

# Evaluation of the Influenza Sentinel Surveillance System in Madagascar, 2009-2014

A. **RAKOTOARISOA**<sup>1,2,3</sup>, L. RANDRIANASOLO<sup>3</sup>, J. GUILLEBAUD<sup>7</sup>, N. RAZANAJATOVO<sup>7</sup>, L. ANDRIAMAMPIONONA<sup>1,2</sup>, S. TEMPIA<sup>4,5,6</sup>, P. PIOLA<sup>2</sup>, A. HALM<sup>8</sup>, J.M. HERAUD<sup>7</sup>

<sup>1</sup>Direction de la Veille Sanitaire et de la Surveillance Epidémiologique (DVSSE), Ministry of Public Health, Antananarivo, Madagascar

<sup>2</sup>Epidemiology Unit, Institut Pasteur of Madagascar, Antananarivo, Madagascar

<sup>3</sup>Indian Ocean Field Epidemiology Training Programme, SEGA One Health Network, Indian Ocean Commission, Mauritius

<sup>4</sup>Influenza Division, Centers for Disease Control and Prevention, Atlanta, United States of America

<sup>5</sup>Influenza Program, Centers for Disease Control and Prevention, Pretoria, South Africa

<sup>6</sup>Center for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases of the National Health Laboratory Service, Johannesburg, South Africa

<sup>7</sup>National Influenza Centre, Virology Unit, Institut Pasteur of Madagascar, Antananarivo, Madagascar

<sup>8</sup>Epidemiology and Surveillance Unit, Indian Ocean Commission, Ebène, Mauritius.



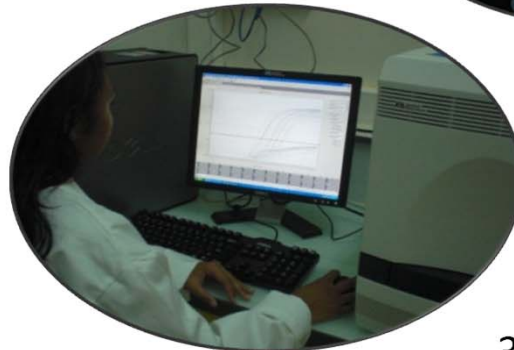
# Introduction

- Influenza sentinel surveillance has been established in Africa including Madagascar;
- Data on the performance of the established surveillance systems are scarce on the continent.
- Such evaluations are useful:
  - to identify shortfalls, improve performance and provide evidence on data reliability for policy making and public health interventions.
  - ensure national objectives ⇒ in line with WHO requirements



# Objective

To evaluate quantitatively and qualitatively the influenza sentinel surveillance system in Madagascar from January 2009 to December 2014.



# Methods

1. Description of the system
2. Data surveillance quantitative analysis
3. Standardized questionnaires and Semi-structured interviews (sentinel staff and key informants IPM & MoH) for qualitative analysis

## Categorization:

INDICATORS	SCORE	PERFORMANCE
< 60%	1	Weak
60 – 79 %	2	Moderate
80 – 100 %	3	Good



## Attributes and indicators of the sentinel surveillance system evaluation

<b>Data quality and completeness</b>	<ul style="list-style-type: none"> <li>% of SMS messages received vs. expected</li> <li>% of SMS with at least one missing or inconsistent value for selected key variables<sup>a</sup></li> <li>% of data collection forms received vs. expected</li> <li>% of data collection forms with at least one missing or inconsistent value for selected key variables<sup>b</sup></li> <li>% of ILI cases that met the case definition</li> <li>% of sampled ILI cases that met the sampling criteria<sup>c</sup></li> <li>% of sampled ILI cases with available laboratory results</li> <li>% of collected variables included in the WHO recommended minimum data collection for influenza sentinel surveillance</li> </ul>
<b>Timeliness</b>	<ul style="list-style-type: none"> <li>% of SMS sent within 48 hours of reference day</li> <li>% of data collection forms received within 7 days from collection</li> <li>% of samples received with 48 hours of collection</li> <li>% of weekly reports issued within the target date</li> </ul>
<b>Representativeness</b>	<ul style="list-style-type: none"> <li>Geographic coverage</li> <li>Inclusion of all age groups</li> </ul>
<b>Simplicity</b>	<ul style="list-style-type: none"> <li>Perception of surveillance staff on selected surveillance activities : Collection of aggregated data (SMS), Completion of data collection form, Data transfer (scale: very difficult, difficult, easy, very easy)</li> <li>Performance of the courier in delivering the following for each sentinel site: Data collection forms, Samples collection (scale: never, rarely, Often, regularly)</li> <li>Human resources</li> </ul>

