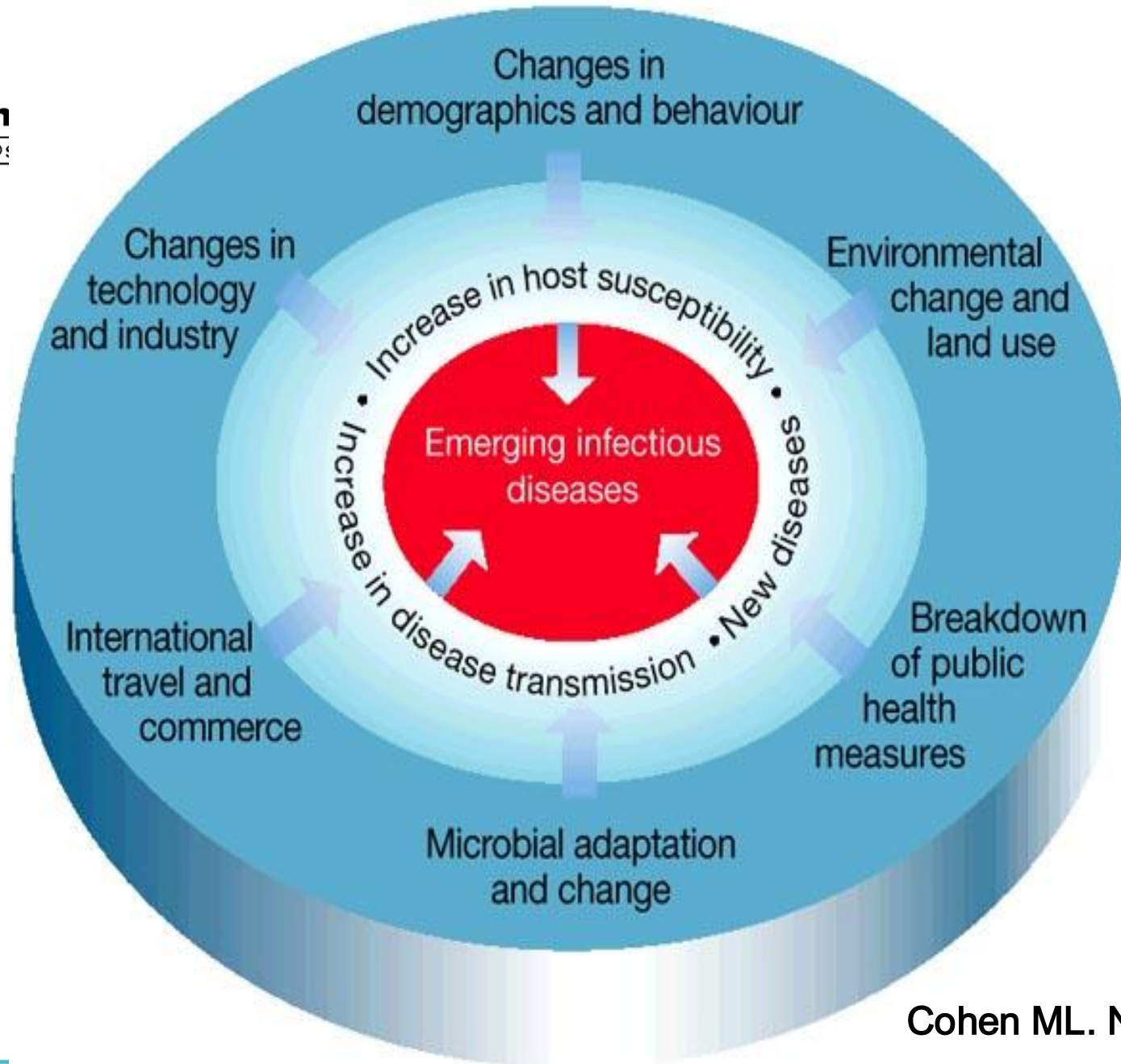


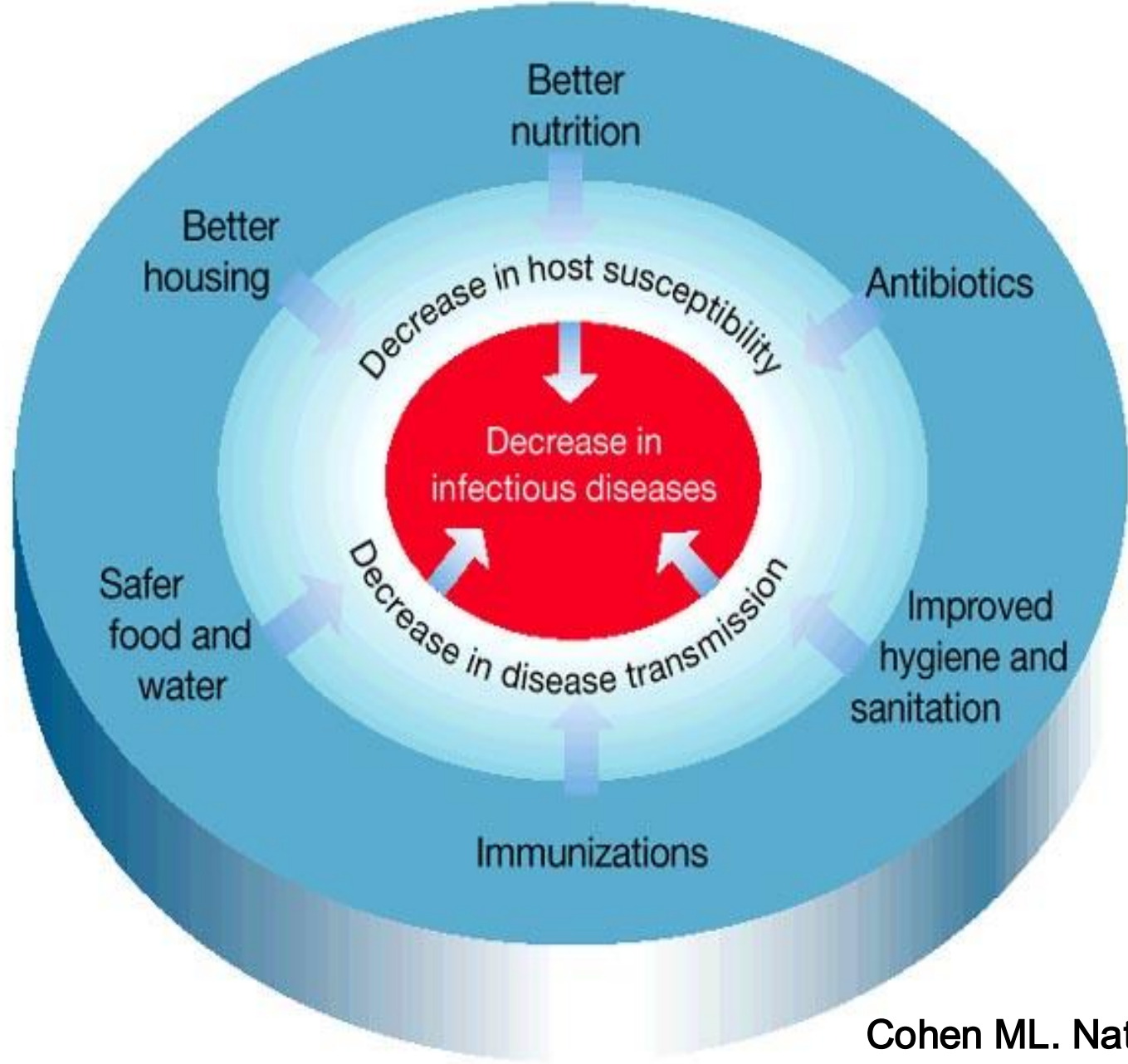
VECCHIE E NUOVE MALATTIE INFETTIVE UNA VERA EMERGENZA?

