Diagnostic activity in Italy, present and future perspectives

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WOAH Reference Laboratory



for swine influenza



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Introduction of IZSLER







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The Italian Experimental Zooprophylactic Institutes (II.ZZ.SS) network, with their 10 headquarters and 90 peripheral diagnostic sections, are an important operational tool available to the National Health Service to ensure

- epidemiological surveillance,
- experimental research,
- training of personnel,
- laboratory support diagnostics in the context of official control of foodstuffs



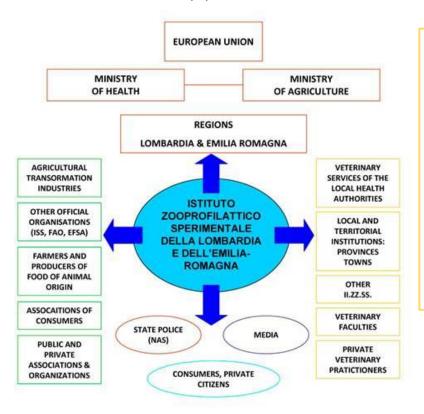
IZSLER works for....,

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the European Union,
 Ministries and the Regions
 that issue guidelines which
 must be followed by the
 Institute

• private entities, such as organizations and associations that are directly concerned with Institute activities and which benefit from the services provided



the Public authorities, the other Experimental
 Zooprophylactic Institutes, the Veterinary services of the local Health
 Authorities which collaborate technically and scientifically with the Institute to complete functions related to hygiene and veterinary public health

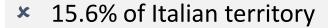
 citizens and consumers who are common stakeholders for the proper operation of the Institute and therefore the protection of the healthiness of foodstuffs, animal hygiene and health and animal products, as well as environmental hygiene

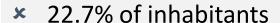


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offlu						
WOAH	FAO					
network of expertise on animal influenza						

Jurisdiction Area	LOMBARDIA	EMILIA ROMAGNA		
Km ²	23,863	22,456		
Municipalities	1527	334		
Inhabitants	10,103,869	4,467,118		
ASL (Sanitary Districts)	8	8		









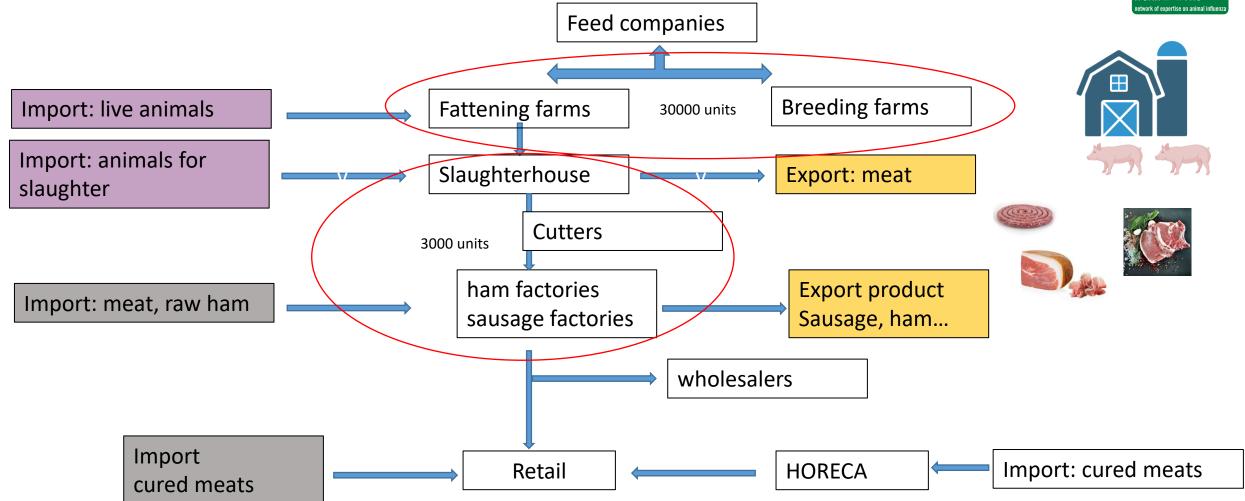
- 24.5% of farmed animals (35% of cattle, 62% of pigs (5 million of pigs), 10% poultry)
- **★** 1.42 pigs/10000 inhabitants
- >70% pigs e about 35% of bovine slaughtered at national level
- ✗ About 40% of Gross National Product (GNP)



