OFFLU swine influenza virus meeting
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Clement Meseko
Chief Vet. Research Officer,
National Vet. Research Institute,
Vom Nigeria

The burden of animal influenza in Nigeria: prospects for early detection and control

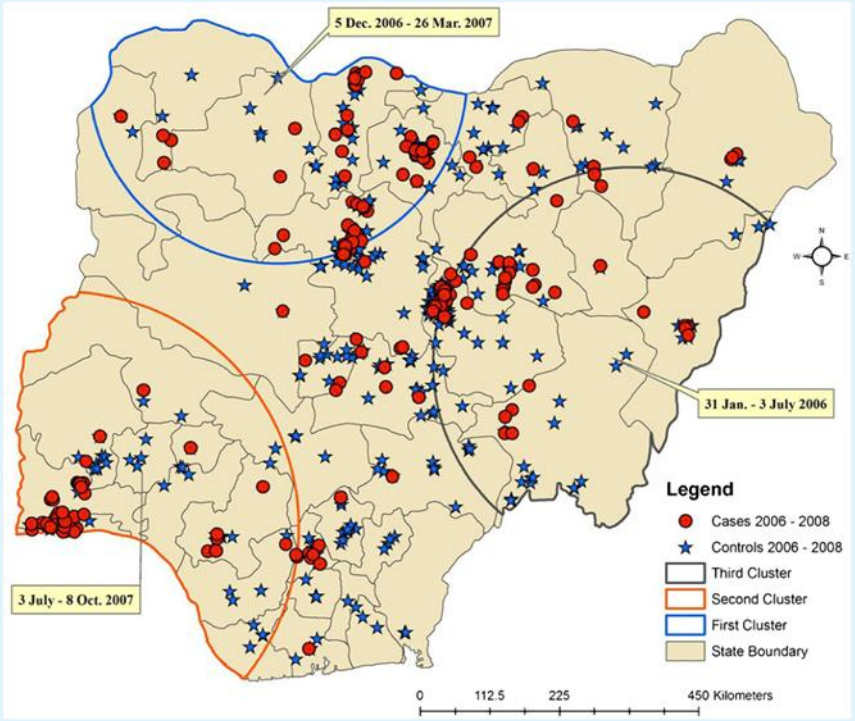
Nigeria:

- Nigeria's climate is a mixture of equatorial/tropical (south) and arid (north)
- Average annual rainfall of 50-430cm
- Temperature range 10-40°C
- 2 major seasons-wet rainy & dry cold harmattan

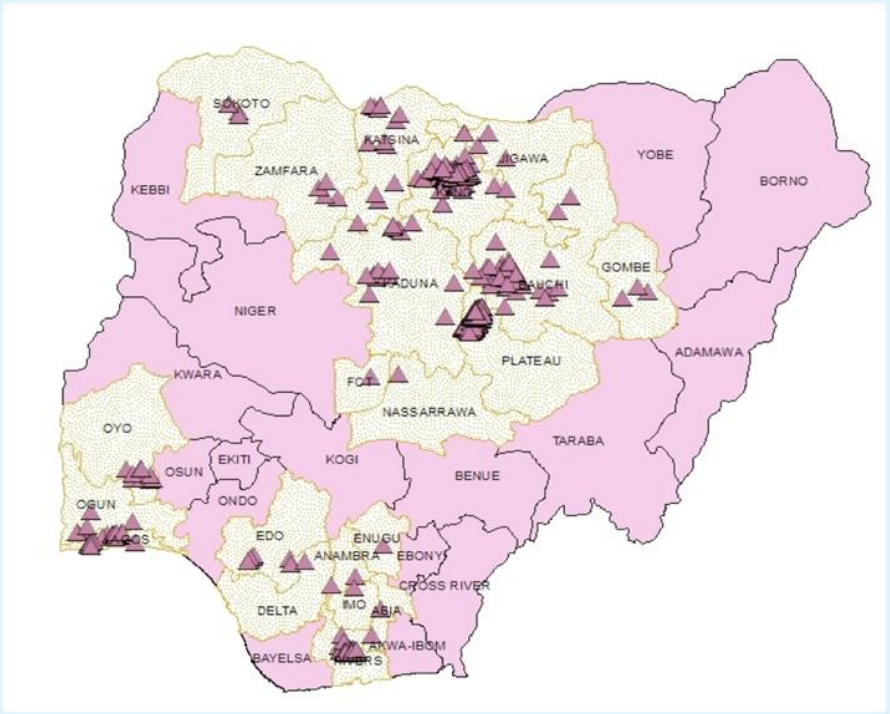
- Population:
  - >190 million people,
  - ≈160 million poultry
  - ≈10 million pigs