Nicola Petrosillo MD, FESCMID

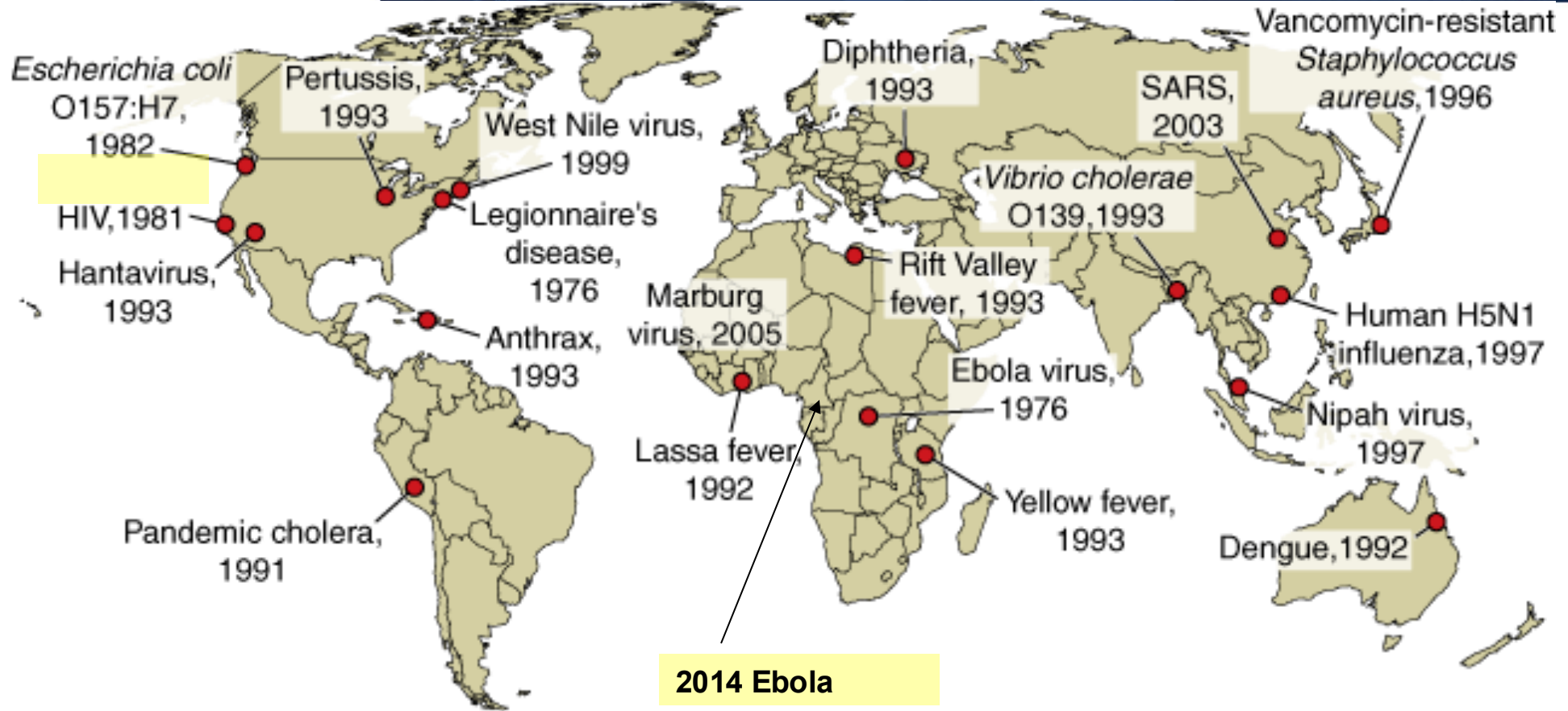
Malattie Infettive, Policlinico Universitario Campus Bio-Medico, Roma



Cohen ML. Nature 2000; 406, 762 - 767



Cohen ML. Nature 2000; 406, 762 - 767



Source: Fauci AS, Kasper DL, Braunwald E, Hauser SL, Longo DL, Jameson JL, Loscalzo J: *Harrison's Principles of Internal Medicine*, 17th Edition: <http://www.accessmedicine.com>

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Events caused by

- **newly evolved strains of pathogens** (for example, multi-drug-resistant tuberculosis and chloroquine-resistant malaria),
- **pathogens that have recently entered human populations** for the first time [for example, HIV-1, severe acute respiratory syndrome (SARS) coronavirus], and
- pathogens that have probably been present in humans **historically, but which have recently increased in incidence** (for example, Lyme disease).

The emergence of these pathogens and their subsequent spread have caused an extremely significant impact on global health and economies.

Jones KE et al. Nature 2008;451:990-3.

