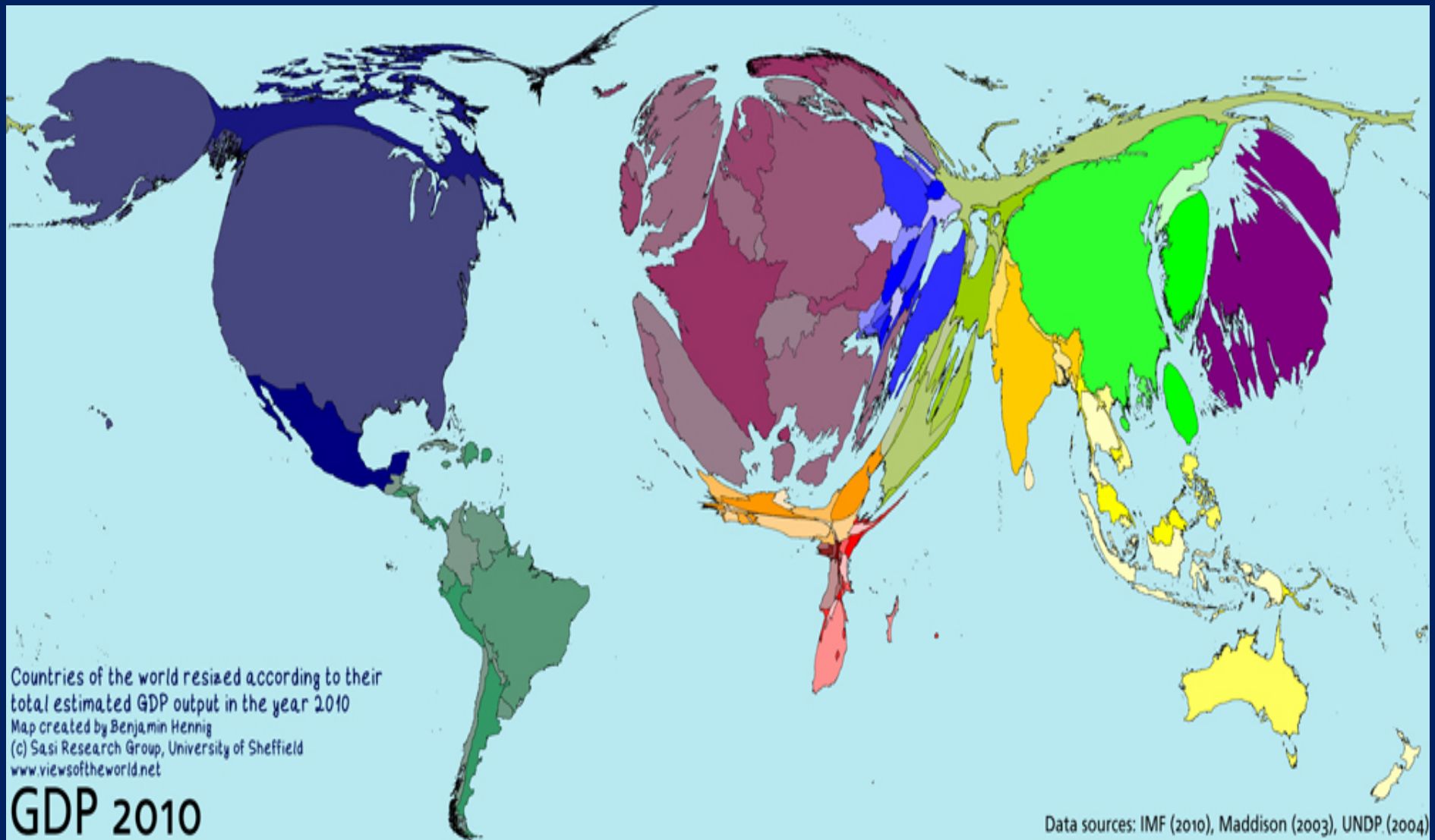


In <month in 2015 210,000 or 90% of a globally endangered species died from a bacterial disease most likely triggered by environmental conditions generated by a rapidly changing climate (Kock et al 2017 in review)

