EXOTIC VIRUSES IN THE NEWS

EBOLA, CHIKUNGUNYA, DENGUE VIRUSES
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EXOTIC VIRUSES IN THE NEWS

Ebola

Chikungunya & Dengue fever
EBOLA VIRUS

• Caused by a *Filoviridae*, genus *Ebolavirus*

• Ebola poses little risk to the U.S. general population.

• Transmission is through direct contact to bodily fluids of an infected person or via objects (like needles) that have been contaminated with infected secretions.

• Via non(?) intact skin and mucus membranes.

• The mortality rate is currently around 60 percent

• Early treatment efforts may decrease risk of serious disease and death
EBOLA VIRUS
INCUBATION & INFECTIOUS PERIODS

• Symptoms usually appear 8 to 10 days after exposure (range 2 – 21 days)

• Individuals who are not symptomatic are not contagious.

• Infectious while febrile and thru later stages of disease

• Patients become more infectious (viral load increases) as disease progresses

• Body after death is infectious

• Infectiousness can be prolonged as patient recovers (semen up to 3 months)
EBOLA VIRUS SYMPTOMS

- Basic Symptoms:
  - Fever,
  - headache,
  - joint and muscle aches,
  - weakness,
  - diarrhea, vomiting, stomach pain and lack of appetite
  - and in some cases bleeding (about 50% have hemorrhagic symptoms)

- If Ebola is possible:
  - Immediately isolate the patient
  - Immediately call Public Health for consultation
    - Determine appropriate medical care needed
    - Determine appropriate laboratory testing needed
  - Continue to follow infection control precautions to prevent the spread of Ebola until ruled out
EBOLA VIRUS TREATMENT

• Symptomatic/supportive treatment only
  – balancing the patient’s fluids and electrolytes
  – maintaining their oxygen status and blood pressure
  – treating them for any complicating infections
  – (mixed results with steroids)

• Timely treatment of Ebola is important

• Supportive therapy should continue with proper infection control practices until appropriate laboratory testing results rules out Ebola

• Experimental prevention and treatments (antibodies and vaccines) are being tested but at this time no specific recommendations.
EBOLA VIRUS TRANSMISSION

• In the past, 2 persons with hemorrhagic fevers from African (Marburg – Like Ebola)
  – one in the U.S. and one in the Netherlands
  – presented to the healthcare system before Marburg virus was diagnosed
  – were treated using standard barrier nursing and infection control practices
  – No transmission to HCPs in either case

• Also, multiple introductions of Lassa Fever (over last 2 decade) - no spread.
  – Some ill during travel as well as seeking medical care
  – So not easily spread airline environment.
  – Cases were sick, but little bodily secretion contamination of environment

• CDC is confident that the standard of care in the U.S. applied correctly, would prevent much if not all of the transmission risk of Ebola patient.
EBOLA VIRUS INFECTION CONTROL


• Early suspicion/recognition is critical
• Immediately apply recommended isolation and infection control procedures
• Use Standard, Contact AND Droplet precautions

Basically procedures should follow that of a blood borne pathogen:
- Keep the patient in an isolated room with a log of everyone who enters/exits
- PPE should include: gloves, fluid impermeable gown, safety goggles or face shield, and consider use of leg protectants and shoe covers if body fluid contact
- Equipment used should be disposable or cleaned via manufacturers instructions
- Only use sharps when absolutely necessary and perform minimal diagnostics

- Laboratory testing for Ebola: minimum 4 mL, serum, non-glass tube.
  - Detailed instructions at www.cdc.gov/ncezid/dhcp/dcpb/cspc/specimens.html
  - Detailed recommendations on how to perform other lab tests safely are pending.

- Environmental cleaning recommendations found in CDC recommendations. Basically all body fluids treated as infectious, 10% bleach or other hospital grade disinfectants will work. Diligent environmental cleaning and disinfection critical and PEP should be worn by those performing cleaning or disinfection.
EBOLA VIRUS EPIDEMIOLOGY

Ebolavirus Ecology

**Enzootic Cycle**

New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintenance and transmission of the virus within bat populations remain unknown.