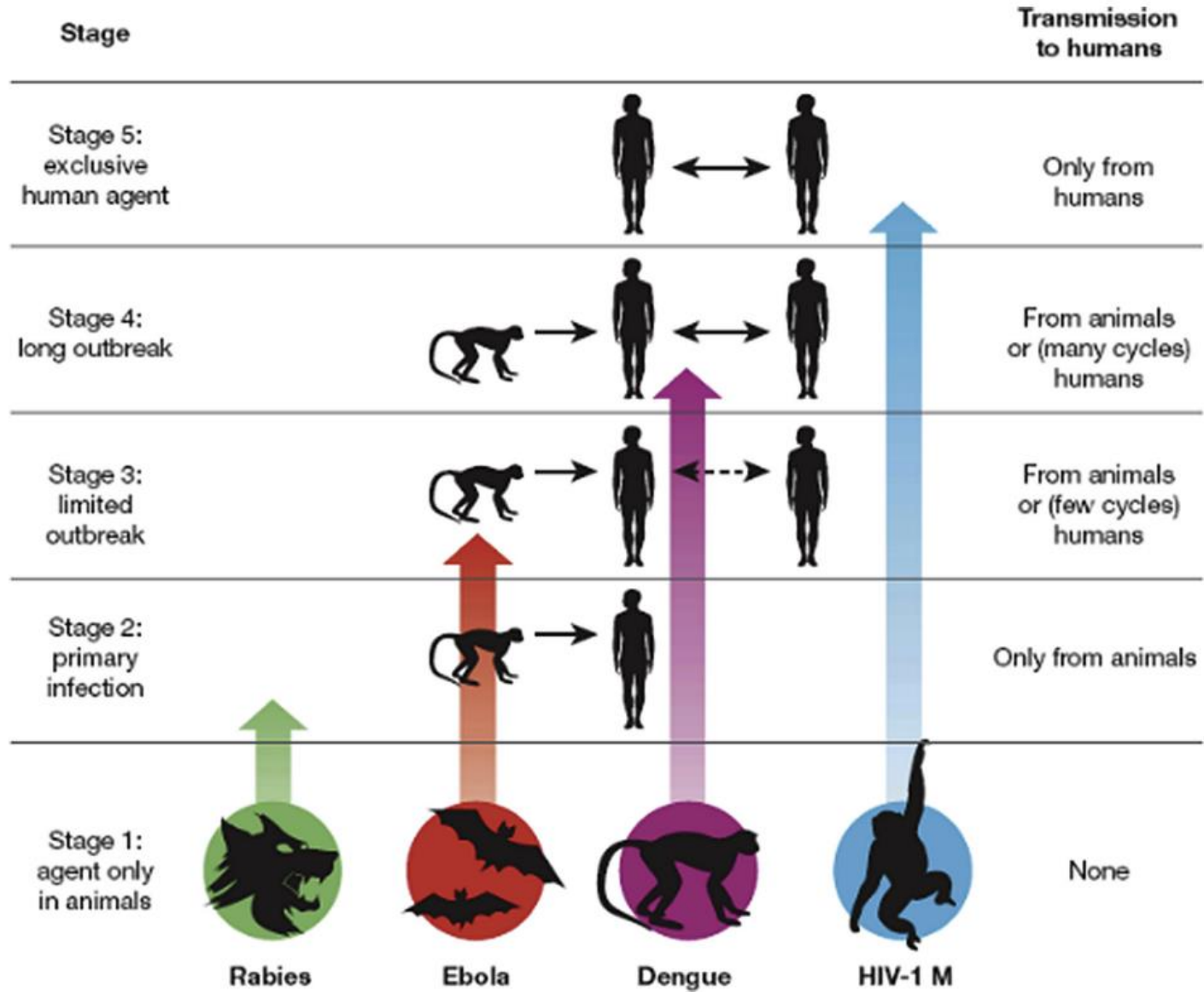


Fig. 1. Illustration of five stages through which pathogens of animals evolve to cause diseases confined to humans. From Wolfe et al. [13].