Spatial distribution of HPAI H5N1 cases in Nigeria

2006-2008 clades 2.2(1,2,3,4)

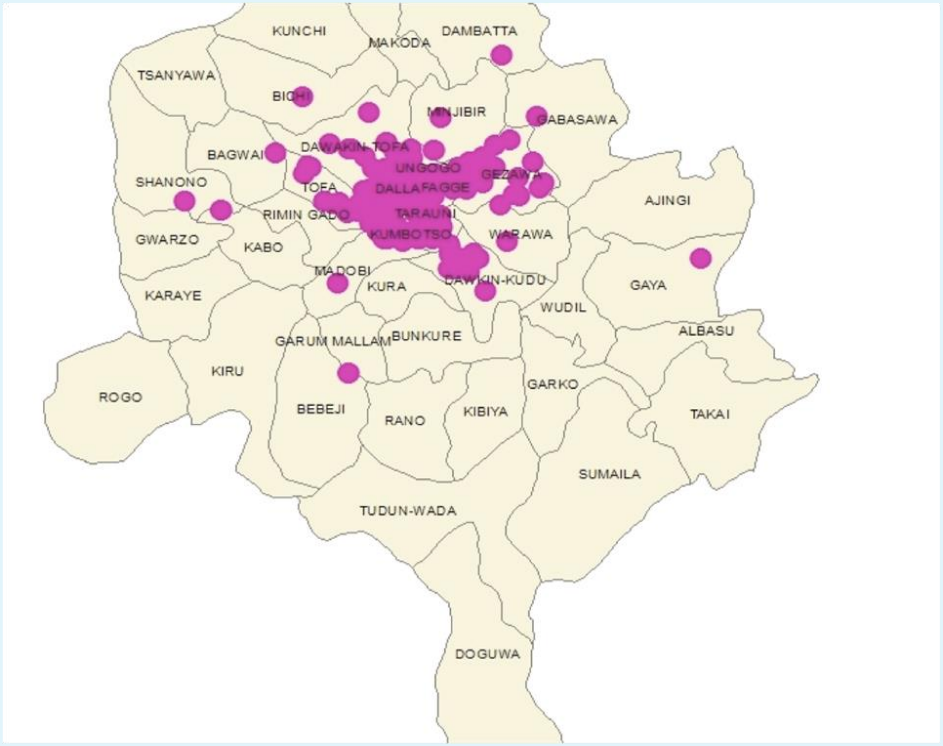


2015-2016 clade 2.3.2.1c

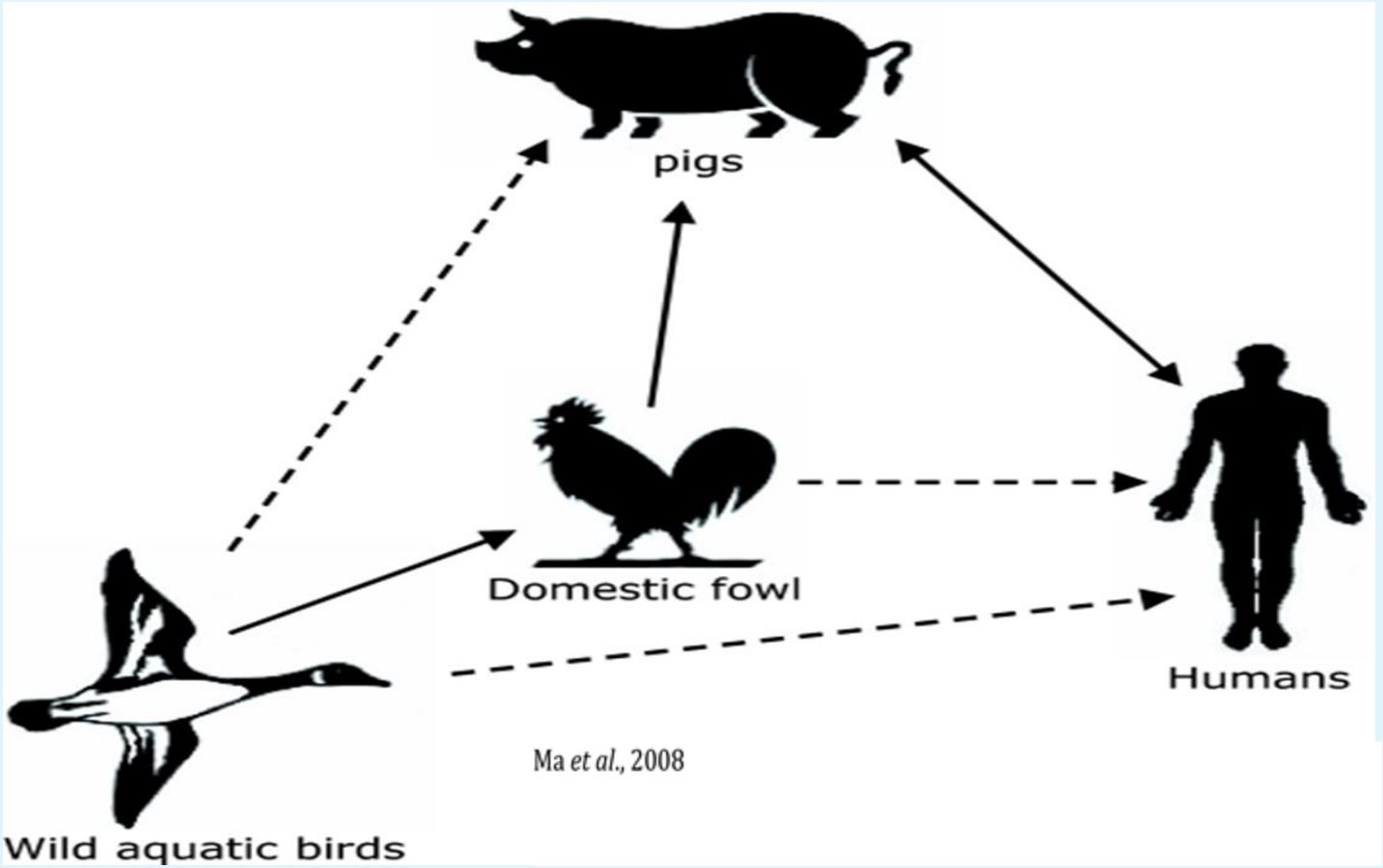


Nigeria (Kano/Plateau states axis) as regional hotspots of influenza

- Highest no of cases in 2006-2008 with repeats in 2015-2016
- Highest concentration of commercial poultry in northern Nigeria
- Largest source of local live bird trade in north–south direction



Cycles of inter species transmission of influenza virus



Swine influenza study

- >10 million pigs in Nigeria- 30% of pigs in Africa (FAOSTAT, 2013).
- ✓High density/confined commercial farms
- ✓live pig markets
