

Strategic directions of GISN development at national level

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GISN-WHO

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Hammamet-Tunisia

02/12/2010

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Influenza Laboratory Surveillance National Laboratory Network for Influenza and Other Respiratory Viruses (1997-2009)

1^o level: Hospitals: laboratory diagnosis by IF
Flu A, Flu B, RSV, ADV, PIV



2^o level: National Influenza Center
Confirm diagnosis, perform viral isolation and subtyping,
molecular studies, antiviral resistance
FLU A (H3N2-H1N1), FLU B, pandemic virus



3^o level CCs WHO
Complete molecular and antigenic studies



WHO

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National Laboratory Network for Influenza and other Respiratory Viruses

Activities at the laboratories with clinical and epidemiological profit:

- Perform rapid diagnosis of respiratory viruses
- Inform results to physicians
- Inform results in the informatic system Nation wide connected (SIVILA) accessed by a unique key in the node
- Send influenza A and B positive samples to the NIC to complete virological information and contribute with GISN

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National Laboratory Network for Influenza and other Respiratory Viruses

National Reference Laboratory (NIC Buenos Aires)

Responsibilities

- Study antigenically and genetically influenza samples from the Network
- Inform the results to SIVILA (National) PAHO and Flunet
- Send influenza isolates to CCs
- Detect new viruses and variants related with outbreaks to keep informed health authorities
- Perform training and quality control to laboratories in the Network
- Perform other studies as sequencing, antiviral resistance or serology.

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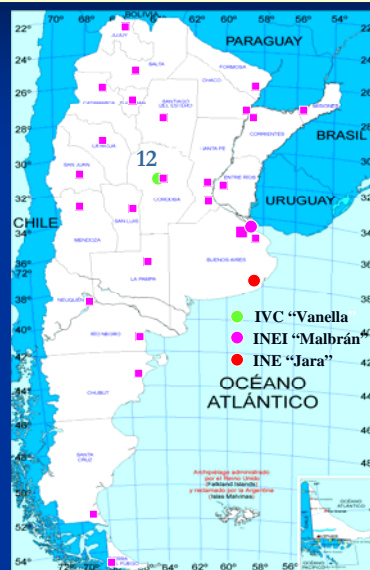
National Laboratory Network for Influenza and other Respiratory Viruses

- **March 2009** (before pandemic)
- N° laboratories in the Network: 33
- Diagnostic technique: IF
- N° Provinces: 21/23 + Buenos Aires City
- Lab. with PCR capacity for influenza: 3 NICs + 2
- Lab. with PCR capacity for other viruses: 12

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National Laboratory Network for influenza and Respiratory Viruses – June 2009-March 2010



June 2009 Pandemic peak: 3 workshops on influenza PCR diagnosis directed to labs with previous experience on PCR

March-April 2010: incorporate 3 provinces with any diagnostic technique

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National Laboratory Network for Influenza and other Respiratory Viruses

- **March 2009** (before pandemic)
 - Nº laboratories in the Network: 33
 - Diagnostic technique: IF
 - Nº Provinces: 21/24 + Buenos Aires City
 - Lab. with PCR capacity influenza: 3 NICs + 2
 - Lab. with PCR capacity other viruses: 12
- **March 2010** (post-pandemic reorganization)
 - Nº laboratories in the Network: 50
 - Diagnostic techniques: IF and PCR
 - Lab. with PCR capacity for influenza:
 - conventional PCR: 7
 - real time PCR: 19 (most of them concentrated in Buenos Aires city and Buenos Aires province)

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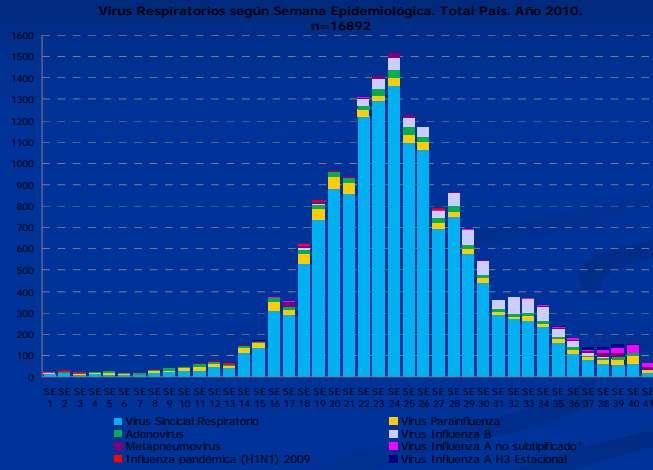
Influenza molecular diagnosis July 2010

- **New equipment (real time PCR) provided by MoH to 12 provinces**
- **Training on real time PCR (performed at NIC) June 2010**
- **Provision of reagents (MoH) and RNA controls (NIC) for A(H1N1) pdm**
- **12 students (12 Provinces)**

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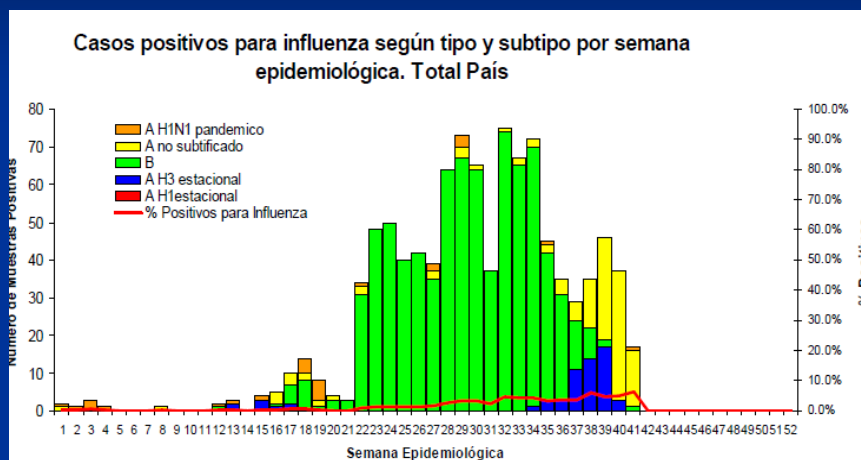
Detection of respiratory viruses by laboratory diagnosis (SIVILA) EW 42 - 2010