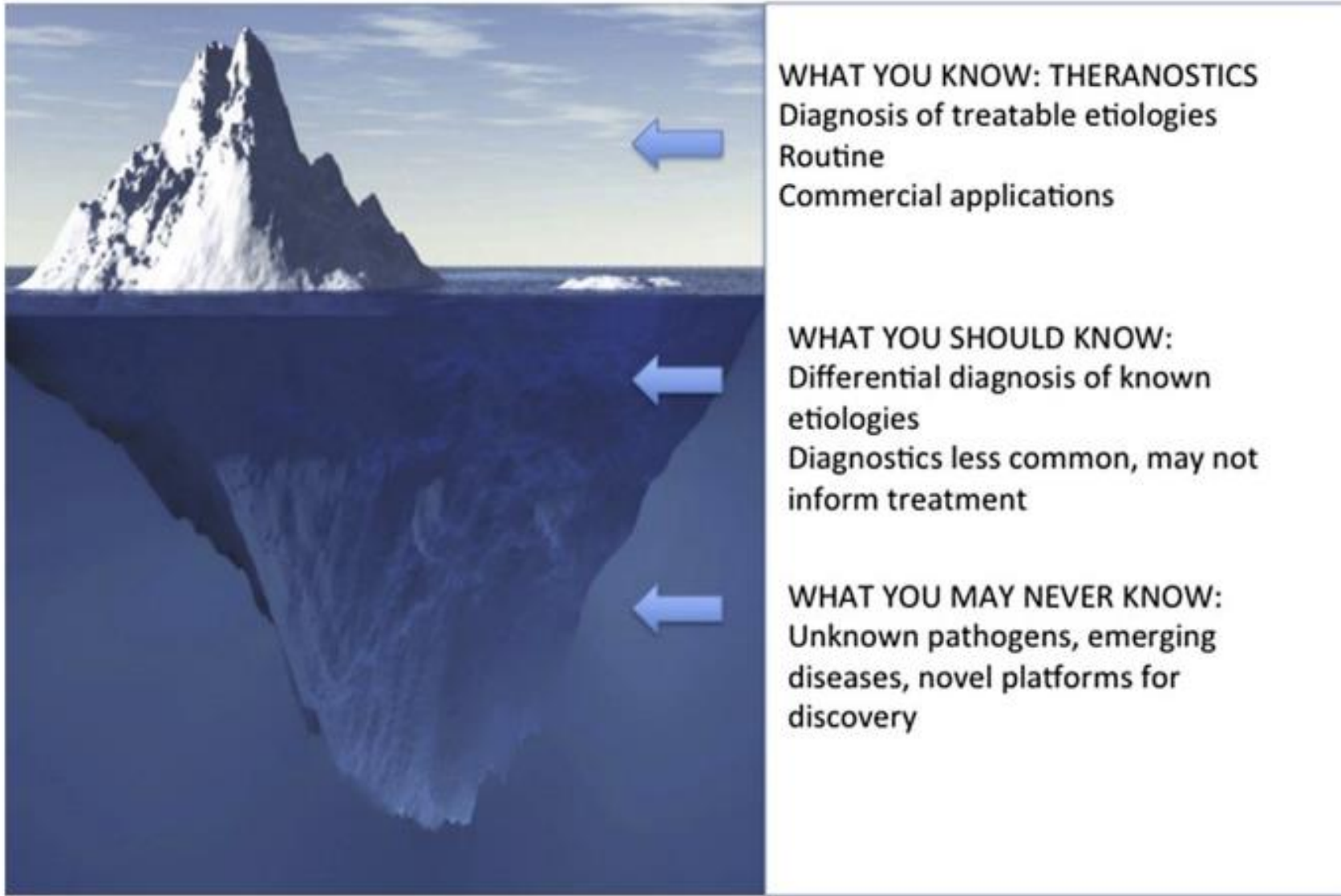


Fig. 2. Diagnostic pyramid.

Main causes of EID spread

- **Crowding** (SARS, MERS-CoV, HCAI, etc.)
- **Mobility** (tourism, migration and refugees) (HIV, TB, HBV, Leishmaniasis, MDR organisms, etc...)
- **Centralized, industrial production of food** (BSE, HUS, *Cyclospora cayetanensis*, etc...)
- **Age and immuno-incompetence** (HCAI, etc...)
