OFFLU Technical Meeting

Coordinating world-wide surveillance for influenza in swine

University of Minnesota, Minneapolis, USA
March19-20, 2014

Brazil update

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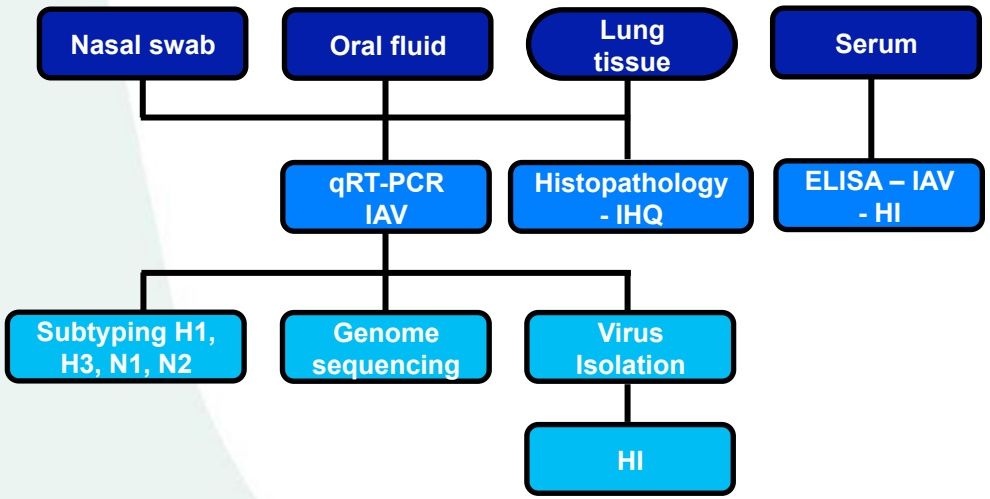
Embrapa Swine and Poultry Research Center

INFLUENZA A VIRUS INFECTION IN SWINE HERDS IN BRAZIL IN 2009 – 2012

Embrapa Swine & Poultry

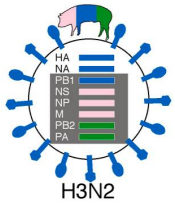
Commercial farms 2010-2011*	Captive wild pig	Feral Pigs	Diag. Lab – CEDISA 2009-2012
- Serum, NS, OF - 62 farms - 375 NS pools - 1875 samples	- 60 lung tissue samples	- Serum, NS, GS - 152 samples	- 86 lung tissue samples



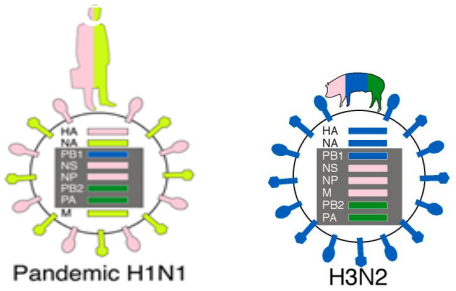
*87% of swine production

❖ 13 Farrow-to-finish farms (HI results):

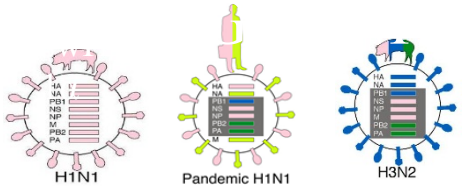
❖ Antibodies against **H3N2**: 4 farms



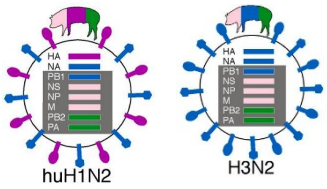
❖ Antibodies against **H1N1pdm09** and **H3N2**: 5 farms



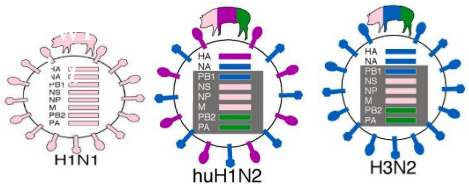
❖ Antibodies against **H1N1**, **H1N1pdm09** and **H3N2**: 2 farms



❖ Antibodies against **H1N2** and **H3N2**: 1 farm



❖ Antibodies against **H1N1**, **H1N2** and **H3N2**; 1 farm



Viral isolation samples

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- **From lungs or nasal swabs: total of 68 IAV**
- Nasal swabs: 107/10, 83/10, 72/11.

