OFFLU Swine Influenza Virus technical meeting
27 – 28 February 2019
OIE Headquarters, Paris, France

Clement Meseko
Chief Vet. Research Officer
Regional Lab for Animal Influenza &Transboundary Diseases
National Veterinary Research Institute
Vom Nigeria

Swine influenza surveillance: Nigeria and other sub-Saharan-African countries

- African countries have less number of pigs compared to Asia, Europe and America
- Nigeria, Ghana, Ugandan, Kenya have sizeable stock in intensive and free range husbandry
- **Important to note that less than optimal biosecurity and veterinary infrastructures make many cohort of piggery in Africa more likely source of pathogens emergence and circulation**
- Because swine influenza is yet to cause massive deaths (though may cause morbidity and economic looses); Stakeholders are yet to prioritise sustained surveillance for swine influenza in Africa

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Risk-based surveillance in slaughter slabs- 2016-2018

- H1N1pdm, H5N1 detected by qPCR, ELISA and HI in pigs, 2016- Nigeria
- H1N1pdm detected by PCR in pigs (2017, 2018)
  - Table 1: NP and H5 ELISA serology

Sera collection	ELISA					
	NP			H5		
	total	Pos	%	total	pos	%
Jos abattoir, 2016	300	183	61	183	42	22.9 (14)
Jos abattoir, 2013	100	15	15	15	0	0
Enugu slaughter slab, 2013	100	24	24	24	0	0
Total	**500**	**222**	**44.4**	**222**	**42**	**18.9 (8.4)**

*Scientific Reports volume **8**, Article number: 5900 (2018)*

Risk-based surveillance in slaughter slabs…

- Swine H1N1pdm, Avian H5N1 detected by PCR, ELISA and HI in pigs, 2016 Nigeria
- Swine H1N1pdm detected by PCR in 2017, 2018

- Table 2: HI serology for different swine flu strains

Antigens		Field sera ID (titre)													
Subtype	**Virus strain**	**353**	**186**	**30**	**24**	**100**	**202**	**15**	**56**	**286**	**72**	**48**	**129**	**204**	**293**
H1avN1av	A/sw/Germany/R1738/2011	80	40	160	20	80	40	20	20	160	40	160	160	40	40
H1huN2	A/sw/Germany/R2107/2010	40	20	640	40	80	10	20	80	40	40	80	20	20	20
H1N1pdm	A/sw/Germany/R26/2011	1280	1280	640	320	320	320	320	320	1280	640	1280	640	640	640
H3N2	A/sw/Germany/R96/2011	10	10	80	10	10	20	10	10	10	20	10	10	10	10

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Risk-based surveillance in slaughter slabs…

- Swine H1N1pdm, Avian H5N1 detected by PCR, ELISA and HI in pigs, 2016 Nigeria
- Swine H1N1pdm detected by PCR in 2017, 2018

- Table 3: HI serology for different H5 strains

		Sera ID					
Subtype/clade	**Virus strain**	**106**	**192**	**229**	**294**	**232**	**242**
H5N1 2.3.2.1c	A/Dubai/AR/3435/14	640	640	1280	160	320	320
H5N8 2.3.4.4.b	A/Tufted duck/AR/8444/16	10	10	10	10	10	10
H5N1 2.2.	A/Whooper swan/Germany/R65/2006	40	10	10	160	20	80
H5N3	A/Common teal/England/7894/2006	80	80	640	320	160	320