...with anthropogenic interfaces



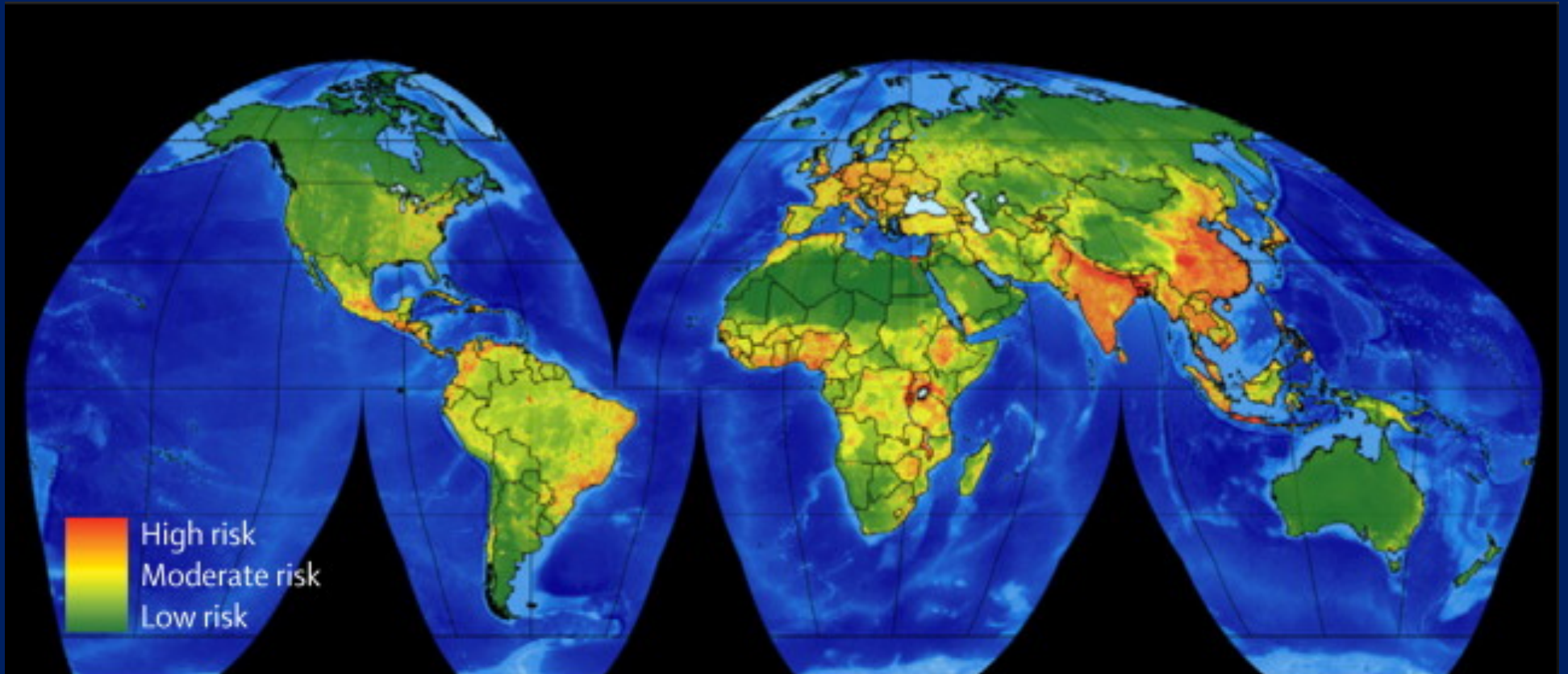
Economic proportionality...



