

# The Daily Briefing - Sept. 11<sup>th</sup>, 2007

New Century, New Challenges, New Dilemmas: The Global Nexus of Animal and Public Health

## 1,399 and counting: Three to four more human pathogens discovered every year

The bag bugs are among us and more are joining the fray all the time, says Dr. Mark Woolhouse, remarking on his recent cataloging of every human pathogen known to exist.

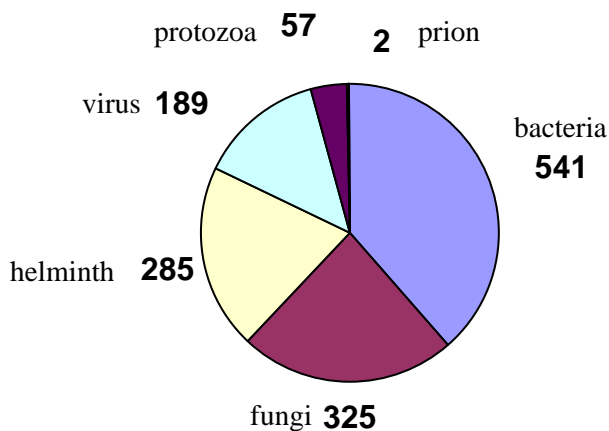
Woolhouse, of the University of Edinburgh, and colleague Eleanor Gaunt have recognized 1,399 pathogens, the majority of which are bacteria (see figure below).



“We have tried to make this formal and systematic as no one had ever cataloged human pathogens,” says Woolhouse.

Woolhouse mentioned a list having been produced in 1980, accounting for the need to produce a new one with recently discovered human pathogens. “There are some within the catalog that have just recently discovered us,” says Woolhouse of the 87 species categories in the list.

Woolhouse and Gaunt note that there are on average three to four new pathogens discovered each year. Along with accounting for these new pests, the work has given a better understanding of the profile of pathogens.



“Diversity of human pathogens”  
- Woolhouse and Gaunt (in press)



Pathogens are also moderately transmissible between humans, says Woolhouse. “If a virus or another (pathogen) treats humans as a dead-end host, the only thing that determines the size of an epidemic is the number of initial individuals infected. Key is the transmission between humans.”

While humans may seem a primary target of current and “yet to be known” human pathogens, less than 100 survive on human hosts alone. This type is called a specialist pathogen.

Some others that utilize humans and animals include hundreds of sponges and hundreds of commensals “who use our skin, our guts, and do so happily,” according to Woolhouse.

About 60 percent, or roughly 770 human pathogens can make their way between both species. Woolhouse cites measles as one example.

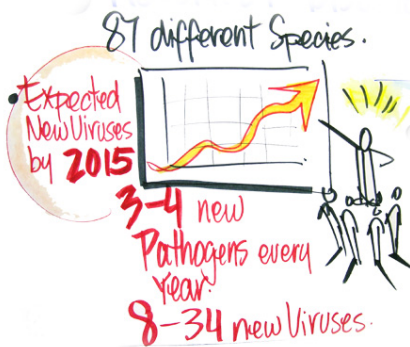
Sources of human pathogens vary, yet the most common reservoir is the animal kingdom. There is a wide range among species, with the most coming from mammals and rodents.

“Proximity (to animals) outweighs taxonomy,” says Woolhouse. “Most of the world does not have direct contact with primates. The concern is ungulates.”

In looking to the future, “expect the unexpected,” says Woolhouse. Pathogen emergence and discovery will

*“If we are going to look for disease events, we need to look for real time data.”*

- Mark Woolhouse, Centre for Infectious Diseases at the University of Edinburgh



continue by the rate of one to four per year, growing from 40 around 1950 to around 200 by the year 2020.

At this rate, organizations cannot focus upon just one disease at a time,

but must be broad-minded about what they are studying. In addition, organizations must enhance surveillance and collaboration in order to limit the effects of emerging pathogens upon the human population.

“Effective surveillance is needed to determine the capabilities of new pathogens,” says Woolhouse. He adds that surveillance relies on international cooperation and should not be just a local issue. “We cannot pin down

disease emergence to one part of the world or another.”

Part of Woolhouse’s research considers the application and solutions brought on by evolving technology. A primary goal is early detection. “It means buying time and allowing for early action. It also lets organizations more effectively and efficiently target resources.”

Technology being used for detection does not hold all of the answers. As Woolhouse points out, there are cultural problems associated with collecting data, as well as concerns over discriminating against those who might be deemed suspect of carrying a disease.

Making use of information and sharing it also has barriers, according to Woolhouse. “People who collect data are remarkably unwilling to share,” he laments. “We need to change our culture to reward sharing data with others who could take it to the next level.”

## Understanding the “commons”

Seminar colleague Howard Wong has recommended a number of readings as a way to become familiar with the concept of the “commons”:

- The November 2005 issue of the Veterinary Record, between pages 673 and 696, includes articles such as “Integrated working” and “Crossing the boundaries.”
- The November 26, 2005 issue of BMJ, volume 331, pages 1213 through 1228.
- The November 26, 2005 issue of BMJ, volume 331, pages 1256 through 1272.

## Overheard...

*“We came here because of the threat of pandemics that will affect us all.”* - Jose Zaglul

*“What are the incentives for people to report information, whether on the ground or within agencies?”*  
- Tara Acharya

*“The notion of transparency is rather opaque...We have a certain understanding of what openness is, but not that it transfers globally.”* - Arvind Singhal

## Strategic issues decry need for deliberation & action

- Lack of awareness / communication / urgency of all determinants of one world, one health (social, economic, political, systems)



- Lack of collaboration (disciplines, countries, communities, organizations, public-private)
- Lack committed leadership (includes local and global re: policies, resources, mindsets, ethics, priorities)
- Lack of education and training (including ethics)
- Lack of infrastructure and capacity (includes local and global logistics, equipment, tools, people, skills, mindsets, sustainable economics)
- Lack of social engagement (grass roots, participatory, all voices)