  Total: 03 samples
- Lungs: 104/09, 12a/10, 83/10, 89/10, 107/10, 131/10 (2 samples), 136/10, 170b/10 (2 samples), 170c/10, 170d/10, 170e/10 (3 samples), 170f/10, 170h/10, 31/11 (2 samples), 66/11, 70/11, 71/11, 85/11, 95/11, 138/11, 146/11, 146b/11, 152/11, 173/11, 18/12, 37/12 (6 samples), 42/12, 198/12 (10 samples), 263/12, 93/13, 119c/13, 137c/13, 183/13 (5 samples). **Total: 65 samples**

**** In green = genome sequencing data***

Genome Sequencing

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- Sequencing data for HA, M and NA (some genomes with complete genome, other partial sequencing).

37 samples sequenced:

- **HA, NA and M segments: 18 samples**
- **NA and M segments: 10 samples**
- ***Eight gene segments: 9 samples.**

Illumina platform (MiSeq)

Genomic Sequencing of HA, NA and M - 2009-2011

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IAV Sample	Subtype	HA	NA	M
A/swine/Brazil/107-3A/2010	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/72-11-507/2011	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/132-09/2009	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/12A10/2010	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/136-10/2010	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/173-11-4/2011	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/170h-10/2009	H1N1	H1N1pdm09	H1N1pdm09	H1N1pdm09
A/swine/Brazil/31-11-1/2011	H1N2	H1δ	N2	H1N1pdm09
A/swine/Brazil/31-11-3/2011	H1N2	H1δ	N2	H1N1pdm09
A/wild boar/Brazil/214-11-13D/2011	H1N2	H1δ	N2	H1N1pdm09
A/swine/Brazil/185-11-7/2011	H1N2	H1δ	N2	H1N1pdm09
A/swine/Brazil/232-11-13/2011	H1N2	H1δ	N2	H1N1pdm09
A/swine/Brazil/232-11-14/2011	H1N2	H1δ	N2	H1N1pdm09
A/swine/Brazil/365-11-6/2011	H3N2	H3	N2	H1N1pdm09
A/sw/Brazil/355-11-6/2011	H3N2	H3	N2	H1N1pdm09
A/sw/Brazil/365-11-7/2011	H3N2	H3	N2	H1N1pdm09
A/swine/Brazil/231-11-1/2011**	H3N2	H3	N2	H1N1pdm09

**In the same farm it was identified H3N2, H1N1pdm09 and H1N2

Feral pigs and Captive wild boar

N. Biondo, 2012

Captive wild boars

Contents lists available at ScienceDirect

Veterinary Microbiology

journal homepage: www.elsevier.com/locate/vetmic

Genomic analysis of influenza A virus from captive wild boars in Brazil reveals a human-like H1N2 influenza virus