## Attributes and indicators of the sentinel surveillance system evaluation

<b>Acceptability</b>	<p>% of surveillance staff that is satisfied with the following reports/follow-ups (scale used: not satisfied, poorly satisfied, satisfied, very satisfied): Virological surveillance report (for laboratory based surveillance sites only), Influenza bulletin, Telephone follow-up on site requests</p> <p>% of time devoted to weekly surveillance activities</p> <p>Cost of the surveillance system, including surveillance material, laboratory testing and human resources</p>
<b>Flexibility</b>	<p>Number of syndromes surveyed under the fever surveillance system</p> <p>Number of pathogens surveyed under the ILI component of the fever surveillance system</p>
<b>Stability</b>	<p>% of functional weeks (e.g. reports received for at least 3/5 working days/week</p> <p>% of data queries successfully resolved.</p> <p>Availability and use of the following standard operating procedures (SOP): Sample collection, Decision tree, Surveillance procedures</p> <p>Stock rupture for selected supplies (measured over the following scale: never, once per year, 2-3 times per year, <math>\geq 4</math> times per year): Data collection forms, Sampling material, Telephone credits for SMS</p> <p>% of sentinel sites with at least one member of staff trained in sentinel surveillance procedures</p>
<b>Utility</b>	<p>Number of alerts detected over a pre-established threshold in 2014.</p> <p>% of sites that do not implement routine laboratory-based surveillance that collected specimens after notification of alerts over a pre-established threshold in 2014.</p> <p>Identification and sharing of circulating seasonal influenza strains.</p> <p>Identification and monitoring of emerging influenza strains with pandemic potential.</p> <p>% of surveillance staff that receive the following reports: Virological surveillance report, Syndromic surveillance report, Influenza bulletin</p>

# Results



## Description of the system

- 22 000 000 inhabitants /596 000 km<sup>2</sup>
- 4 Bioclimates
- 34 Public Health Centers including 12 biological sentinel sites

### Objectives :

- Identify circulating influenza viruses
- Detect emerging influenza viruses with pandemic potential
- Share viral isolates with WHO Collaborating Centers for influenza (WHO CC)



# Tools

- Case definition
  - Fever : axillary temperature  $\geq 37.5^{\circ}\text{C}$
  - ILI :
    - 2009 à 2013 : **Fever AND Cough AND/OR** sore throat within 7 days of symptom onset
    - 2014 : **Fever AND Cough** with onset of symptoms within the last 10 days
- Data transfer:
  - aggregated daily counts using a short message service (SMS)-based system
  - Data collection forms sent weekly by express courier





