THE ROLE OF SENTINEL SURVEILLANCE IN THE DETECTION OF EMERGING INFECTIOUS DISEASE AT THE HUMAN-ANIMAL INTERFACE, NIGERIA

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Background

- Climate change, population growth and increase rural-urban migration put pressure on food production and peri-urban farming.

- Intensive livestock production in confined animal feeding operation (CAFO) increases intermingling between animals and human with public health consequences (Saenz et al., 2006).

- These animals are natural reservoir of infectious diseases that can be transmitted to human- zoonosis (Ma et al., 2008).

- Human being are also a source of infection or re-infection to animals- reverse zoonosis (Myers et al., 2007).
Background...

- About 13 zoonotic diseases cause **2.4 billion cases** of human illness and **2.2 million deaths** worldwide - more severe in Asia and Africa (ILRI, 2012)
- 60% of infectious diseases in human are zoonotic, and 75% of these diseases are emerging and re-emerging (OIE, 2012)
- Nigeria is one of the top 4 geographical hotspots of zoonotic disease globally with potential risks for emergence of novel or pandemic pathogens (ILRI, 2012)
- There are indeed high risk groups of zoonotic infections, more risky countries and farm practices that are more at risk
- Meanwhile, controls at the level of animal host is also considered the most cost effective way of solving myriad of problems associated with zoonotic diseases (WHO, 2012)
Background...

• Unfortunately there are not enough data to buttress prevalence of zoonotic pathogens in sub-Saharan Africa because disease reporting is scanty to none -why?

• It is not the absence of pathogens, but failure of detection-why?

• Current surveillance system is bedevil -weak infrastructures, little resources, etc.

• However, effective sentinel surveillance requiring less human and material resources that is focussed and targeted may be the solution, with several advantages

• Continuous monitoring of a population at risk over time may detect novel or emerging pathogen for prompt public health intervention
METHODOLOGY

• This sentinel surveillance was designed and implemented in an intensive urban piggery, identified as potential risk for emergence of zoonotic and pandemic influenza virus.

• It attempted to study the incidence of swine influenza in a specific cohort and geographical area over a period at the human-animal interface.
METHODOLOGY…

• The surveillance involved a small focus group of researchers, expending less human and material resources and in close contact with study population

• Clinical (cases of influenza-like illness) and epidemiological data were collected from pigs and human contacts monthly over 24 months

• Field work was regular, consistent and persistent

• Specimens collected were analysed by RRT-PCR and virus isolation in embryonated eggs
Aerial view of sampling location

GPS
6.413207 N
3.193127 E
Altitude
92 feet above sea level
Oke-Aro pig farm estate, Nigeria
Dicey and risky
Human
Avian
Swine
Movement
RESULTS

• 227 cases of influenza-like illness was observed in pigs over the period of study and 40 cases in pig handlers

• 31 (13.66%) of specimen analysed were positive by RRT–PCR, 29 (12.76%) were successfully isolated and 18 (8%) were identified as 2009 pandemic A/H1N1 influenza virus

• This represent the first detection and isolation of pandemic H1N1 in pigs in Nigeria and the second in Africa

• No virus was isolated in pig handlers
Figure(i): Monthly number of cases observed and number positive by real time RT-PCR.
DISCUSSION

• Prior to this sentinel surveillance, a couple of population based random surveillances were conducted nationwide by the Federal Livestock Department in pigs
• Another cross-sectional surveillance was co-sponsored by FELTIP-CDC program in the country, sampling pigs and human contact
• None of those was able to detect swine flu
• Reasons:
  - 1st surveillance was not focused on population at risk
  - 2nd surveillance was focused on population at risk but was not sustained.
• This investigation was focussed and sustained and it detected novel influenza virus
Advantages of sentinel surveillance

• This sentinel surveillance by a small focus group, expended moderate resources and achieved close monitoring over a period
• Provides effective alternative to population based surveillance
• Applied to subset of population identified as high risk of suspected infection
• Individual cases were observed and sampled
• Flexible and manageable with cooperation of pig farmers, pen attendants and other service providers in the farms
Advantages…

• Because of close monitoring and persistence, it was able to detect pathogen that could easily be missed by a more elaborate, fanned out and time limited surveillance

• This is one of the very few effective surveillance at the human-animal interface in Nigeria where both animals and animal handlers were monitored

• Disadvantage: result may not be generalized
Recommendation

• 2009 Pandemic A/H1N1 influenza virus was apparently transmitted from human to pigs as have been reported in many countries
• Re-transmission from pigs to human is also likely
• Genetic mutation and recombination of human and animal strains of influenza virus is a potential risk requiring close monitoring (sentinel surveillance)
• In addition, it is recommended that disease control measures such as biosecurity and vaccination should be targeted at this occupationally exposed group to avoid infectious spill to the larger community.

• **ONE FLU- ONE VACCINE- ONEHEALTH**
Acknowledgement.

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Oke-Aro pig farmers unions and cooperatives
Thank you

THANK YOU FOR YOUR ATTENTION
References