*Scientific Reports volume **8**, Article number: 5900 (2018)*

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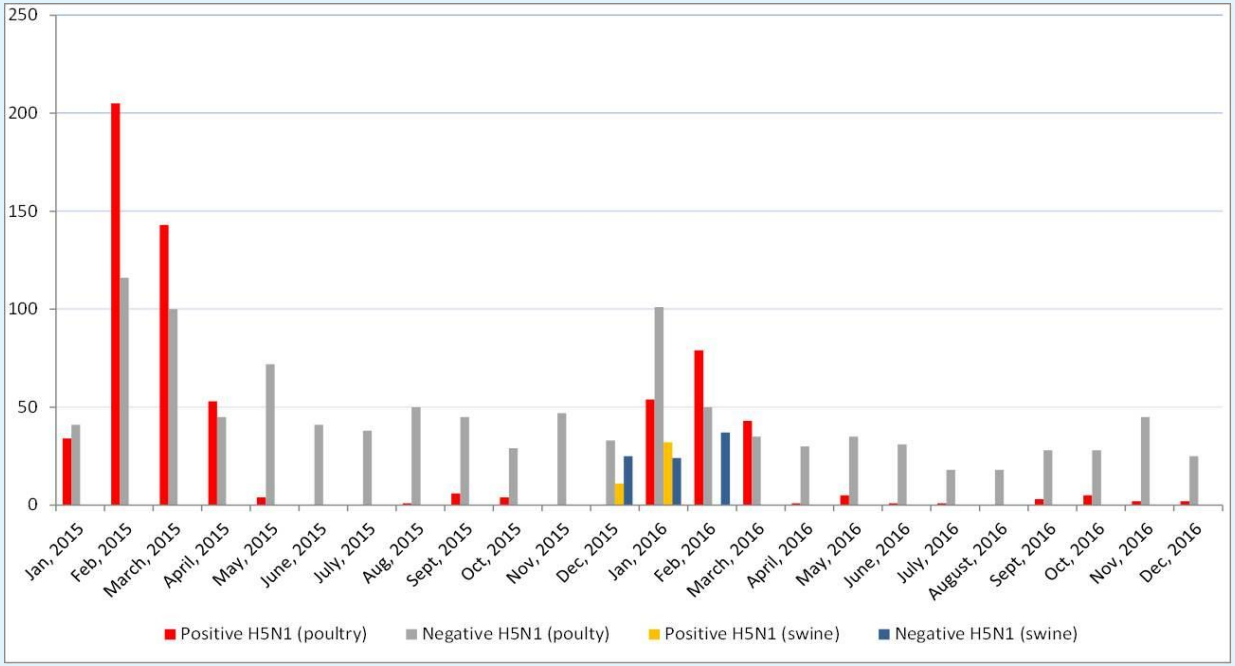
Risk-based surveillance in slaughter slabs…

- Swine H1N1pdm, Avian H5N1 detected by PCR, ELISA and HI in pigs, 2016 Nigeria
- Swine H1N1pdm detected by PCR in 2017, 2018

- Epidemiology



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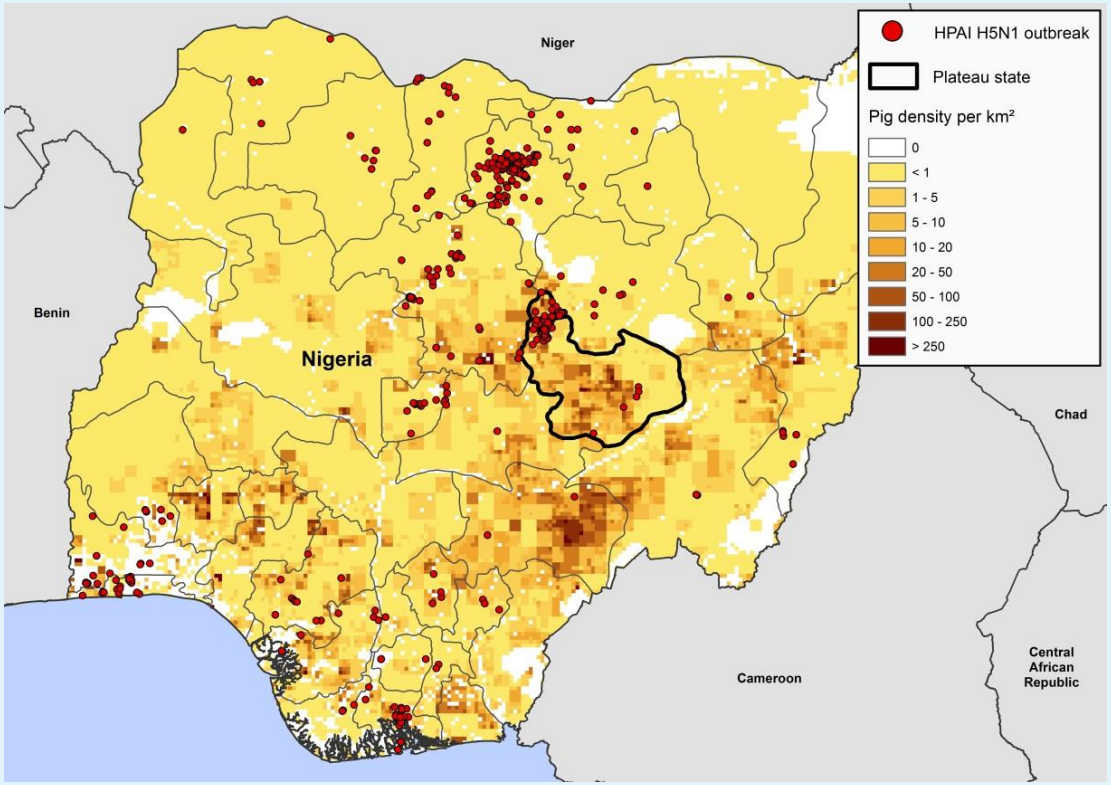
Risk-based surveillance in slaughter slabs…

