


## Biology 675

EPIDEMIOLOGY OF EMERGING INFECTIOUS DISEASES

- *E. coli*
- WEST NILE ENCEPHALITIS
- MAD COW DISEASE
- MEASLES-2012
- NEXT?



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### Disease

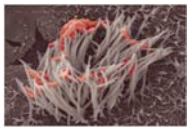
"Is not disease the rule of existence?"  
—Henry Thoreau, 1851

### Future: Emerging Infectious Diseases

Pertussis 2003

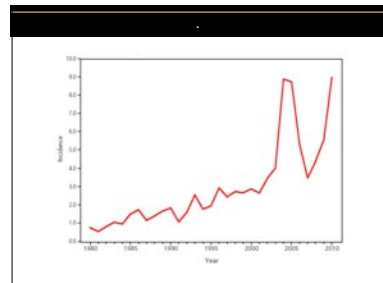
Why in these areas?  
How could you prevent pertussis?

### Pertussis (Whooping Cough)



### Pertussis (Whooping Cough)

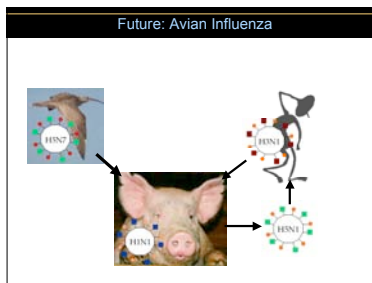
- **Stage 1:** catarrhal stage, like common cold
- **Stage 2:** paroxysmal stage—violent coughing sieges
- **Stage 3:** convalescence stage



### Future: Emerging Infectious Diseases


Pertussis 2010-2012

Why in these areas?



### Bioterrorism

<ul style="list-style-type: none"> <li>• Anthrax</li> <li>• Brucellosis</li> <li>• Psittacosis</li> <li>• Botulism</li> <li>• Q fever</li> <li>• Tularemia</li> <li>• Typhus</li> <li>• <i>Shigella</i></li> <li>• Cholera</li> <li>• Plague</li> </ul>	<ul style="list-style-type: none"> <li>• "Eradicated" polio and measles</li> <li>• Encephalitis viruses</li> <li>• Hemorrhagic fever viruses</li> <li>• 1918 Influenza A strain</li> <li>• Monkeypox</li> <li>• Nipah virus</li> <li>• Smallpox</li> <li>• Yellow fever</li> </ul>
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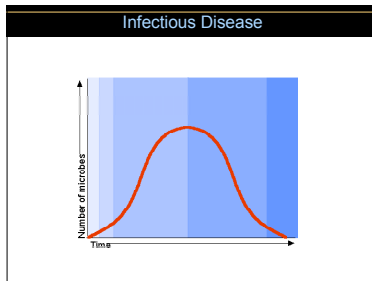


Disease	
• Signs	= Measurable changes due to disease
• Symptoms	= Changes felt by patient, result of disease
• Congenital	= Existing at birth
• Acquired	= Obtained during life of individual
• Genetic	= Inherited

- | Acquired Disease   |
|--|
| <ul style="list-style-type: none"> <li>• Drug-induced</li> <li>• Iatrogenic</li> <li>• Infectious</li> </ul> |

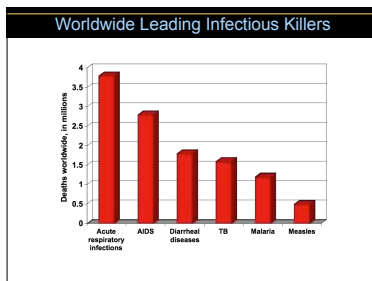
- | Top 10 Events of the 20 <sup>th</sup> Century   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Eradication of smallpox</li> <li>• Discovery of penicillin</li> <li>• HIV epidemic</li> <li>• Influenza epidemic</li> <li>• Polio vaccine</li> </ul> | <ul style="list-style-type: none"> <li>• Childhood immunization</li> <li>• Antibiotic resistance</li> <li>• Tuberculosis</li> <li>• Cultivation of infectious agents</li> <li>• Chlorination</li> </ul> |