- **War** (Polio, Cholera, etc...)
- **Change in vector distribution and vector susceptibility** (Zika, Dengue, Chikungunya, West Nile, etc...)



Forum Risk Management

obiettivo sanità

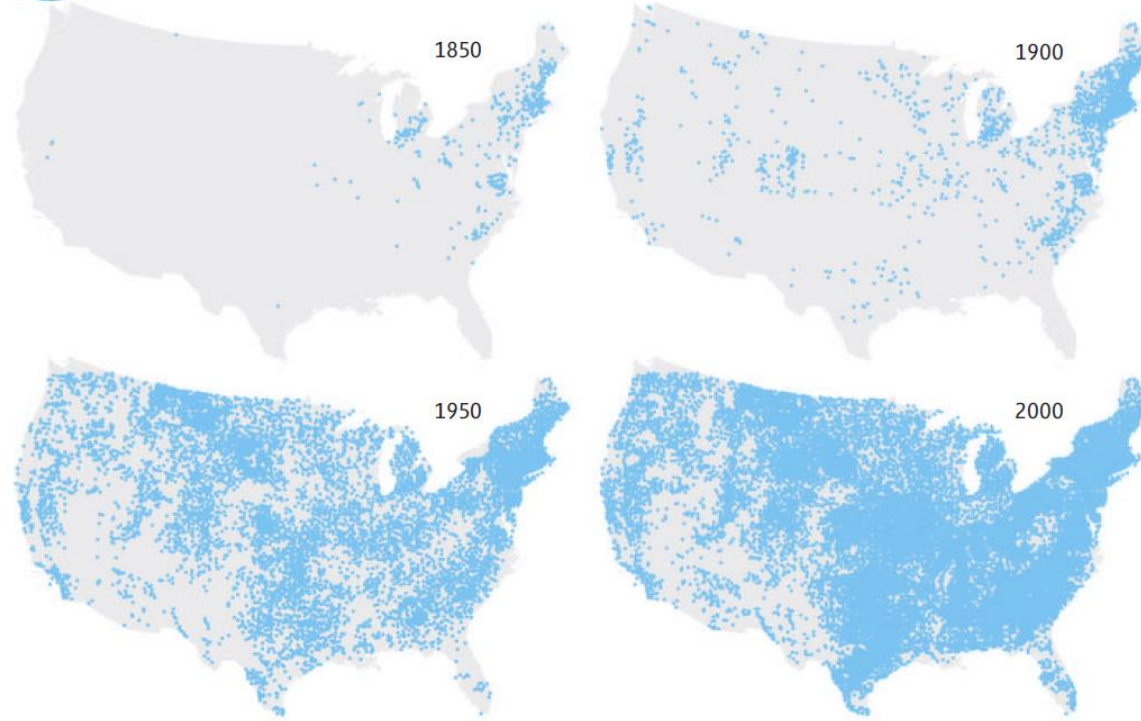


A Global Perspective on the Anthropocene

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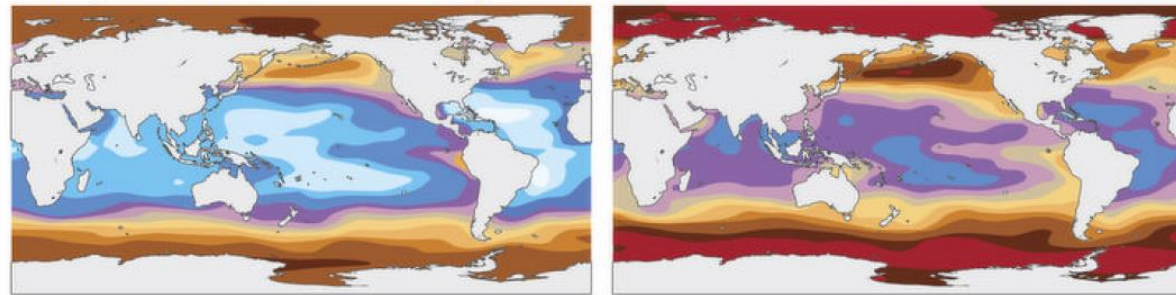
Growth of U.S. Dams and Reservoirs