**Ebolaviruses:**

- Ebola virus (formerly Zaire virus)
- Sudan virus
- Tai Forest virus
- Bundibugyo virus
- Reston virus (non-human)

**Epizootic Cycle**

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.

- Human-to-human transmission is a predominant feature of epidemics.

Following initial human infection through contact with an infected bat or other wild animal, human-to-human transmission often occurs.
Sierra Leone: 646 cases/273 deaths
Guinea: 485 cases/358 deaths
Liberia: 468 cases/255 deaths
Nigeria: 4 cases/1 death

Total clinical cases: 1603
• Total deaths: 887
• Approx. 55% mortality rate

No cases have occurred in the United States

Data updated August 1, 2014
EBOLA VIRUS RISK TO IOWA

Ebola virus poses very little risk to the U.S. & Iowa

• No reported cases in the U.S.
• Persons who are not symptomatic are not contagious
• Casual contact does not spread the virus
• Contact with bodily fluid from a person with symptoms is needed for transmission

Measures to prevent travelers from bringing Ebola to the U.S.

• Level 3 travel warnings – Liberia, Sierra Leone, Guinea
• Airports in Liberia, Sierra Leone, and Guinea are screening all outbound passengers for Ebola symptoms
• Guidelines and procedures for airlines
• Guidelines and infection control recommendations for healthcare providers in the U.S.
HIGH RISK EXPOSURE:

- Percutaneous or mucous membrane exposure, or direct skin contact with body fluids of a person with confirmed or suspected Ebola infection (without appropriate PPE)
- Laboratory processing of body fluids of suspected or confirmed Ebola case (without appropriate PPE or precautions)
- Participation in funeral rites or other direct exposure to human remains in the geographic areas where the outbreak is occurring (without appropriate PPE)

Testing should occur in persons who develop a fever >101.5°F within 21 days of having a high risk exposure

Testing should also occur in persons with high risk exposure and other compatible symptoms (severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage) and blood work findings that are abnormal (thrombocytopenia and / or elevated transaminases) or unknown
LOW RISK EXPOSURE:

• Persons who spent time in a healthcare facility where Ebola patients are being treated
  – includes healthcare workers who used appropriate PPE, employees not involved in direct patient care, or other hospital patients who did not have Ebola and their family caretakers
• Household members of an Ebola patient without high-risk exposures as defined on the last slide
• Persons with direct unprotected contact with bats or primates from Ebola-affected counties

• Testing is recommended for:
  – Persons who develop fever (>101.5°F), other compatible symptoms (severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage), and have unknown or abnormal blood work findings (thrombocytopenia and / or elevated transaminases) within 21 days of having a low risk exposure
  – Persons who develop fever and abnormal blood work findings in absence of other symptoms within 21 days of having low risk exposure
EXPOSURE TO EBOLA AFFECTED COUNTRY:

Persons with fever (>101.5°F), other symptoms (severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage), and abnormal (thrombocytopenia and / or elevated transaminases) or unknown bloodwork within 21 days of visiting an Ebola affected country should be tested if no other diagnosis is found.
WHAT TO DO IF YOU SUSPECT YOUR PATIENT MAY BE INFECTED WITH EBOLA

• Immediately apply recommended isolation and infection control procedures
  – Implement Standard, Contact AND Droplet precautions

• Call IDPH Center for Acute Disease Epidemiology
  – During business hours call: (800) 362-2736
  – After hours call: (515) 323-4360
    (the Iowa State Patrol will contact the person on call)

• IDPH review testing criteria with healthcare provider and proceed accordingly
  – IDPH will consult with healthcare providers to determine best location for medical care

• IDPH and local public health will determine appropriate quarantine measures for exposed family members and exposed healthcare workers
Exotic Viruses are:
• Exciting for the media
• Confusing for the public
• Rely on science-based facts and key messages