# Case description of the 34 sentinel sites in Madagascar, 2009-2014:

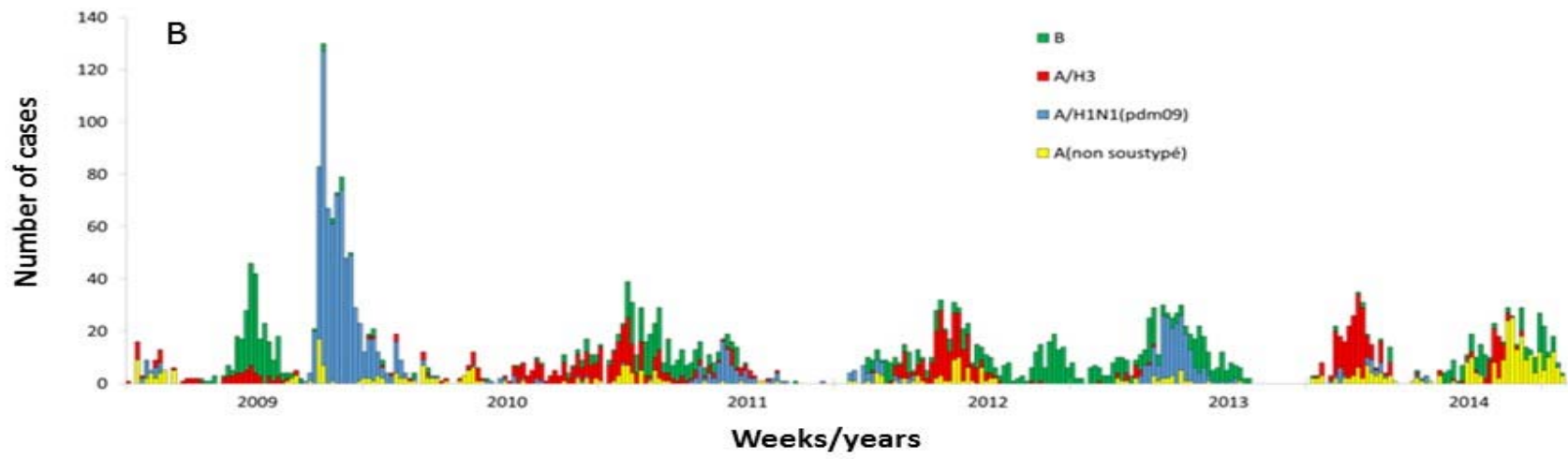
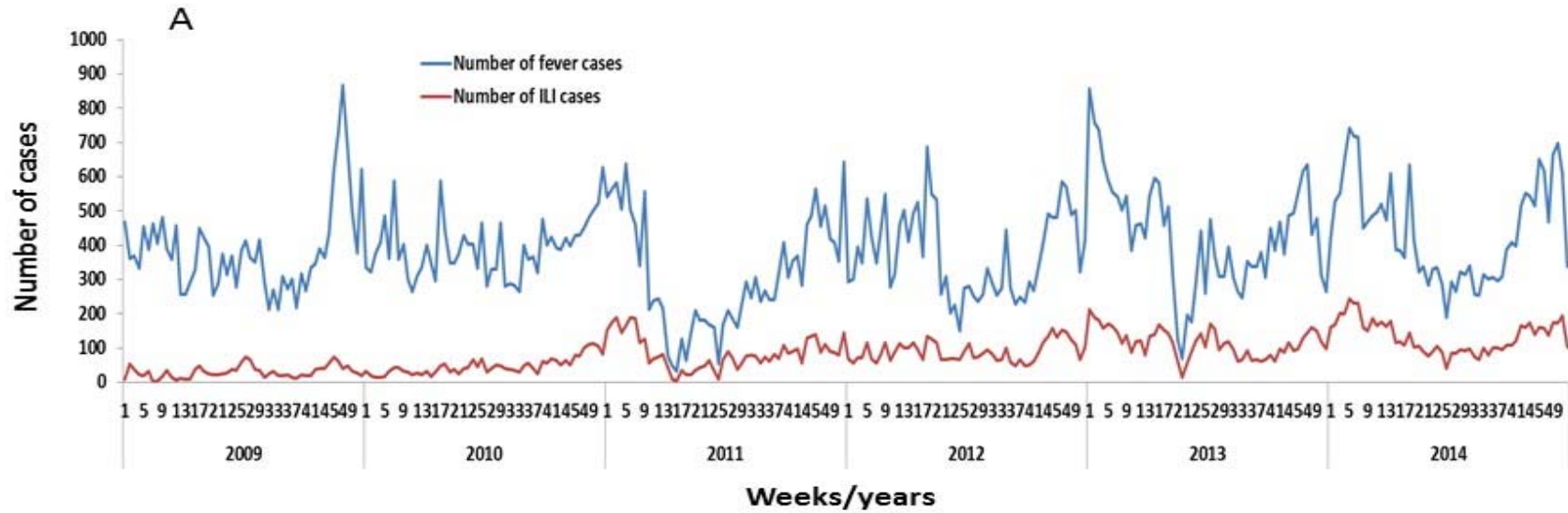
- Total fever cases = 177 718
- ILI Cases = 25 809 (14.5%)
- Samples collected = 9 293 (35.6%) → tested = 9 192 (98.9%)
- Influenza positive specimens = 3 573 (38.9%) :
  - 30.9% (1,106) = A(H1N1)pdm09
  - 23.2% (830) = A(H3N2)
  - 31.5% (1,127) = B
  - 14.3% (510) = A unsubtype



# Fever surveillance system in Madagascar, 2009-2014.

A: Fever and ILI cases. B: Laboratory-confirmed influenza cases.