- ✓Backyard farms
- ✓free roaming pigs

Swine influenza study in Africa

- H1N1pdm09 endemic in commercial pigs Nigeria (Meseko et al.,2014)
- H1N1pdm09 detected in Cameroon (Njabo *et al*.,) Kenya (Munya et al., 2015) Togo (Ducatez et al., 2015)

- Recent serology:
  antibody to H1N1pdm09 West & Central Africa (Snoeck *et al*., 2015)
  antibodies to H1N1pdm09, H1 and H3 in Nigeria (Meseko *et al*., 2016)

- H5 sequences from pigs in GenBank- Egypt
- Other genomic and serological investigation ongoing at FLI, Germany

What is known

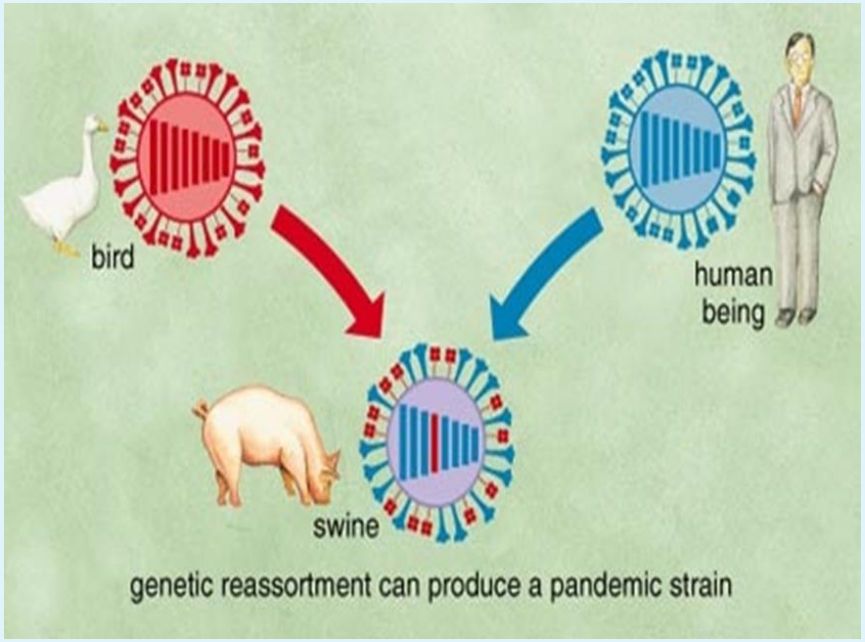
- Pigs central for the emergence of zoonotic influenza virus
- Nigeria is burdened by several outbreaks of:

✸avian H5 (Monne et al., 2015)

✸pigs harbors H1 (Meseko et al., 2013)

✸human seasonal H1 & H3 (David-West and Cooke, 1974)

- Interspecies reassortments of influenza in pigs may result in emergence of a zoonotic virus with pandemic potential



Risk of inter species transmission …

Pertinent questions:

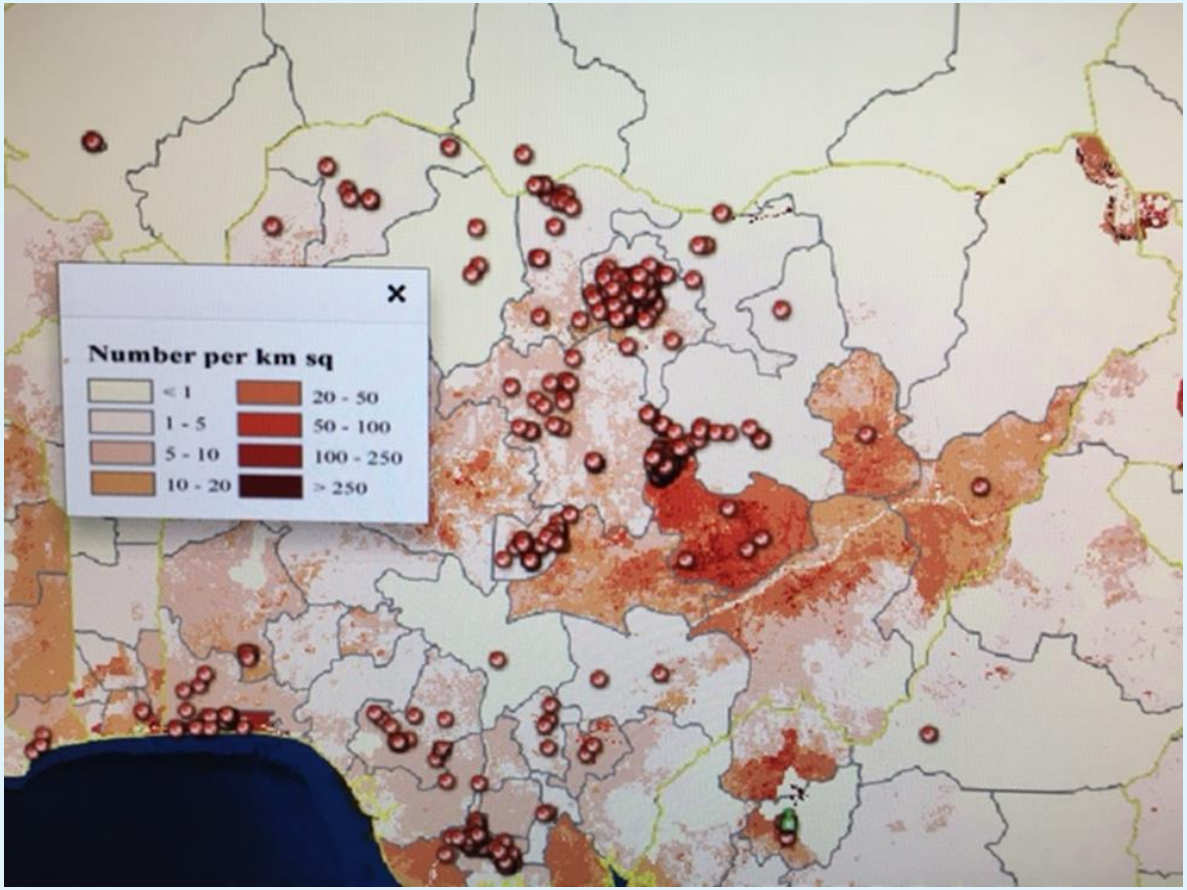
- Would co-mingling of avian, swine and human results in interspecies transmission of influenza and inter-subtype gene reassortment in pigs ?