Key Messages:
1. Ebola does not pose a significant risk to Iowans or the U.S. public.
2. If you or your family have plans to travel outside the U.S. (especially to exotic locales), check the CDC web site for travel advisories and vaccine/preventive medicine recommendations.
3. The most likely diseases that you will get and bring back to Iowa, are the common diseases like flu and measles. Thus take action to protect yourself and your family against much more common and vaccine-preventable diseases.
EBOLA VIRUS RESOURCES

• Guidelines for Evaluation of US Patients Suspected of Having Ebola Virus Disease
  http://emergency.cdc.gov/han/han00364.asp

• Infection Prevention and Control Recommendations for Hospitalized Patients with Known or Suspected Ebola Hemorrhagic Fever in U.S. Hospitals

• Interim Guidance about Ebola Virus Infection for Airline Flight Crews, Cleaning Personnel, and Cargo Personnel

• Level 3 Travel notice – Liberia

• Level 3 Travel notice – Sierra Leone

• Level 3 Travel notice – Guinea
Chikungunya and Dengue

- **Alphavirus**
- **Mosquito borne**
- 72 – 97% have symptoms when infected
- Fatality rare, but can occur in older adults
- Arthralgia, arthritis, etc. symptoms can last months.

- **Flavivirus** (4 serotypes, same family as WNV and St. Louis)
- **Mosquito borne**
- Many children and first infections have no or minimal Sx
- Fatality rates low (but up to 10% for DSS)
- Lifelong immunity to serotype, but subsequent infections with other serotypes more likely to be serious
Incubation and Infectious Period

**Chikungunya**
- Usually 3-7 days (range 1-12 days)
- Person to person transmission typically does not occur.
- Mosquitos in US can transmit virus, so need to stop mosquitos from feeding on patient for first week of illness.

**Dengue**
- Usually 4-7 days (range 3-14 days)
- Person to person transmission typically does not occur.
- Mosquitos in US can transmit virus, so stop mosquitos from feeding on patient until fever resolves.
Symptoms

**Chikungunya**
- Primarily fever and joint pain (often multiple joints, bilateral and symmetric, in hands and feet), but can include headache, muscle pain, rash, conjunctivitis, nausea and vomiting
- Leukopenia
- Complications of continuing or relapsing joint pain.
- Must avoid aspirin and other NSAID until confirm not Dengue.

**Dengue**
- Primarily fever—“break bone fever” and headache, retro-orbital pain, muscle pain, joint pain, rash, nausea
- Leukopenia
- Complications of febrile seizures, dehydration, and progression to hemorrhage and shock. Watch for warning signs of severe dengue.
- Must avoid aspirin and other NSAID, and corticosteroids.

**Difficult to distinguish between these. Both viruses found in same areas of world. Treat suspected Chikungunya as Dengue until Dengue ruled out.**
## Treatment

<table>
<thead>
<tr>
<th>Chikungunya</th>
<th>Dengue</th>
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<tbody>
<tr>
<td>• No specific, supportive</td>
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<tr>
<td>• Use acetaminophen or paracetamol initially.</td>
<td>• Prevent dehydration</td>
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<tr>
<td>• For persistent joint pain, can try narcotics, corticosteroids, physiotherapy</td>
<td>• Watch for warning signs (i.e. decreasing platelets, increasing hematocrit)</td>
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<td>• Don’t use NSAID, don’t use steroids and don’t assume need IV fluids</td>
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<td>• Treatment is complicated; see complete guidelines and recommendations.</td>
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Infection Control

**Chikungunya**
- No person to person transmission
- Except via percutaneous needle stick, *in utero*, laboratory exposure.
- May be transmitted via blood transfusion, or organ transplantation.
- Stop mosquito bites.