Source: NIC/IPM data base



# 1) Data quality and completeness

Indicators	%	Score
% median of SMS messages received vs. expected	93.0	
% of SMS with at least one missing or inconsistent value for selected key variables <sup>a</sup>	0.1	
% median of data collection forms received vs. expected	89.5	
% of data collection forms with at least one missing or inconsistent value for selected key variables <sup>b</sup>	3.4	2.9
% of ILI cases that met the case definition	94.9	Good
% of sampled ILI cases that met the sampling criteria <sup>c</sup>	99.5	
% of sampled ILI cases with available laboratory results	98.9	
% of collected variables included in the WHO recommended minimum data collection for influenza sentinel surveillance	77.7	

## 2) Timeliness

Indicators	%	Score
% of SMS sent within 48 hours of reference day	69.8	
% median of data collection forms received within 7 days from collection	90.3	2.2 Moderate
% median of samples received with 48 hours of collection	45.9	
% of weekly reports issued within the target date	100	

### 3) Simplicity

Indicators	%	Score
Perception as “easy” of surveillance staff on		
- collection of aggregated data (SMS)	94	
- completion of data collection form	100	
- data transfer	94	
<hr/>		2.8 Good
Regular performance of the courier in sentinel site		
- Delivering data collection forms	48	
- Collecting Samples (for laboratory based surveillance sites)	100	
<hr/>		
Human resources	17 IPM 68 sites	

## 4) Acceptability

Indicators	%	Score
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% of surveillance staff that is satisfied with the following		
- virological surveillance report (for laboratory based surveillance sites)	98	3.0 Good
- influenza bulletin	93	
- telephone follow-up on site requests	98	
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% median of time devoted to weekly surveillance activities	25 IPM 37 sites	
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## 5) Stability

Indicators	%	Score
% median of functional weeks (e.g. reports received for at least 3/5 working days/week)	94.3	2.5 Moderate to Good
% of data queries successfully resolved.	93.2	
Regular use of the following standard operating procedures (SOP):	85.3	
- Sample collection	97.9	
- Decision tree	81.7	
- Surveillance procedures		
Stock out never occurred		
- Data collection forms	60.9	
- Sampling material	75.0	
- Telephone credits for SMS	81.3	
% of sentinel sites with at least one member of staff trained in sentinel surveillance procedures	71.9	
% of staff trained for surveillance activities		
- primary responsibility	66.7	
- supporting responsibility	33.3	

## 6) Utility

Indicators		Score
Number of alerts detected over a pre-established threshold during 2014	38	
% of syndromic surveillance sites that collected specimens after notification of alerts over a pre-established threshold during 2014	72.7%	
Identification and sharing of circulating seasonal influenza strains with WHO CC	70 -80 influenza isolates/clinical specimens annually	2.0 Moderate
% of surveillance staff that receive regularly		
- Virological surveillance report	66.7%	
- Syndromic surveillance report	70.0%	
- Influenza bulletin	57.4%	



# Limitations

- Change of case definition in 2014 (becoming more sensitive)
- Lack of parallel system to check the exhaustiveness of the detected alerts
- not all minimum data collection requirements suggested by WHO for influenza sentinel surveillance were met



# Strengths (1)

## Utility:

- detect alerts through syndromic surveillance and lab-confirmation of the etiology of detected outbreaks

## Flexibility:

- monitor several syndromes under the same platform, increasing cost-effectiveness and avoiding the implementation of vertical surveillance programs .
- monitor the circulation of several respiratory pathogens in the country, including respiratory syncytial virus (RSV)

## Stability:

- operate continuously since its establishment in 2007



# Strengths (2)

## **Acceptability:**

- Surveillance staff endorsed well these activities
- Cost of implementation are moderate

## **Simplicity:**

- Availability of clear standard operating procedures at sentinel sites

## **Utility:**

- High proportion of respiratory samples with available influenza results

# Weaknesses

- Ratio of trained staff moderate
- Phone network and coverage
- Accessibility of some sentinel sites



# Conclusion & suggestions (1)

**The overall score for the system : 2.5  
(moderate to good performance)**

- Surveillance system in Madagascar performs satisfactorily and provides reliable and timely data for public health intervention
- moderate cost of the system and its simplicity and acceptability are key factors that contributed to its stability
- Nonetheless, the surveillance system is largely reliant on external funds



## Conclusion & suggestions (2)

- Maintaining the surveillance system through national funds should be evaluated and/or contemplated
- More regular training to surveillance staff as well as increased support to more remote sentinel sites
- Collection of additional information on underlying medical
- Evaluation and comparison of passive surveillance systems existing with the sentinel surveillance system