Causes of Death	
U.S.	Worldwide
Heart disease	✓ Pneumonia
Cancer	✓ Diarrhea
Cardiovascular disease	✓ Tuberculosis
Pulmonary disease	✓ AIDS
Accidents	✓ Malaria
Diabetes	✓ Hepatitis B
✓ Influenza/pneumonia	✓ Measles
✓ Nosocomial	✓ Neonatal tetanus
Alzheimer's	✓ Pertussis
Kidney disease	✓ Worms
✓ HIV	



- | Infectious Disease   |
|--|
| <ul style="list-style-type: none"> <li>• Nosocomial</li> <li>• Community-acquired</li> <li>• Endogenous</li> </ul> |

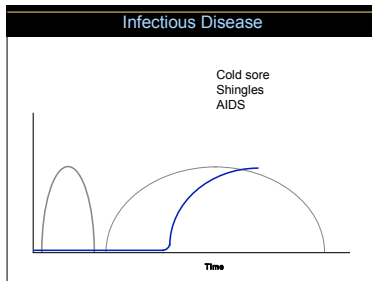
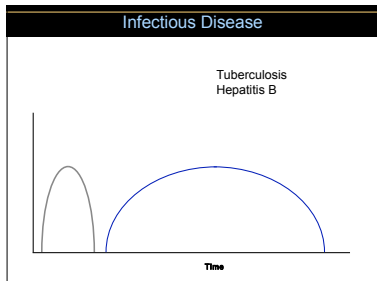
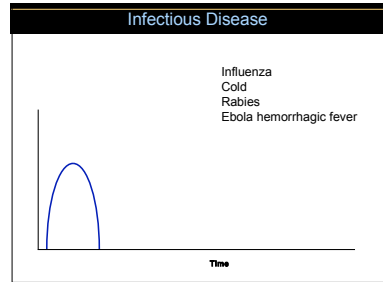
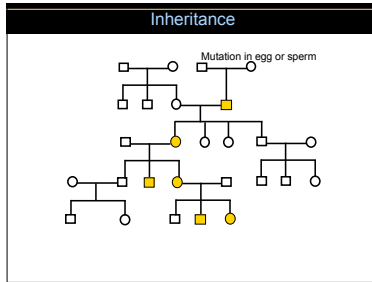
- | Infectious Disease   |
|--|
| <ul style="list-style-type: none"> <li>• Noncommunicable disease</li> <li>• Communicable disease <ul style="list-style-type: none"> <li>• Contagious disease</li> <li>• Quarantine</li> <li>• Isolation</li> </ul> </li> </ul> |



- | Human spongiform encephalitis can be transmitted by  |
|--|
| <ul style="list-style-type: none"> <li>A. The abnormal gene can be inherited.</li> <li>B. Ingestion of the causative agent.</li> <li>C. Transplant of infected tissue.</li> <li>D. All of the above.</li> <li>E. None of the above.</li> </ul> |

### Spongiform encephalitis

- Creutzfeldt-Jakob Disease
- Gerstmann-Sträussler-Scheinker Syndrome
- Fatal Familial Insomnia
- Kuru
- new-variant Creutzfeldt-Jakob Disease
- Scrapie of sheep and goats
- Transmissible Mink Encephalopathy
- Chronic Wasting Disease of deer and elk
- Feline Spongiform Encephalopathy
- Bovine spongiform encephalopathy



### Quarantine, isolation, or neither?

- Person with Creutzfeldt-Jakob disease?
- Dog that bit a person?
- Person with TB?
- Person with Ebola hemorrhagic fever?

- Marburg hemorrhagic fever (MHF) is a severe and highly fatal disease caused by a virus from the same family (Filoviridae) as the Ebola virus. The first cases were identified in 1967 in Europe among laboratory workers handling African green monkeys imported from Uganda. Seven outbreaks have occurred since then.

### Marburg History

Year	Cases	Deaths	Country	Situation
1967	32	7	Uganda	Lab workers in Germany & Yugoslavia
1975	3	1	Zimbabwe	Two travelers to Zimbabwe and a hospital nurse
1980	2	1	Kenya	Patients visited Kitum Cave in Kenya's Mount Elgon National Park
1987	1	1	Kenya	Patient visited Kitum Cave in Kenya's Mount Elgon National Park
1998	154	128	Congo	Workers at a gold mine in Durba, Congo
2005	313	280	Angola	Believed to have begun in Uige Province
2008	5	2	Uganda	Mine workers + 1 U.S. traveler
2008	1	1	Uganda	Dutch traveler

### BioBuck