SOURCE: JAMES P. M. SYVITSKI ET AL., PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A 369, (2011)

Getting More Acidic

Aragonite saturation state 1 2 3 4 5



CO₂ 280 PPM

CO₂ 450 PPM

SOURCE: O. HOEGH-GULDBERG ET AL., SCIENCE 318, 5857 (14 DECEMBER 2007)

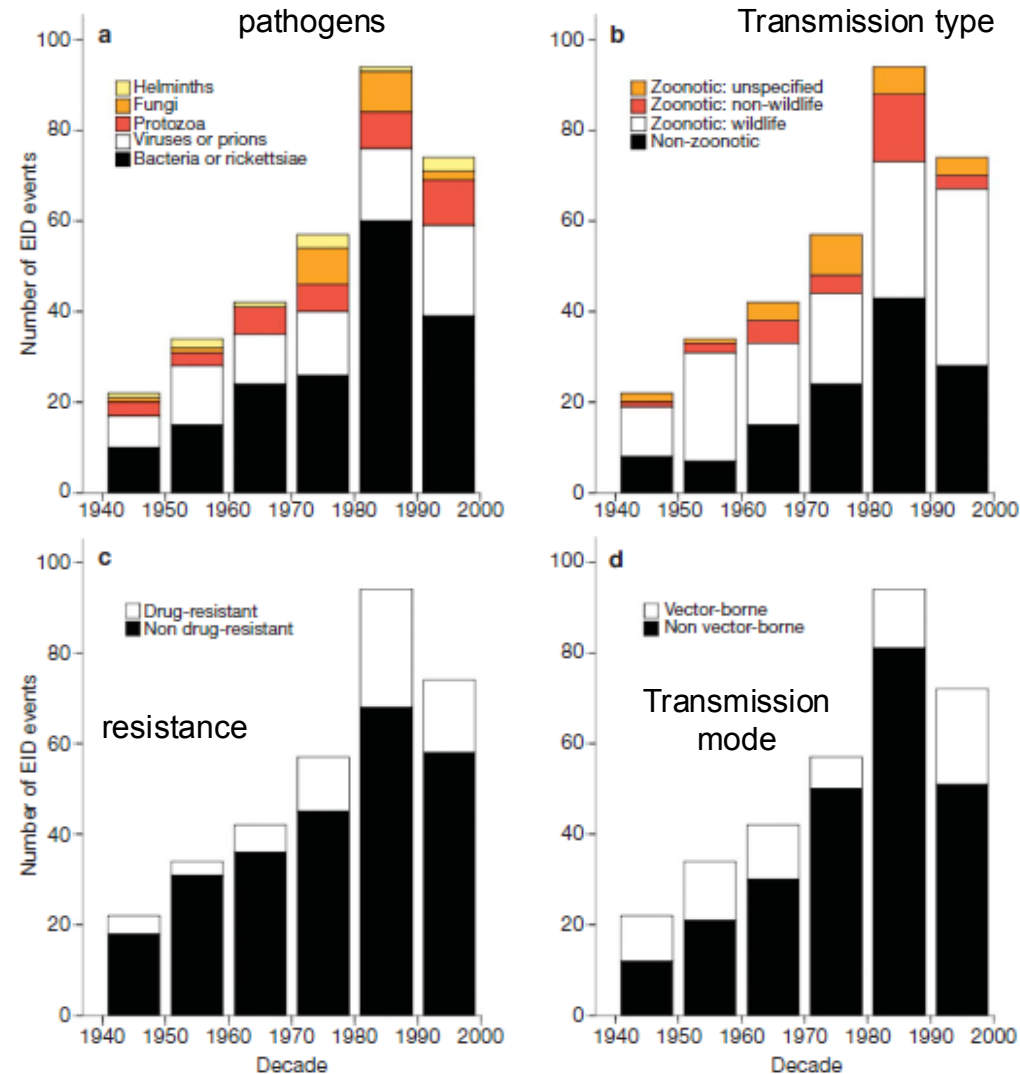
Vince G. Science
2011;334:32-3, 37

#ForumRisk19



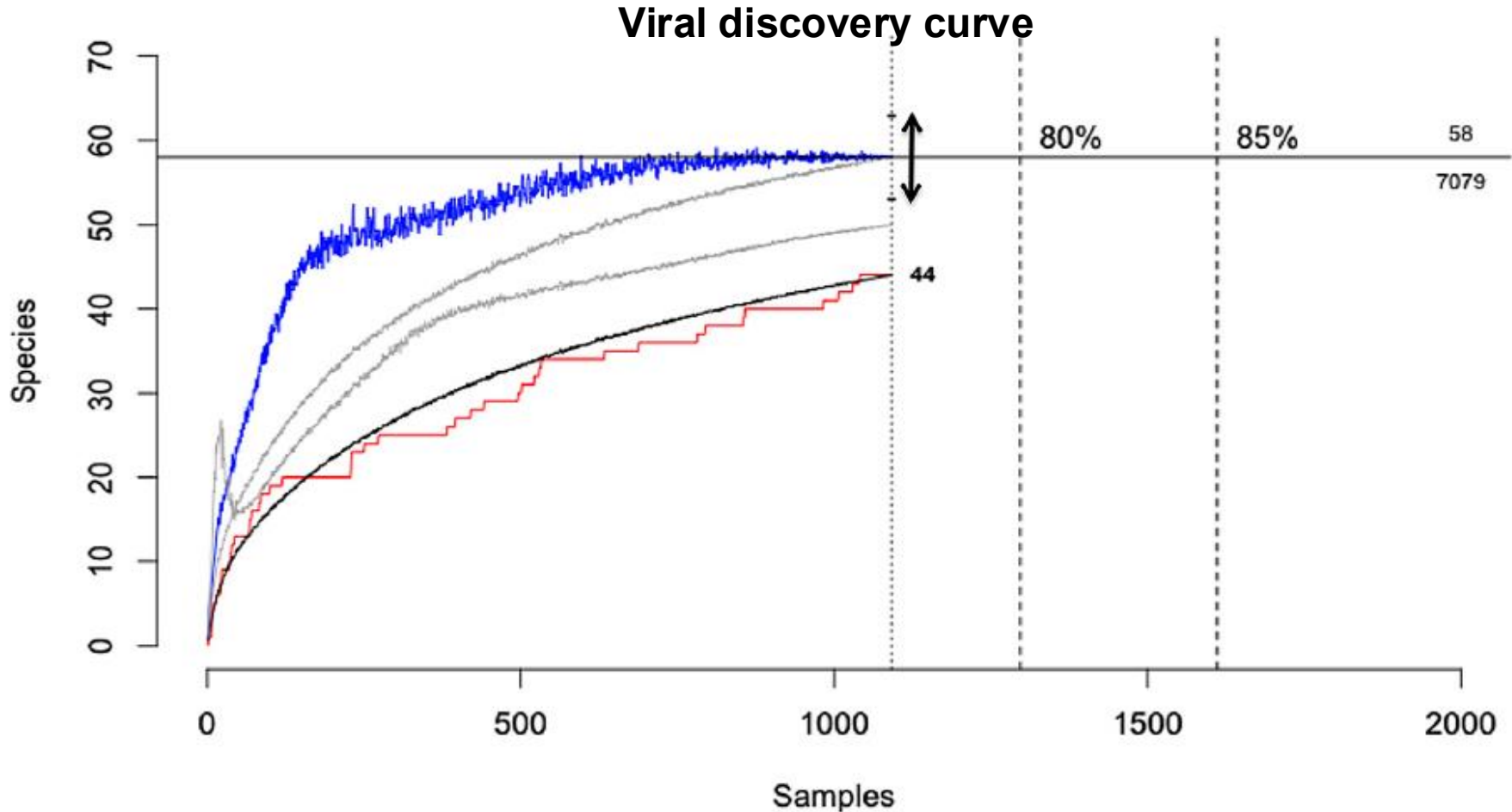
www.forumriskmanagement.it

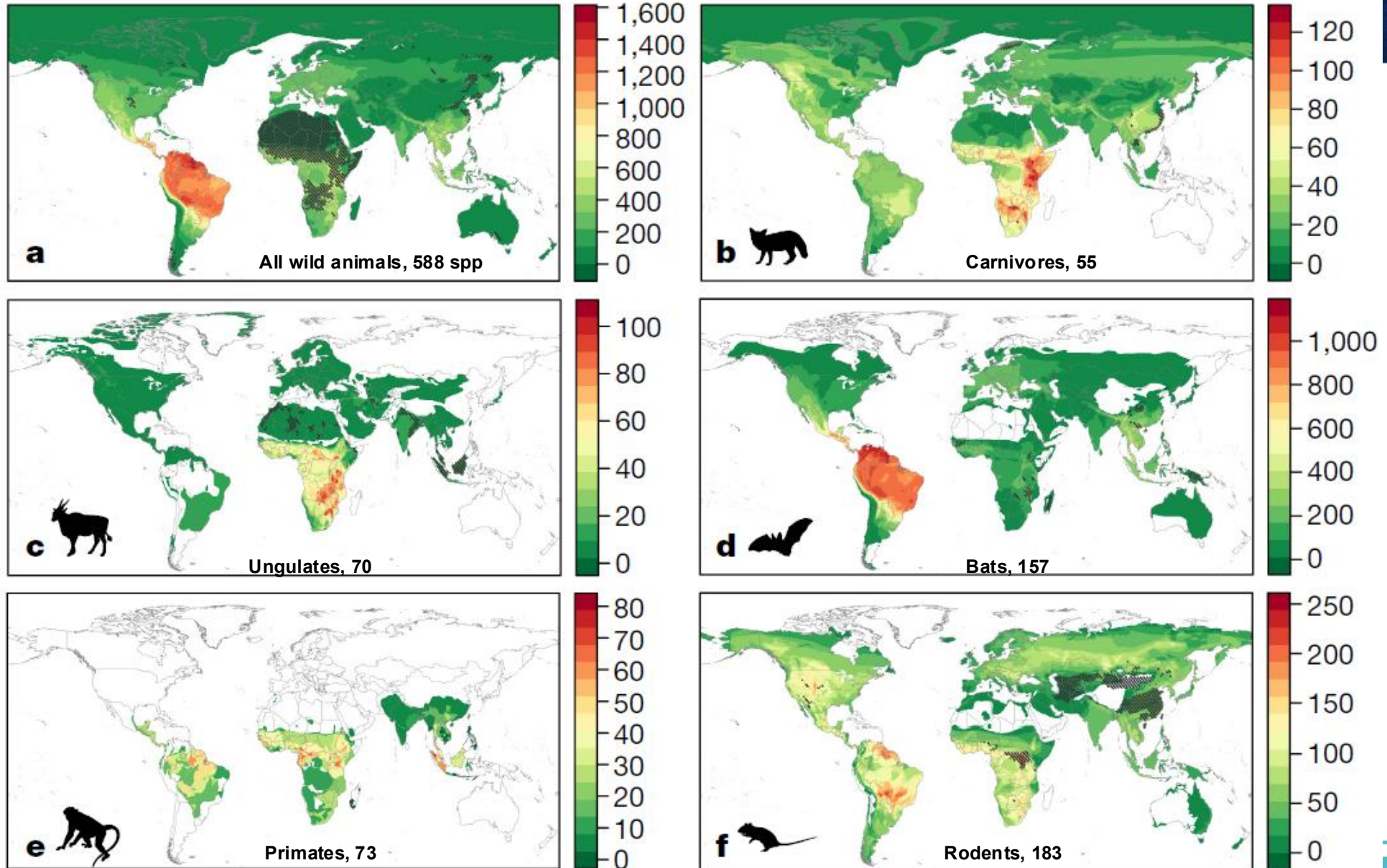
335 new human pathogens have been discovered between 1940 and 2004. The majority (60.3%) of EID