Predictions of inter-subtype transmmission and re-assortments:

"Avian H5N1 subtype viruses do have the potential to acquire mammalian transmissibility by reassortment in current agricultural scenarios"- Zhang et al., 2013 Science

"We observed a relative increase in infectivity and transmission in swine of an HPAI-derived H5N1 following incorporation of H1N1pdm09 internal genes"- Abente et al., 2017 General Virology

Pig population density mapped on H5N1 hotspots (source: Empres-i)

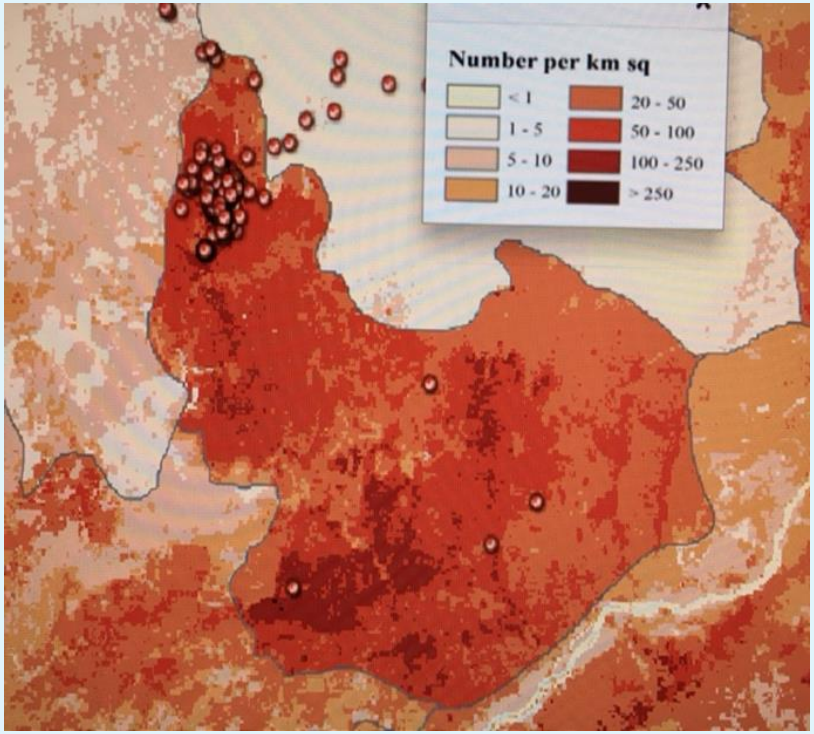


