Ebola Reston in the Philippines
Ebola Reston

- Is the only known Asian origin with genetic characteristics similar to the virus first identified in Zaire.
- Crab-eating macaques (Macaca fascicularis) – imported from the Philippines.
- Causes a lower fatality rate in monkeys vs. African Ebola viruses.
- Can infect humans but with no clinical illness.
Ebola Reston

- History of Outbreaks
  - 1989-Reston, Virginia, USA Hemorrhagic fever outbreaked in the Reston monkey facility among imported cynomolgus monkeys from the Philippines. Reston Ebola virus was isolated.
  - 1990-Texas, USA, Italy. Outbreak occurred among monkeys imported from the Philippines
Ebola Reston

- 1992-Italy
- 1996-Texas, USA, Philippines  Enzootic hemorrhagic fevers were detected in the same monkey facility in the Philippines.
1997-2008: A total of 11,295 primate sera had been screened for Ebola Reston antibody and none was serologically positive.
Ebola Reston Outbreak in swine

- The 2008-2009 Ebola Reston Outbreak in Swine
- This is the first time Ebola Reston Virus has been identified in livestock
PRRS

- Endemic in the Philippines
- Morbidity from 35 to 100%
- Mortality 30-90%
- High mortality in piglets than in Adult pigs
- Ages affected nursery, weanlings, sow, fatteners, gilts, boar
- The mortality in pigs was unusually high in 2008
How was Ebola virus detected in pigs?

- August, 2008- 28 tissue samples were sent to the Foreign Animal Disease Diagnostic Laboratory of the U.S Department of Agriculture for the detection of Porcine Reproductive and Respiratory Syndrome Virus.
- Tissue culture reveals the presence of CPE and were sent to CDC for confirmation and differential Diagnosis
- 6 out of 28 tissue samples were found positive for Ebola Reston Virus
How was ebola virus detected in pigs?

• The disease was accidentally discovered as a co-infection of Porcine Respiratory Reproductive Syndrome (PRRS) also known as blue-ear disease

• October, 2008- CDC informed the Phil. Gov’t of its’ findings.

• January 2009-Composite team from WHO, OIE, FAO, CDC, DOH and DA was formed to investigate the disease
ERV Outbreak in Swine, 2008-2009
Serum samples received and stored
1039 – from randomly selected pigs
- Ab, Ag ELISA detection, CDC
  - all (-) Ag, 21% (+) for Bulacan farm and
    7.47% in Pangasinan
Tissue samples sent to CDC
- Farm A – 19/70 PCR (+)
- Farm B – all 70 PCR (-)
Ebola Reston Virus monitoring in humans

ERV Outbreak in Swine, 2008-2009
Serum samples received and stored
77 exposed individuals in the farms/slaughter houses
  - 6 Ab (+)
73 individuals involved in depopulation
  - baseline samples – Ab (-)
  - repeat sampling after 1 month
Could *Ebola Reston* evolve genetically?

- The Ebola virus strains collected in two farms (2008) vary up to 3-5% from previous 89/90, 1992 and 1996 strains.
- The Ebola virus isolated in Bulacan of June 2009 has 1% genetic variance from the strain isolated in June 2008.
Modes of *Ebola Reston* Transmission

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<th>Transmission Type</th>
<th>Monkeys to Monkeys</th>
<th>Monkeys to Human</th>
<th>Swine to Human</th>
<th>Human to Human</th>
<th>Bats to Swine</th>
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What we learned from the outbreak so far..

Although the 15 people who tested positive from 1989 to 2008 did not have clinical symptoms, the number is too small to be conclusive
Conclusions

• Human infections have been proven, and in one case, demonstrated to be viraemic
• The number of humans infected (n=15) is too small to draw any conclusions
• Genetic change has been documented (2008 strain is 5% genetically different from 90s strain)
• It has been demonstrated for all Filovirus species that relatively minor changes can result in marked differences in clinical outcomes
• It is plausible that if more people become infected, we would see a range of clinical responses including morbidity and death
Reference

- 2009 WHO expert consultation on Ebola Reston pathogenecity in humans