Pig production chain

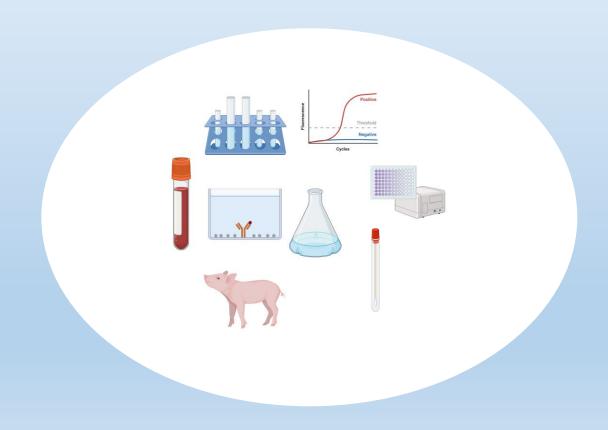
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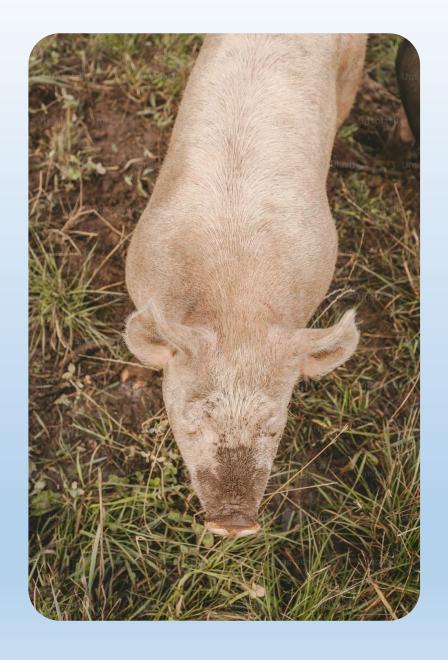






IZSLER Diagnostic activity



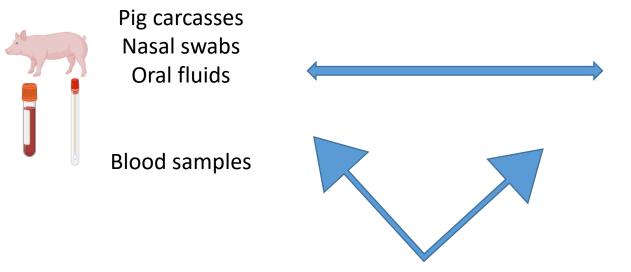




Swine influenza viruses sources



Routine diagnostic submissions to IZSLER laboratories: NO National surveillance plan in pigs



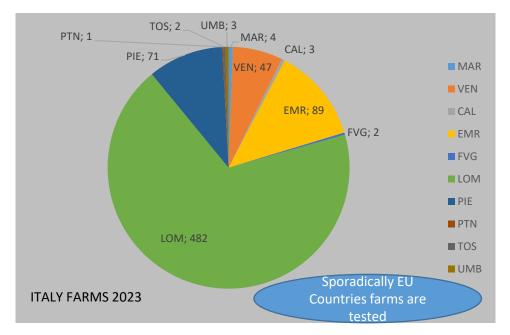
Field veterinarians
Private companies

Virological diagnosis Serological diagnosis ????

Deep virological investigations Italian/EU National funding for research purpose



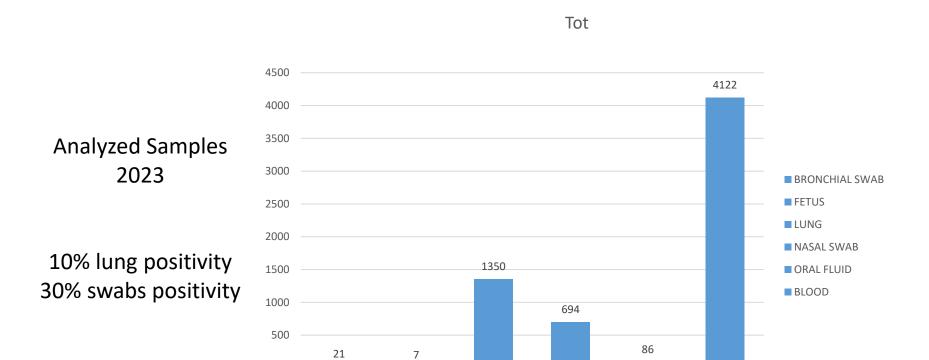








Swine influenza viruses sources: passive surveillance



LUNG

NASAL SWAB

ORAL FLUID

VIROLOGICAL DIAGNOSIS

FETUS

BRONCHIAL

SWAB

SEROLOGY

BLOOD



Laboratory diagnosis

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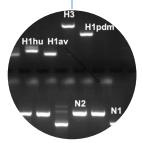
histopathology