...produces the very cascade of disease events

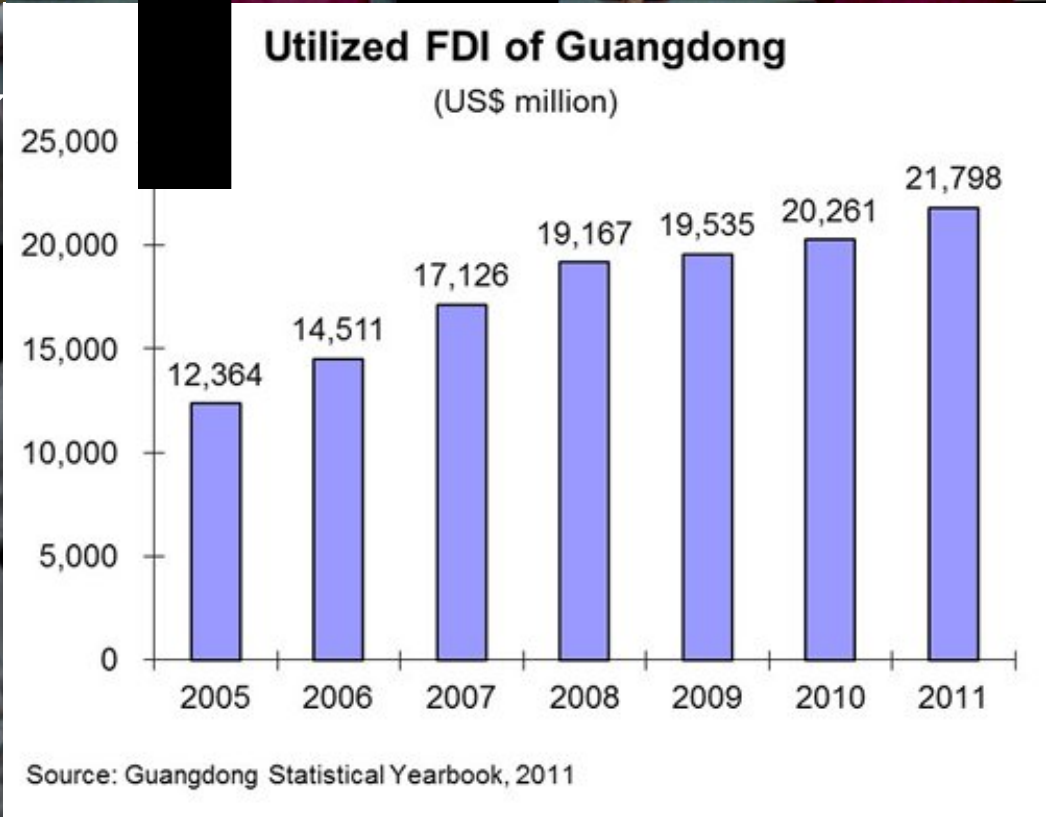


'Hot spots' confound geography for causality

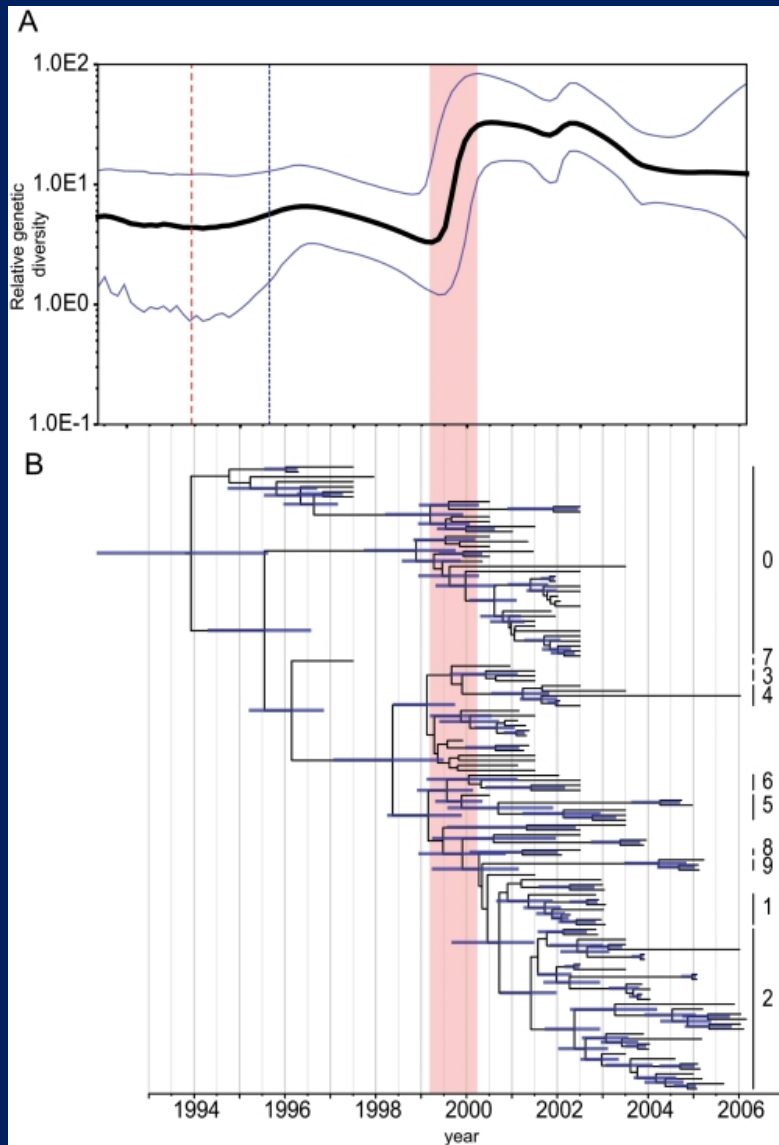


Morse *et al.* 2012

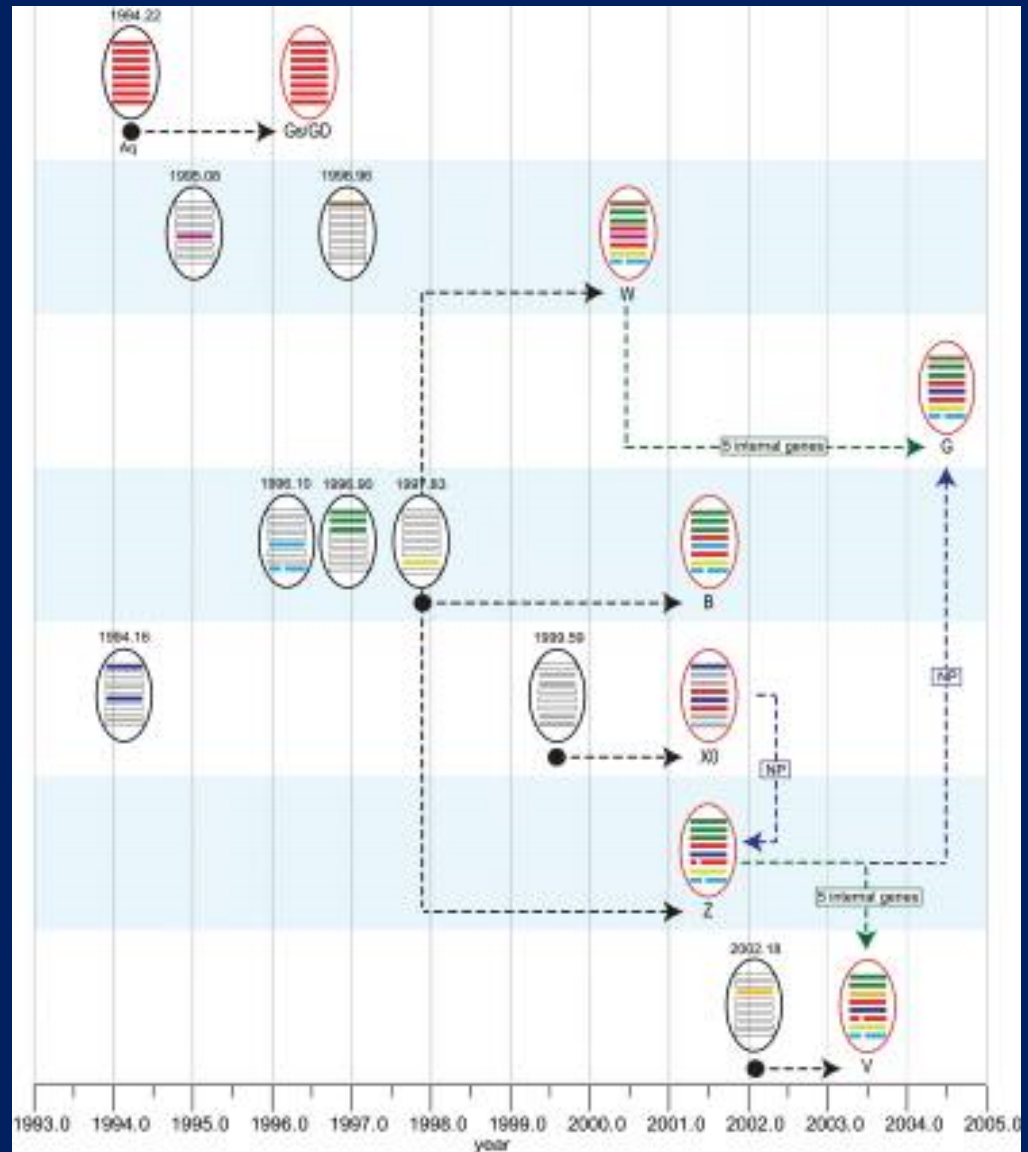
Causality's direction reversed



Cladogenesis by sector

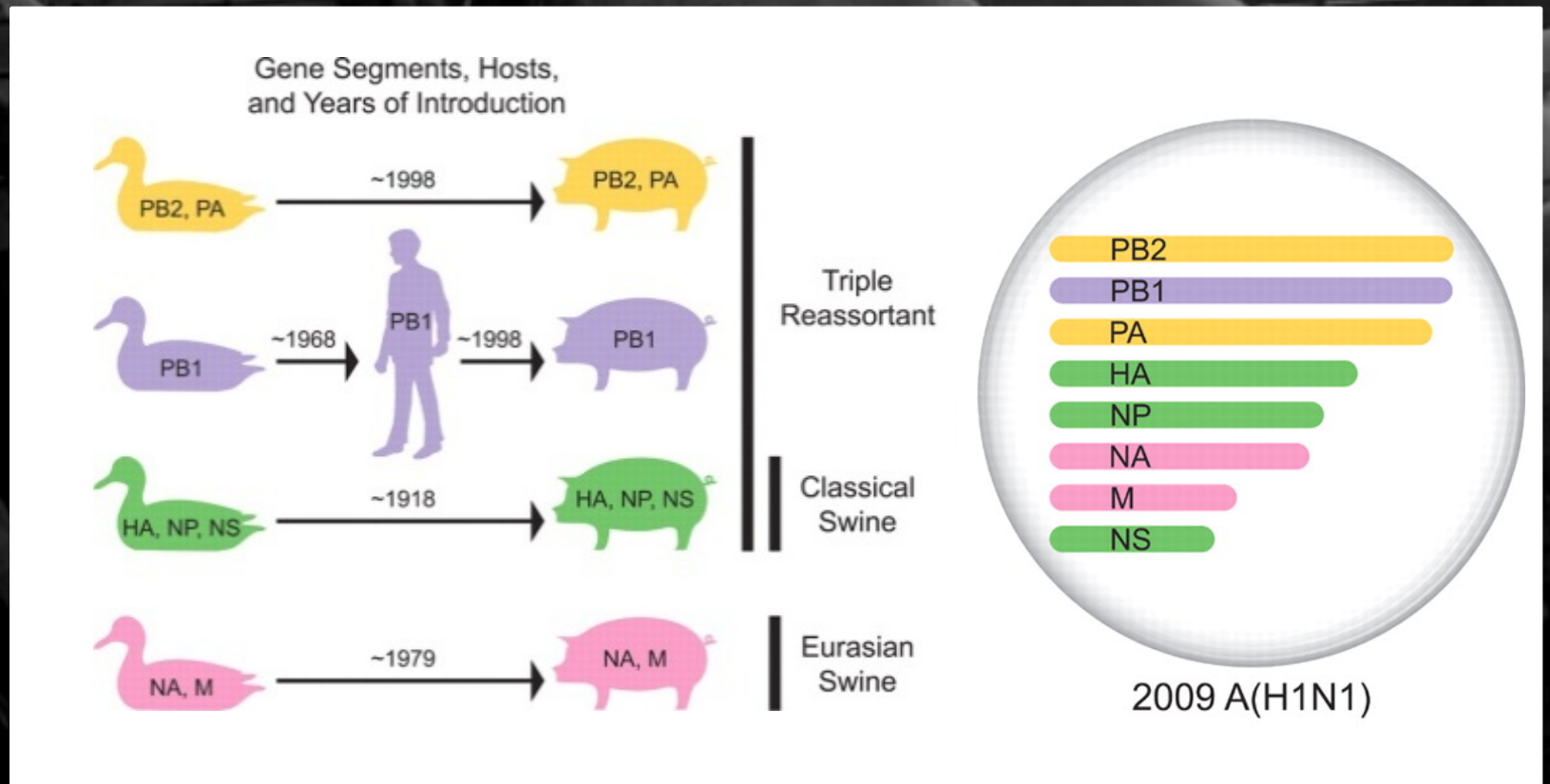


Guan Yi



Vijaykrishna et al. 2008

Intercontinental reassortment accelerates selection