- Swine H1N1pdm, Avian H5N1 detected by PCR, concurrently by ELISA and HI in pigs, 2016 Nigeria
- Swine H1N1pdm detected by PCR in 2017, 2018
- Spatial Epidemiology:



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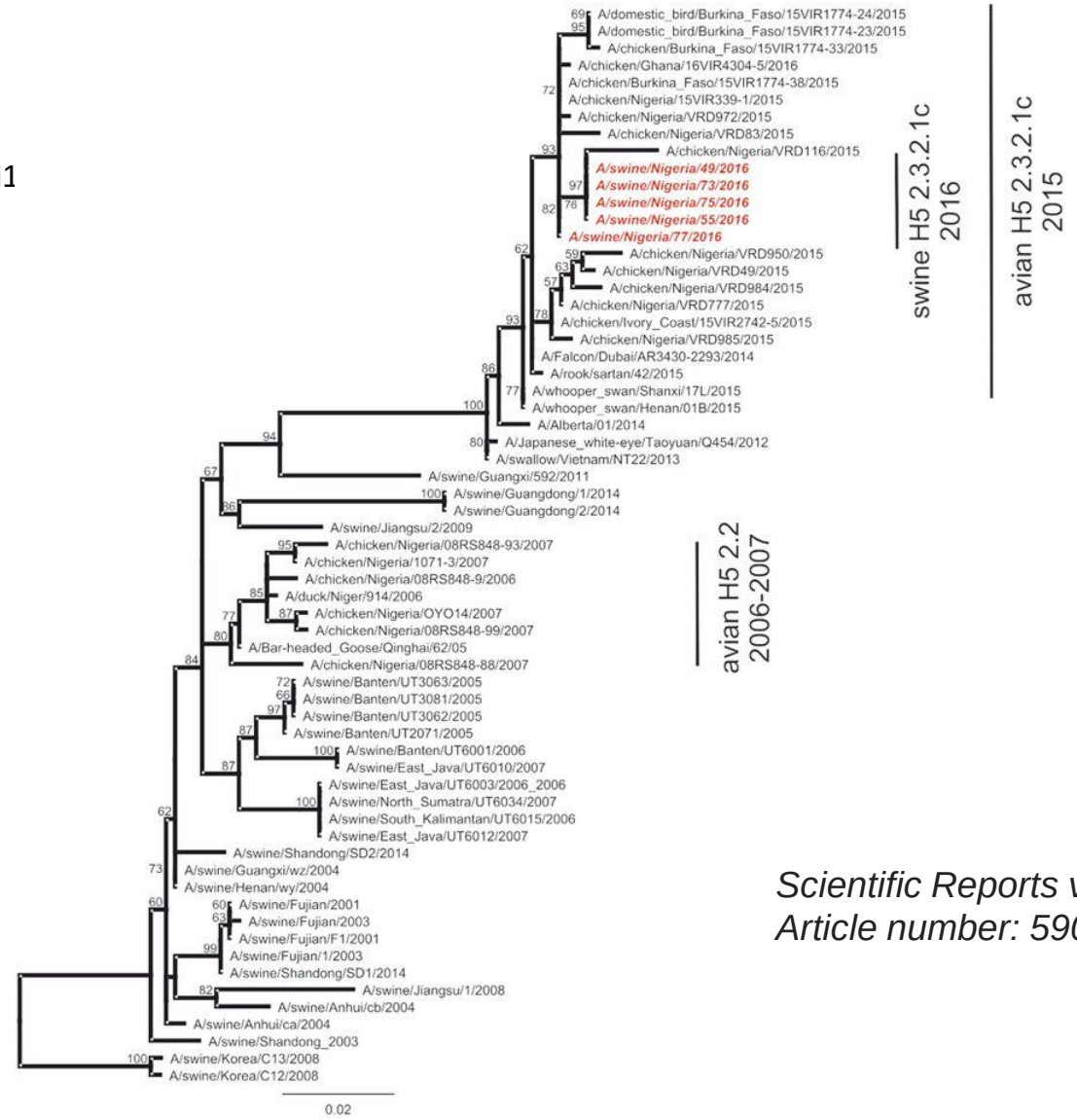
Phylogenetics of H5 from pigs