# Acknowledgements

- Ministry of Public Health (MoH)
- Epidemiology & Surveillance department MoH
- National Influenza Centre, Virology Unit, Institut Pasteur of Madagascar (IPM)
- Epidemiology Unit of IPM
- Epiconcept
- Epidemiology and Surveillance Unit, Indian Ocean Commission
- S. TEMPIA, A. HALM, J.M. HERAUD





**THANK YOU FOR YOUR ATTENTION**

Madagascar

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image Landsat

Date des images satellite



COMMISSION DE  
L'Océan Indien

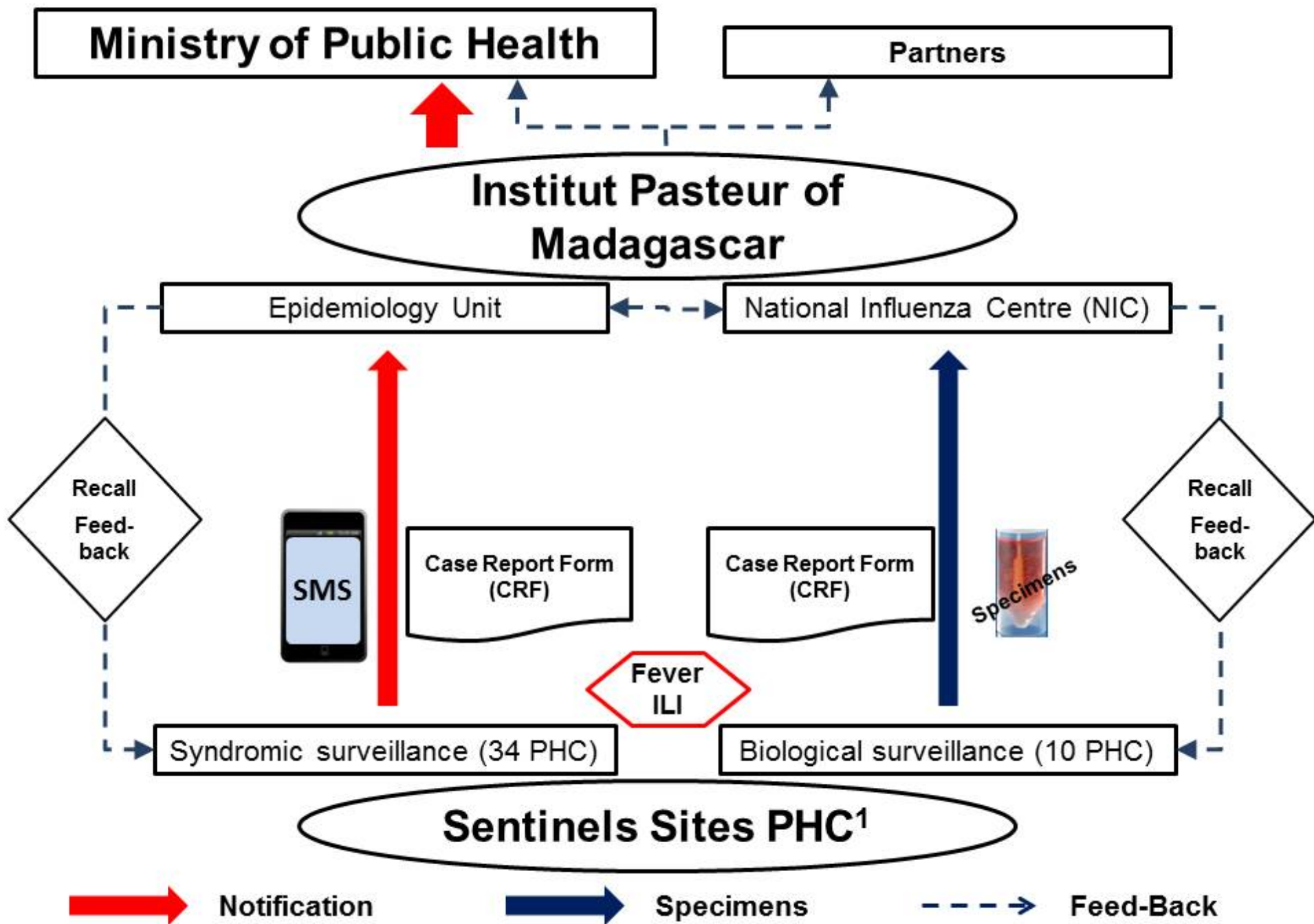


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<sup>1</sup> Primary Health Centre