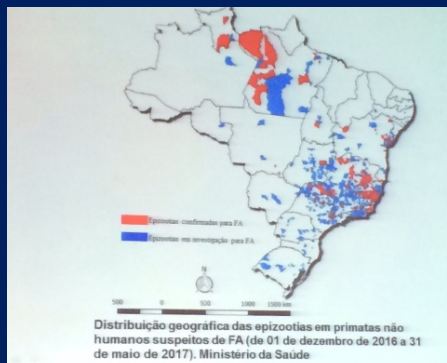


Perhaps the greatest health risk of arboviral emergence comes from extensive tropical urbanization and habitat fragmentation....

Domestication of vectors is a critical factor in emergent diseases e.g. *Ae. aegypti* is a monophyletic group (Brown et al. 2013) & all populations outside Africa are descended from a single lineage Powell and Tabachnick 2013. indicating a one-off event. The colonization of urban expanding habitat by this highly anthropophilic mosquito led to the emergence of permanent endemic cycles of urban DENV and chikungunya virus (CHIKV), as well as seasonal interhuman transmission of yellow fever and Zika viruses. Weaver and Reisen 2010



Muhammad Mahdi Karim



Political ecology underpins disease emergence

Social development within neoliberal agendas are strong undercurrents that promote structural changes