

INFECTIOUS DISEASE UPDATE -2016

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Potential Conflicts of Interest

Consultant: Merck, Pfizer, Sanofi-Pasteur
Dynavax, Novavax

Lecturer: Merck, Genentech

EMERGING AND RE-EMERGING INFECTIOUS DISEASES

Middle East Respiratory Syndrome – CoV

Enterovirus – D68

Measles

Chikungunya

Polio

Ebola

Zika

EMERGING AND RE-EMERGING INFECTIOUS DISEASES

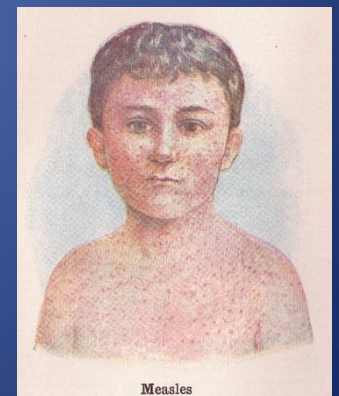
Middle East Respiratory Syndrome – CoV

Still occurs in Middle Eastern Countries
Often hospital-associated
Dromedary camels
Occasional international introductions



Measles

2015: Disneyland outbreak – 147 cases
Parents withholding children from vaccination
2016: 52 cases in 15 states (6 cases in TN)



Enterovirus D68

Previously rarely recovered virus

2014 Summer/Fall outbreak across US

An enterovirus that causes respiratory disease

Children with rash admitted to ICUs – recover quickly

Acute flaccid myelitis outbreak – residual paralysis

Has become rare again – fortunately!

EMERGING AND RE-EMERGING INFECTIOUS DISEASES

Chikungunya

2013 first time in Caribbean – large outbreak

Mosquito (*Aedes aegypti*) transmitted

Travelers import into US – little spread



EMERGING AND RE-EMERGING INFECTIOUS DISEASES

Ebola

2013-2015 epidemic in West Africa over
28,000 cases; over 11,000 deaths
Spread via contact with body fluids
Epidemic now ended
Few importations into US – little spread
Vaccine created



EMERGING AND RE-EMERGING INFECTIOUS DISEASES

Polio

Paralytic disease caused by 3 enteric viruses

World-wide use of tri-valent oral vaccine

Scheduled for eradication by 2000...but still struggling

Type 2 poliovirus eradicated in 2015

Type 3 not detected since 2012

Type 1 remains in Pakistan and Afghanistan

Problems:

2016: 3 cases in Nigeria!

Switch from OPV to IPV



Zika

Obscure virus akin to dengue,
chikungunya

Transmission: Mosquito (*Aedes aegypti*)