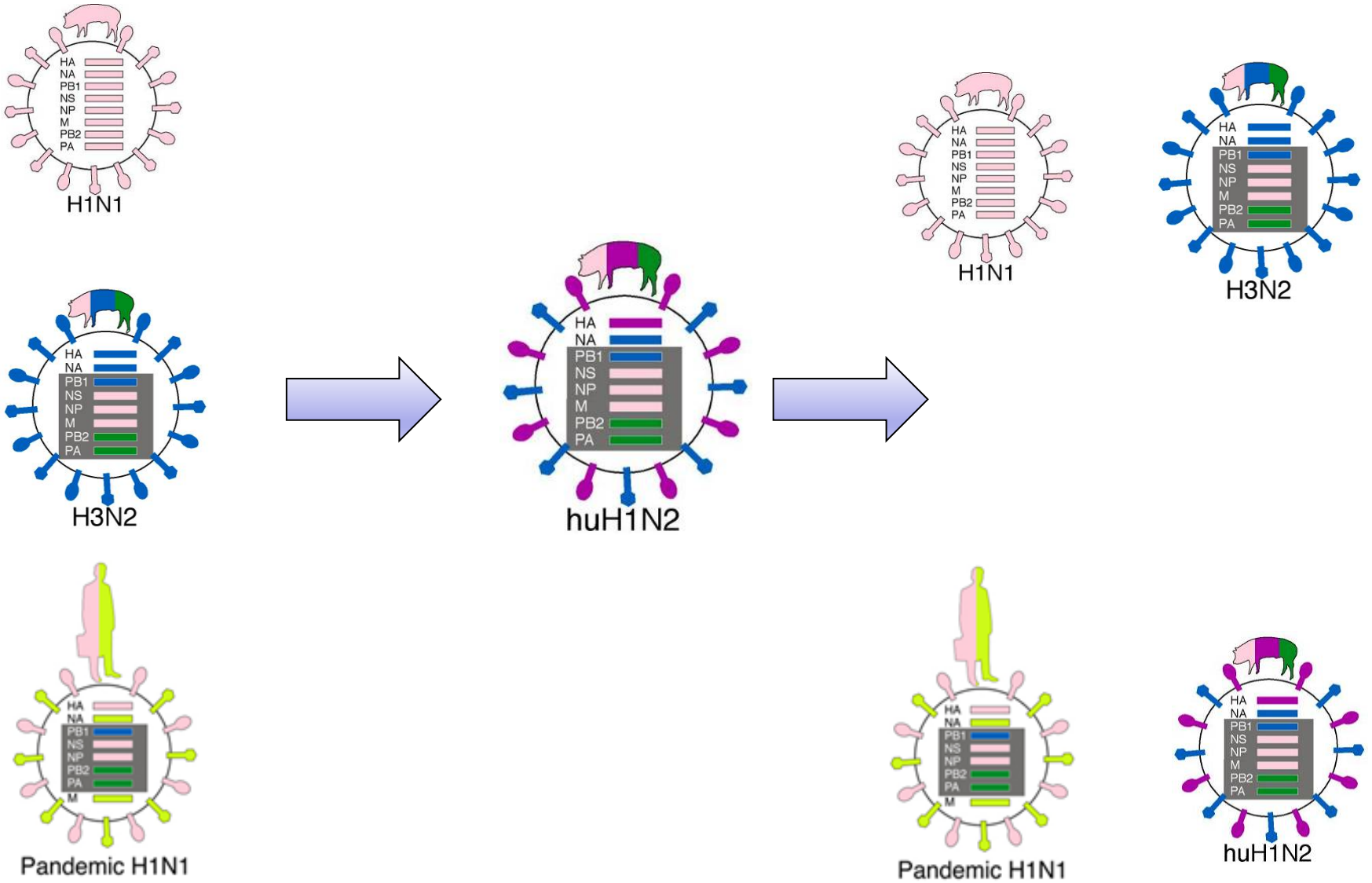
Natalha Biondo [a], Rejane Schaefer [b,*], Danielle Gava [b], Mauricio E. Cantão [b], Simone Silveira [b], Marcos A.Z. Mores [b], Janice R. Ciacci-Zanella [b], David E.S.N. Barcellos [a]

- HA and NA δ cluster
- Internal genes derived from H1N1pdm09

Table 1
Most closely relatives to A/wild boar/Brazil/214-11-13D/2011 determined by BLAST search at NCBI (http://www.ncbi.nlm.nih.gov/blast/Blast.cgi).

Gene	GenBank accession number	Isolate	Subtype	Identity (%)
PB2	CY122668.1	A/Singapore/GP1132/2009	H1N1	99
	CY122700.1	A/Singapore/GP1146/2009	H1N1	99
PB1	CY055303.1	A/Singapore/GN285/2009	H1N1	99
	CY053625.1	A/Russia/165/2009	H1N1	99
PA	KC833448.1	A/swine/Thailand/UD400/2009	H1N1	99
	CY045233.2	A/Taiwan/126/2009	H1N1	99
HA	CY125172.1	A/New York/26/2002	Mixed	97
	CY003696.1	A/New York/489/2003	H1N2	97
NP	CY045235.2	A/Taiwan/126/2009	H1N1	99
	HQ728111.1	A/swine/Taiwan/CH-1204/2009	H1N1	99
NA	AF533744.1	A/Neuquen/V690/98	H3N2	96
	AF533741.1	A/Cordoba/V391/98	H3N2	96
M	CY069644.1	A/Singapore/527/2009	H1N1	99
	CY069629.1	A/Singapore/471/2009	H1N1	99
NS	CY050371.1	A/Korea/S1/2009	H1N1	100
	GU108490.1	A/Zhejiang-Yiwu/11/2009	H1N1	100

Before 2010 After 2010



Thank you

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Ministry of Agriculture, Livestock and Food Supply

BRAZILIAN GOVERNMENT BRASIL