and epidemiological instabilities in ecosystems, supportive of disease emergence very often most experienced at the margins of society. *Wallace et al 2017 (in review)*

One mistake centuries of disease

Ebov in West Africa (*Wallace, Gilbert, Wallace, Kock 2014*)

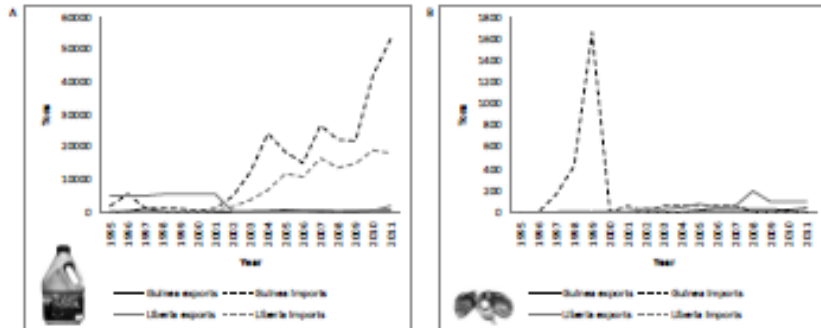


Figure 1: Figure 1. Exports-imports of a) palm oil and b) palm oil kernels for Guinea and Liberia, 1995-2011. Data from FAOSTat.