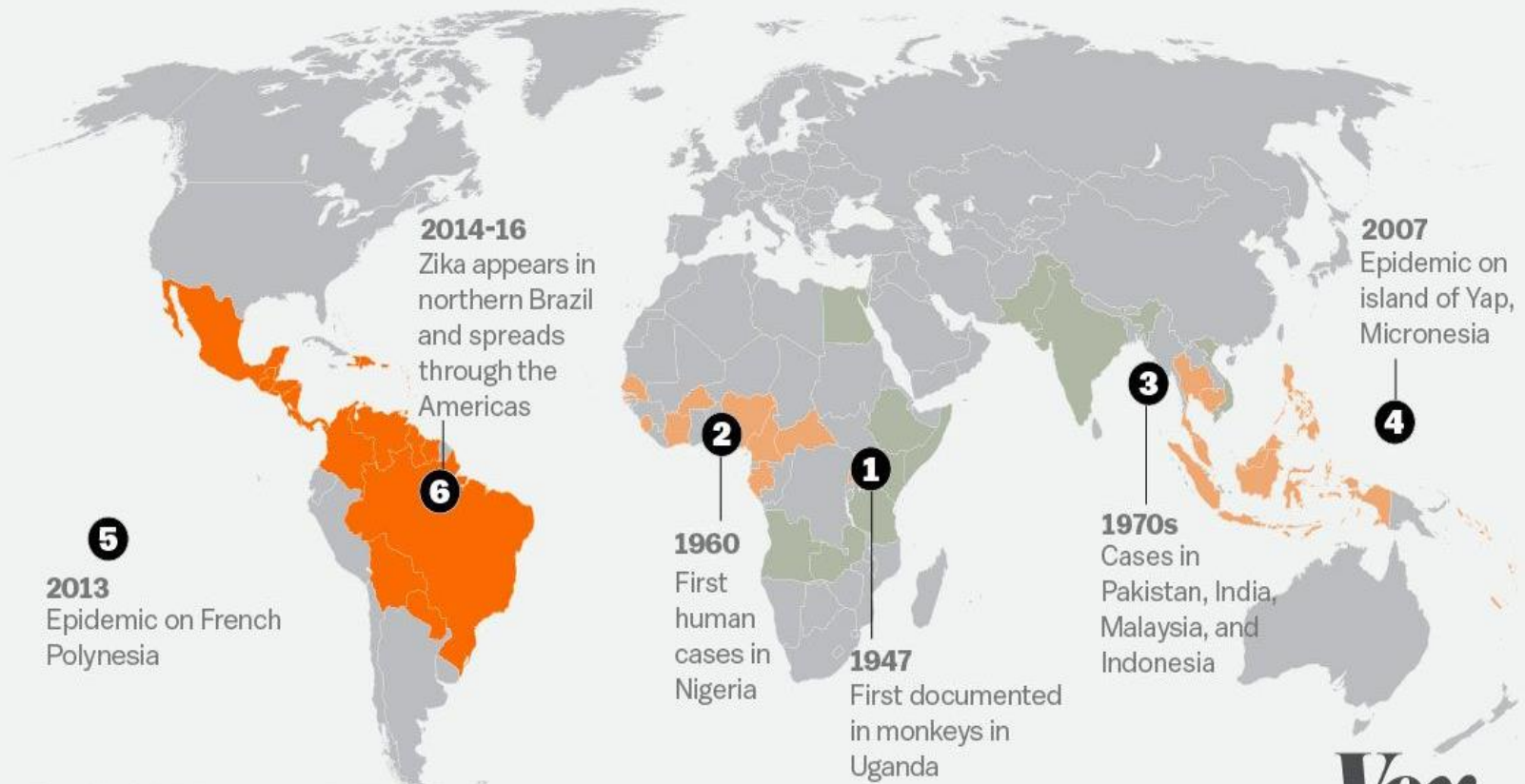
Sexual

How the Zika virus spread

Active transmission

Known previous transmission

Antibodies also detected



SOURCE: WHO and Lancaster University , Feb.1

Vox

Zika

2014 Appears in Brazil – widespread throughout
Mexico, Central and South America,
Caribbean
Puerto Rico

Feb, 2016 WHO: Public Health Emergency of
International Concern

Zika

Clinical illness: Fever, rash, conjunctivitis
muscle and joint aches
Several days – a week



Illness during pregnancy → microcephaly

Pathogenesis of Microcephaly

Zika injected by mosquito (or acquired sexually)



Virus in bloodstream to placenta
Infects certain placental cells



Virus crosses placenta, infects developing fetus



Virus infects and destroys developing brain cells



Results in small brain, small skull

Microcephaly



The more we learn about Zika, the more adverse effects are recognized

Microcephaly

Risk greatest in first trimester (all 3)

Blindness

Symptoms not evident at birth

Deafness

Can develop later

Fetal loss

? Risk of infection in infancy, childhood

Prematurity

? Risk of infection in adults
(Guillain-Barre Syndrome)

Zika

Over 2,900 cases imported into the continental US

15,800 cases in US territories, including Puerto Rico

Includes 671 pregnant women in continental US

1,080 in the territories

Only mosquito transmission in continental US

Miami-Dade county

Many control measures including case-finding

mosquito abatement, education, travel advisories

Zika

Continuing geographic expansion (none after Olympics!)

Research: Vaccines, Vector Control,
Diagnostic tests, Therapeutics

Epidemiology: Natural history of disease in
congenitally-infected infants, pregnant
women, adults

Proportion of men chronically infected;
duration

STAY TUNED – Constant new information

Previews of Coming
Attractions

New Vaccines on the
Horizon

HEPATITIS B

1991 ACIP Recommendations

- Routine for infants
- “Catch-up” for youngsters and adolescents
- Adults with risk factors
 - HCW
 - Sexual exposure
 - Illicit drugs/needles
 - Diabetes (2010)

HEPATITIS B

~20,000 new infections annually

95% in adults

Serious consequences:

- Acute hepatic necrosis

- Chronic active hepatitis

- Cirrhosis

- liver cancer

Current Hepatitis B Vaccines

Two Hep B; one Hep B/HepA

3 doses: 0, 1, 6 months

Limitations:

Reduced seroconversion with increasing age, obesity, smoking, diabetes

Reduced adherence to 3-dose, 6-month regimen

Prolonged time to seroconversion

Preview (at FDA)

Adjuvanted Hepatitis B vaccine

Two doses: 0, 1 month

Enhanced seroprotection in
older persons, diabetics

Respiratory Syncytial Virus - RSV

- Originally reported as a cause of severe respiratory infections in young children
- Now recognized as causing severe disease in older adults:
 - Community – dwelling
 - Those with chronic obstructive pulmonary disease
 - cardiopulmonary disease
 - long-term care
 - nursing homes
- Annual attack rates: 2-10%

RSV And Influenza Are Comparably Severe

4-years (1989 – 1992)

Hospitalized patients age 65+ with influenza-like or cardiopulmonary illness

	<u>Diagnosis</u>	<u>Deaths</u>
Influenza	11%	6%
RSV	10%	10%

Respiratory Syncytial Virus - RSV

Several manufacturers working on
vaccines and therapies

Sequential vaccine studies:

Adults age 60+

Pregnant women

Infants

Previews

RSV vaccine in late-stage trials in adults 60+

Early data suggest ~60% protection

(comparable or better than influenza vaccine)

Will persons age 60+ accept 2 seasonal vaccines each year (influenza and RSV)?

Previews (at FDA)

Adjuvanted Shingles vaccine
(2 doses; 0, 2 months)

92% effective preventing shingles – all ages
However, 17% local sx substantial

INFLUENZA VACCINE

CDC RECOMMENDATION:

EVERYONE older than 6 months of age

Live, attenuated vaccine (LAIV) – nasal spray
should not be used this year

When in doubt...

VACCINATE!