- H5N1



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Risk-based surveillance in slaughter slabs…

The potential for interspecies transmission and genetic reassortment of influenza in pigs require further surveillance and monitoring especially in Africa where co-mingling occurs

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Risk-based surveillance in slaughter slabs… ongoing investigation

- From Dec 2018 to Feb 2019, about 100 tracheal and lung tissues were collected from pigs at a sentinel site (slaughter house)
- 70 specimens have been analysed by RT-PCR for matrix gene out of which 12 (17%) are positive for flu A
- Further analysis- PCR, sub typing and isolation in progress

Risk-based surveillance in mixed species farms

- We identified some farms with pigs and poultry in the same premises, such farms are under surveillance (Ijomanta & Asala)
- Already some samples collected from **asymptomatic chickens and pigs were positive for flu A matrix gene by RT-PCR** …

Events in other countries in Africa

- Ghana- H1N1pdm- 4 deaths and 44 hospitalised, Dec 2017: The Ministry of Health announced that samples from Kumasi Academy students sent to the Noguchi Memorial Institute tested positive for the pandemic strain of influenza type A, H1N1 2009 also known as Swine Flu.Cameroon-
- The 2009 pandemic **influenza** A/H1N1 virus, A(H1N1) pdm09, detected in Nigerian and **Ghanaian pigs was described by** Adeola et al., 2015- by antigen capture ELISA, prevalence of 8% in Ibadan and 10% in Kumasi was reported.

- Egypt (Gomma et al., 2018) - Showed evidence of infection of pigs with avian, human, and swine influenza viruses in Cairo, Egypt-
- The investigators found virological evidence of infection with avian H9N2 and H5N1 viruses as well as human pandemic H1N1 influenza virus

Conclusion

- Many countries in Africa keep pigs in sizeable number
- While biosecurity may reduce incidence of swine influenza in America and Europe… lack of it may aggravate swine influenza circulation in Africa
- Many pigs are on free range in addition to intensive farming system thereby increasing contact with other animals (feral birds, waterfowls, dogs, horses, donkeys etc) thus bringing to fore the potential for interspecies transmission
- Hotspots have been defined; ….area with potential for repeated outbreaks of disease… Nigeria have avian, swine, human and equine influenza within a decade
- Pigs are still the traditional mixing vessel to be monitored in the region.

- THANK YOU FOR LISTENING

Acknowledgment

- Grateful to…

NATIONAL VETERINARY RESEARCH INSTITUTE, VOM. NIGERIA

Unterstützt von / Supported by

Alexander von Humboldt Stiftung/Foundation

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