events were caused by zoonosis of which 71.8% had a wildlife origin and 22.8% were vector-borne.

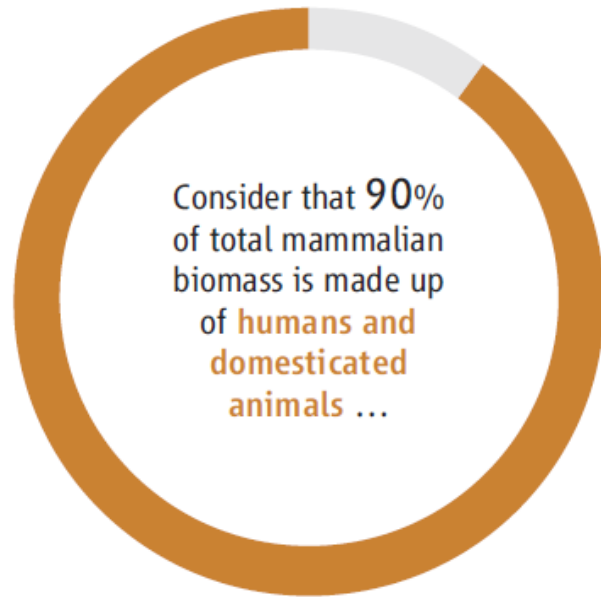


Jones KE et al. Nature
2008;451:990-3.

Most emerging diseases originate from animals and thus are zoonoses, and it has been estimated that there are up to 320,000 unknown viruses in zoonotic reservoirs.







VACLAV SMIL, *THE EARTH'S BIOSPHERE: EVOLUTION, DYNAMICS, AND CHANGE*. MIT PRESS (2002)

The sources and mode of transmission of EID

Today **90%** of the earth's biomass is in the human-domestic animal sphere compared to **0.1 %** in the neolithic age.

Currently there is a further evolution, the transformation of a microorganism from showing only animal to animal transmission gradually evolving to being only human to human transmission.

It is the “viral chatter” that means repeated short introductions into humans, initially without the ability to sustain human to human transmission.

HIV made at least ten entries into humans before sustained human-to-human transmission was established.

Wolfe ND. *Nature* 2007;447:279-83.
Vince G. *Science* 2011;334:32-3, 37