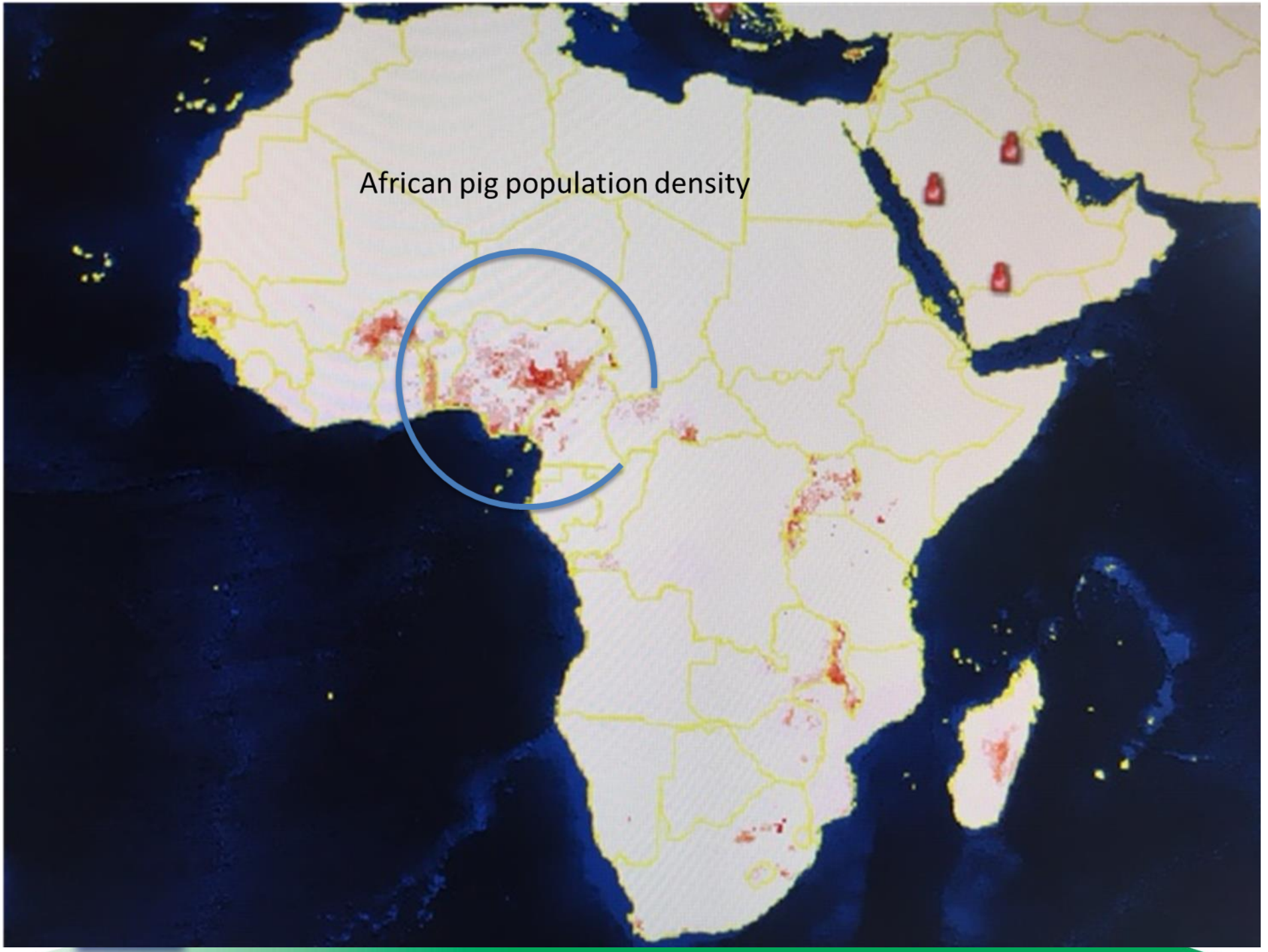
Sentinel surveillance in pigs

Research in progress:

- Risk based sentinel study in Nigeria

- Seasonal and yearly collections (Dec-February)



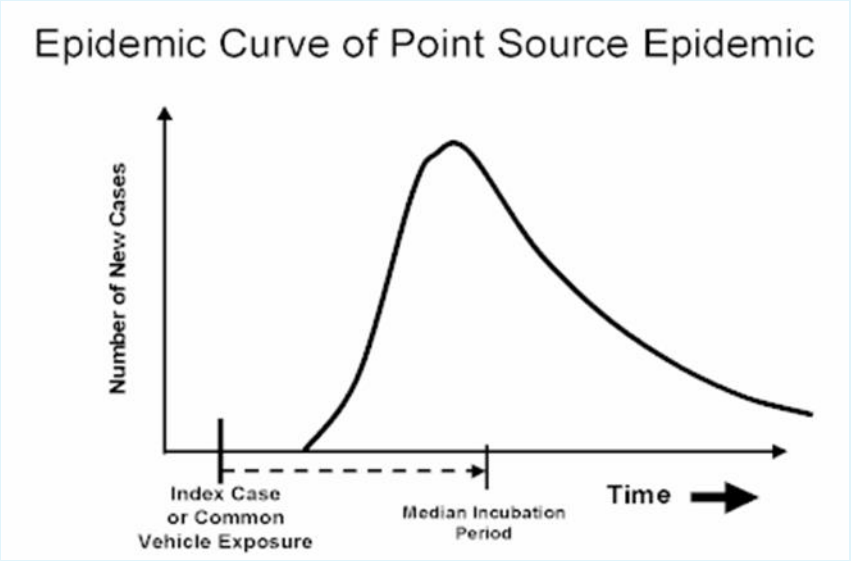

African pig population density

Conclusion

- The best public health action is before the onset of an epidemic, not during or after”

  - anonymous

- That time is now!



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OIE FAO
network of expertise on animal influenza