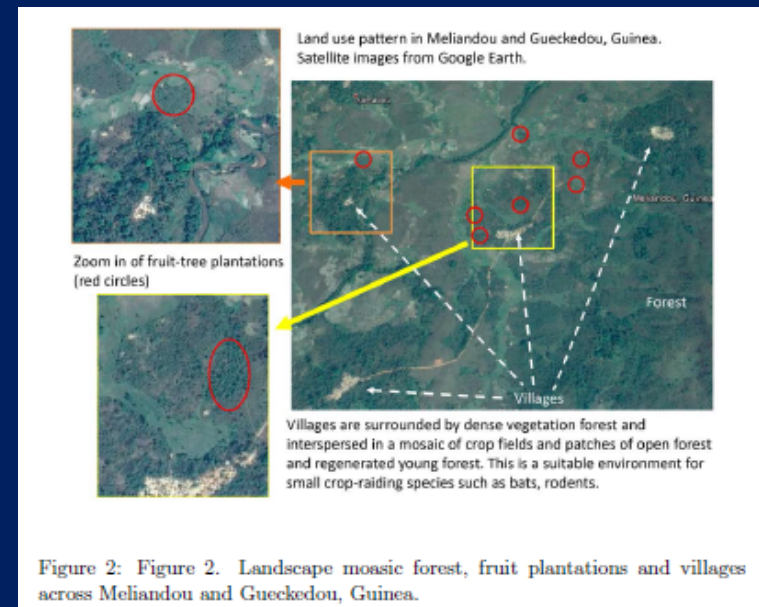
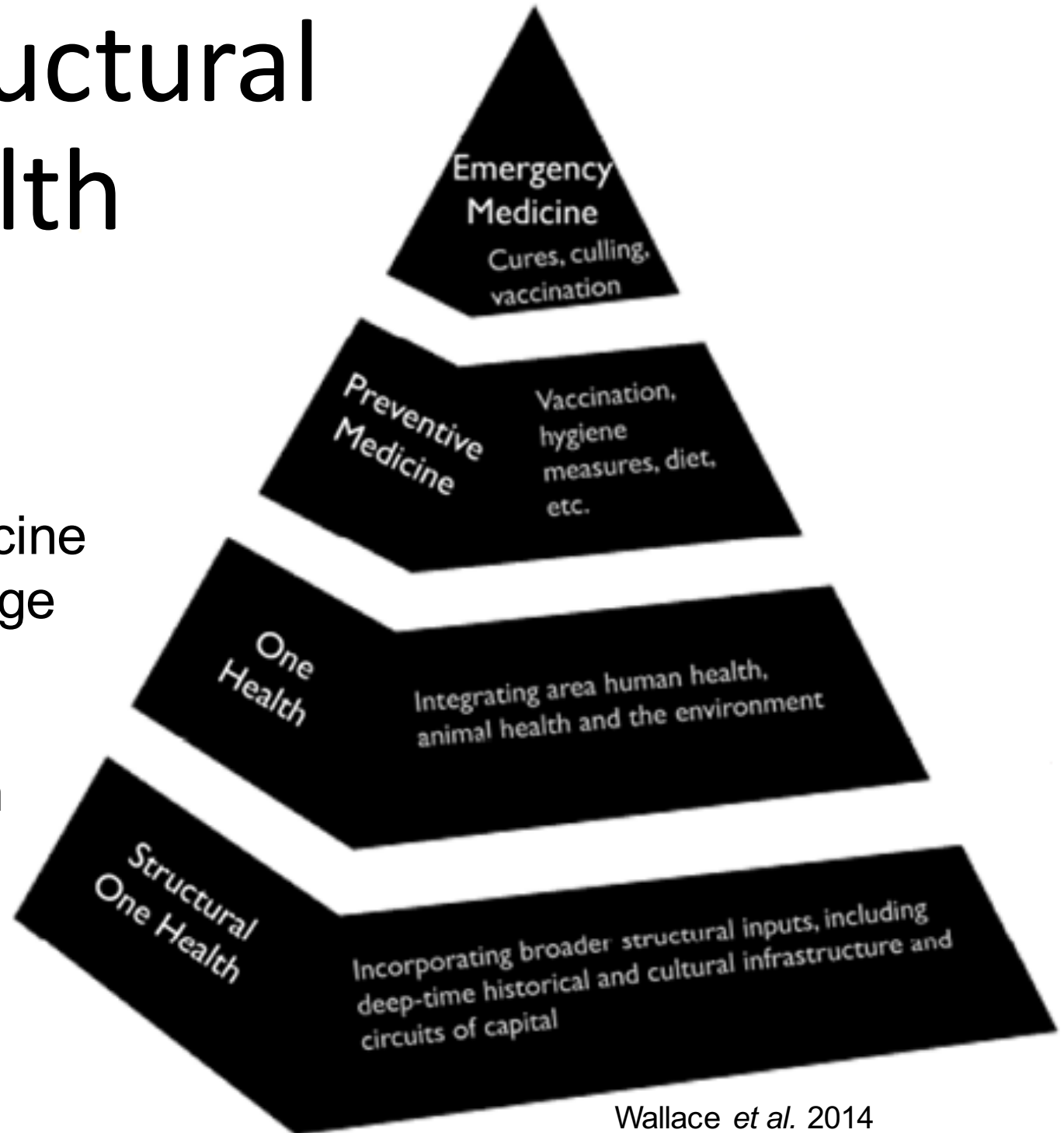


Figure 2: Figure 2. Landscape mosaic forest, fruit plantations and villages across Meliandou and Gueckedou, Guinea.

For a Structural One Health

Health sector
Invests <3% on
zoonoses and
preventive medicine
– this must change

Biodiversity
underpins health



Acknowledgements

Organisers of the WHO CBD conference especially Cristina Romanelli and colleagues.....

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Many institutions...