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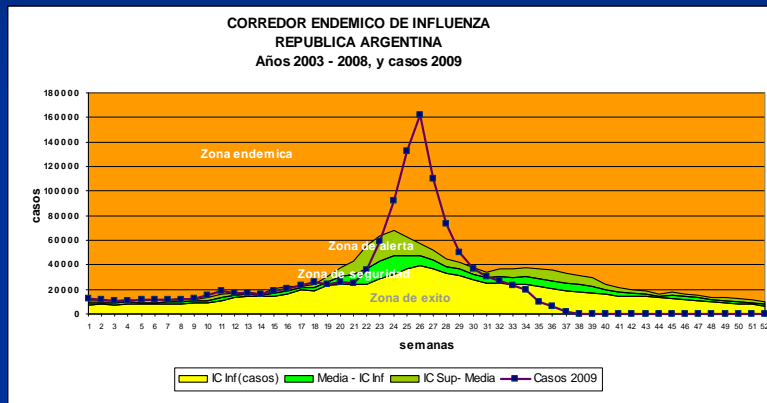
Influenza laboratory diagnosis informed in SIVILA Argentina 2010



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ILI notification – 2009 Endemic corridor 2003-2008

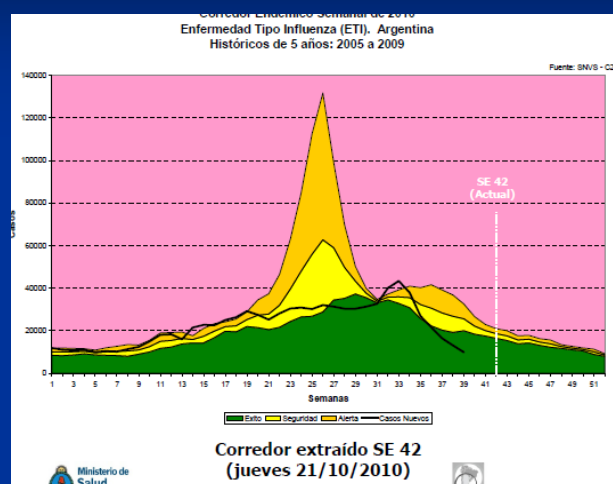


SINAVE – Min. Salud

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ILI notification – 2010 Endemic corridor 2005-2009



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New capacities in the NIC

- First detection (April 2009) of influenza A (H1N1)pdm by viral isolation on MDCK cells in BSL3 facilities and sequencing
- Full genome sequencing, species jumping events, in Collaboration with Columbia University (USA) and Instituto Nacional de Tecnologia Agropecuaria (INTA Argentina).
- Antiviral resistance by pyrosequencing and phenotypic studies in collaboration with Health Protection Agency (UK) and Oswaldo Cruz Institute (Brazil)

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Antiviral Resistance to Oseltamivir

Nº of Argentinean strains sensitive and resistant detected by IC50 and pyrosequencing (2005-2010):

Strains	H1		H3		B	
	S	R	S	R	S	R
YEAR	S	R	S	R	S	R
2005	0	0	4	0	0	0
2006	4	0	0	4	0	0
2007	0	0	0	24	0	0
2008	8	0	0	1	0	0
2009	54	1	3	0	0	0
2010	0	0	10	0	15	0
TOTAL	64	1	17	29	15	0

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Seroepidemiological post-pandemic study of influenza A (H1N1) pdm virus in two populations of adults and children from Buenos Aires, Argentina.

Age (years)	positives	negatives	total	%positives
1-4.9	10	13	23	43,48%
5-9.9	25	15	40	62,50%
10-14.9	33	16	49	67,35%
≥ 15	20	23	43	46,51%
	88	67	155	56,77%
18-19.9	8	4	12	66,67%
20-29.9	30	88	118	25,42%
30-39.9	24	94	118	20,34%
40-49.9	11	58	69	15,94%
50-59.9	2	63	65	3,08%
60-69.9	1	25	26	3,85%
≥ 70	2	9	11	18,18%
	78	341	419	18,62%

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Work plan 2 years

- **At the Network:**
 1. Shift Flu A MD diagnosis to Flu A + Flu B
 2. Improve labs performance taking into account the new format and components
 3. Quality control
 4. Determine gaps and give consequent training
 5. Insure reagents provision by MoH
 6. Reduce the delay in data load in SIVILA

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Work plan 2 years

- **At the NIC:**
 1. Reinforce sequencing and phylogenetic analysis capacity
 2. Analyze in a GISN context the necessity for introducing some changes in the algorithm used to study flu strains (e.g. HI)
 3. Reinforce antiviral resistance surveillance
 4. Rise the epidemiological background of virologists
 5. Adapt the NIC capacity to act as a Reference Laboratory in an expanded local Network

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Vision 5 years

- 2009 pandemic introduced fundamental changes in the structure and capacities that supports influenza surveillance in the world
- It is necessary to stabilize the new structure to insure a good response
- Taking into account the important role developed by NICs all around the world during the last pandemic, it should be necessary to rethink their crucial role in a future revision of National Pandemic Plans

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