One-step real-time RT-PCR -Screening





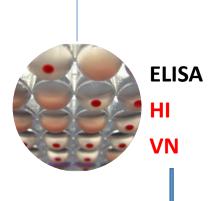
Molecular characterization



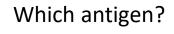
Subtyping PCR/NGS Genomic sequencing

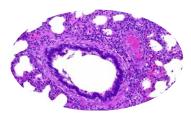






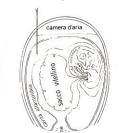
Serum

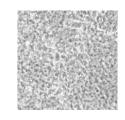




VS







- Confirmation
- ► HA/ELISA
- ► HI
- ► PCR/NGS



Subtype_HAclade_NA_PB2_PB1_PA_NP_MP_NS

72	В	H3N2_H3[84]_N2g_av_av_av_av_av_av							
H3N2	36	H3N2_H3[2010]_It-N2_av_av_av_av_av_av							
H1N2		H1N2_1C.2.4_N2g_pdm_pdm_pdm_pdm_pdm_pdm							
	\vdash	H1N2_1C.2.2_N2g_pdm_pdm_pdm_pdm_pdm							
		H1N2_1A.3.3.2_N2g_pdm_pdm_pdm_pdm_pdm_pdm							
	~	H1N2_1A.3.3.2_2009_N2g_pdm_pdm_pdm_pdm_pdm_pdm							
	ш	H1N2_1B.1.2.2_It-N2_av_av_av_av_av_av_av							
	ш	H1N2_1B.1.2.1_N2g_av_av_av_av_av_av							
		H1N2_1C.2.5_N2g_av_av_av_av_av_av							
	_	H1N2_1C.2.4_N2g_av_av_av_av_av_av							
	Ω	H1N2_1C.2.2_N2g_av_av_av_av_av							
		H1N2_1C.2.1_N2g_av_av_av_av_av							
	AH	H1N2_1C.2.4_N2g_pdm_pdm_pdm_pdm_pdm_av							
	38	H1N2_1A.3.3.2_N2g_pdm_pdm_pdm_pdm_pdm_av							
	35 38 AH	H1N2_1C.2.4_N2g_pdm_av_pdm_pdm_pdm							
	33	H1N2_1C.2.4_N2g_av_av_av_av_pdm_av							
	26	H1N2_1C.2.4_lt-N2_av_av_av_av_av							
	9	H1N2_1C.2.4_lt-N2_av_av_av_av_av							
	S	H1N1_1A.3.3.2_N1av_pdm_pdm_pdm_pdm_pdm_pdm							
	۵	H1N1_1A.3.3.2_N1pdm_pdm_pdm_pdm_pdm_pdm_pdm							
	Σ	H1N1_1C.2.5_N1av_av_av_av_av_pdm_av							
	_	H1N1_1C.2.2_N1av_av_av_av_av_pdm_av							
H1N1		H1N1_1C.2.5_N1av_av_av_av_av_av_av							
	⋖	H1N1_1C.2.2_N1av_av_av_av_av_av_av							
	_	H1N1_1C.2.1_N1av_av_av_av_av_av_av							
		H1C.2.4_N1av_av_av_av_av_av_av							
	39	H1N1_1A.3.3.2_N1av_pdm_av_pdm_pdm_pdm_pdm							
	37	H1N1_1A.3.3.2_N1av_pdm_pdm_pdm_pdm_av_av							
	34	H1N1_1C.2.5_N1av_pdm_pdm_pdm_pdm_pdm_av							
		H1N1_1C.2.1_N1av_pdm_pdm_pdm_pdm_pdm_av							
	31	H1N1_1A.3.3.2_N1av_pdm_pdm_pdm_pdm_pdm_av							
		0	00%	5,00	%	10,00%	15,009	2/6	20,0
		0,	00/0	2,00	, -	_0,0070			,

~100 sequenced strains/year Deep investigation allow us to identify high variability

What about serological investigation?



The National influenza pandemic plan



Multidisciplinary network of experts called DISPATCH

(epiDemic Intelligence, Pandemic Scenarios, risk assessment)

Ministry of Health
Coordinator

RespiVirNet Network

Italian network for epidemic intelligence

Regional contacts

Public health contacts

Relevant institutions (university, microbiology associations, research institute, IZSS)





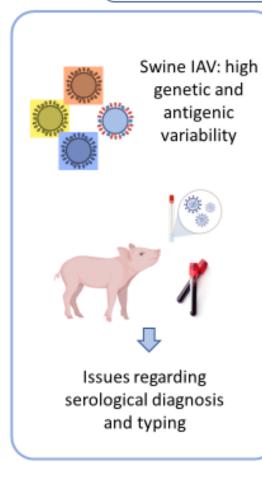
Future perspectives

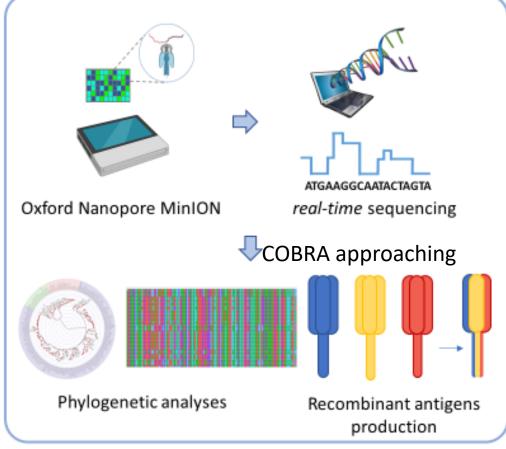


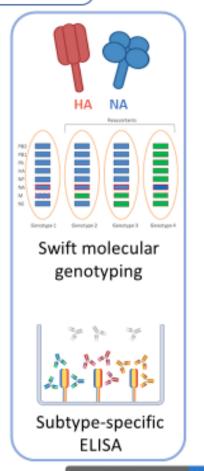
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Chasing variability: development and application of new diagnostic strategies of molecular and serological genotyping for swine influenza viruses











Thank you

Special thanks to the swine influenza team:

Alice Prosperi

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Ada Mescoli

Irene Zanni

Laura Baioni

Andrea Luppi