**Dengue**
- No person to person transmission
- Except via percutaneous needle stick, *in utero*, laboratory exposure.
- May be transmitted via blood transfusion, or organ transplantation.
- Stop mosquito bites.
Laboratory Testing

**Chikungunya**
- Culture for virus
- PCR test
- Serology for IgM
- Serology for 4 fold rise (acute/convalescent)
- Done at CDC

**Dengue**
- Culture for virus
- PCR test
- Serology for IgM
- Serology for 4 fold rise (acute/convalescent)
- Done at CDC
CHIKUNGUNYA EPIDEMIOLOGY

Current or previous local transmission of chikungunya virus
CHIKUNGUNYA EPIDEMIOLOGY
Current mosquito vectors for Chikungunya:

- *Aedes aegypti*
- *Aedes albopictus*

Thrive in tropical and subtropical climates but are poorly adapted to the climate and landscape in Iowa.

Based upon current transmission of Chikungunya, the risk of local transmission of Chikungunya in Iowa is low.

Iowan’s who travel to areas where transmission is ongoing should take measure to prevent mosquito bites.
DENGUE VIRUS EPIDEMIOLOGY

1002 alerts for Past 3 months

United States of America ID_00663

Map Layers

HealthMap Reports
Recent reports of local or imported dengue cases from official, newspaper, and other media sources.

Source:
- Country Level
- Local Level

Global Consensus Map (2013)
Risk areas determined by consensus between sources including: national surveillance systems, published literature, questionnaires, and formal and informal news reports. Source:
- Absent
- Unlikely
- Uncertain
- Likely
- Present

CDC Yellow Book Map (2012)
CDC Yellow Book Map (2010)
Endemic risk areas determined using data from Ministries of Health, international health organizations, journals, and knowledgeable experts. Source:
- Endemic Area
DENGUE RISK TO IOWA

- Current mosquito vectors for Dengue are the same as Chikungunya:
  - *Aedes aegypti*
  - *Aedes albopictus*

- Thrive in tropical and subtropical climates but are poorly adapted to the climate and landscape in Iowa

- Iowan’s who travel to areas where transmission is ongoing should take measure to prevent mosquito bites
CHIKUNGUNYA & DENGUE PREVENTION

WERE YOU RECENTLY IN THE CARIBBEAN?

MOSQUITOES spread diseases such as CHIKUNGUNYA and DENGUE.

Watch for fever with joint pains or rash in the next 2 weeks. If you get sick, see a doctor.

Tell the doctor you traveled to the Caribbean.

For more information: call 800-CDC-INFO (232-4636) or visit www.cdc.gov/travel.
PUBLIC HEALTH INVESTIGATION OF CHIKUNGUNYA & DENGUE VIRUSES

• IDPH and local health department in Iowa investigate cases of Dengue virus every year
  – 2-5 cases reported each year
  – All in travelers
• Iowa will likely see imported cases of Chikungunya as well
  – So far this year, IDPH has consulted on 4 potential cases of Chikungunya (those that were tested, were negative)
  – There have been no Chickungunya cases confirmed in Iowa
• If Chikungunya or Dengue virus is suspected, call IDPH.
• Testing is available through CDC (specimen submission will be coordinated through SHL)
REMEMBER YOUR 3 KEY MESSAGES

Chikungunya
1. There are no cases in Iowa, but it has been brought into neighboring states by travelers.
2. Chikungunya is a mosquito-borne illness just like West Nile virus. All but a couple cases in Florida were imported by travelers returning from areas where the disease is endemic such as the Caribbean.
3. There is no vaccine; however this disease can be prevented by using insect repellent and sleeping under mosquito nets.

Dengue
1. A handful of Dengue cases (2-5) are imported into Iowa each year by travelers
2. Dengue is transmitted through mosquito bites.
3. There is no vaccine; however this disease can be prevented by using insect repellent and sleeping under mosquito nets.
Chikungunya resources:
http://www.cdc.gov/chikungunya/

Dengue resources:
http://www.cdc.gov/Dengue/
QUESTION & ANSWER SESSION

• Please type questions into the comments box on your computer

• Participant phone lines will remain muted throughout the question & answer session