

# **Improving the GISRS for novel influenza viruses with pandemic potentials**

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# The History and development of GISRS

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- Initiated since 1947- Vaccine made with 1943 Weiss strain failed to protect new variant (71 years)
- 1952-birth of the network(GISN)(66years)
- 1962-2 WHO CCs, 59 NICs/49 countries
- 1984-3 WHO CCs, 108 NICs/76 countries
- 2004-5 WHO CCs, 112 NICs/83 countries
- 2010-6 WHO CCs, 136NICs/106countries
- 2011-rename as GISRS
- 2018-6 WHO CCs, 144NICs/114countries

# WHO Global Influenza Surveillance and Response System

20 December 2017

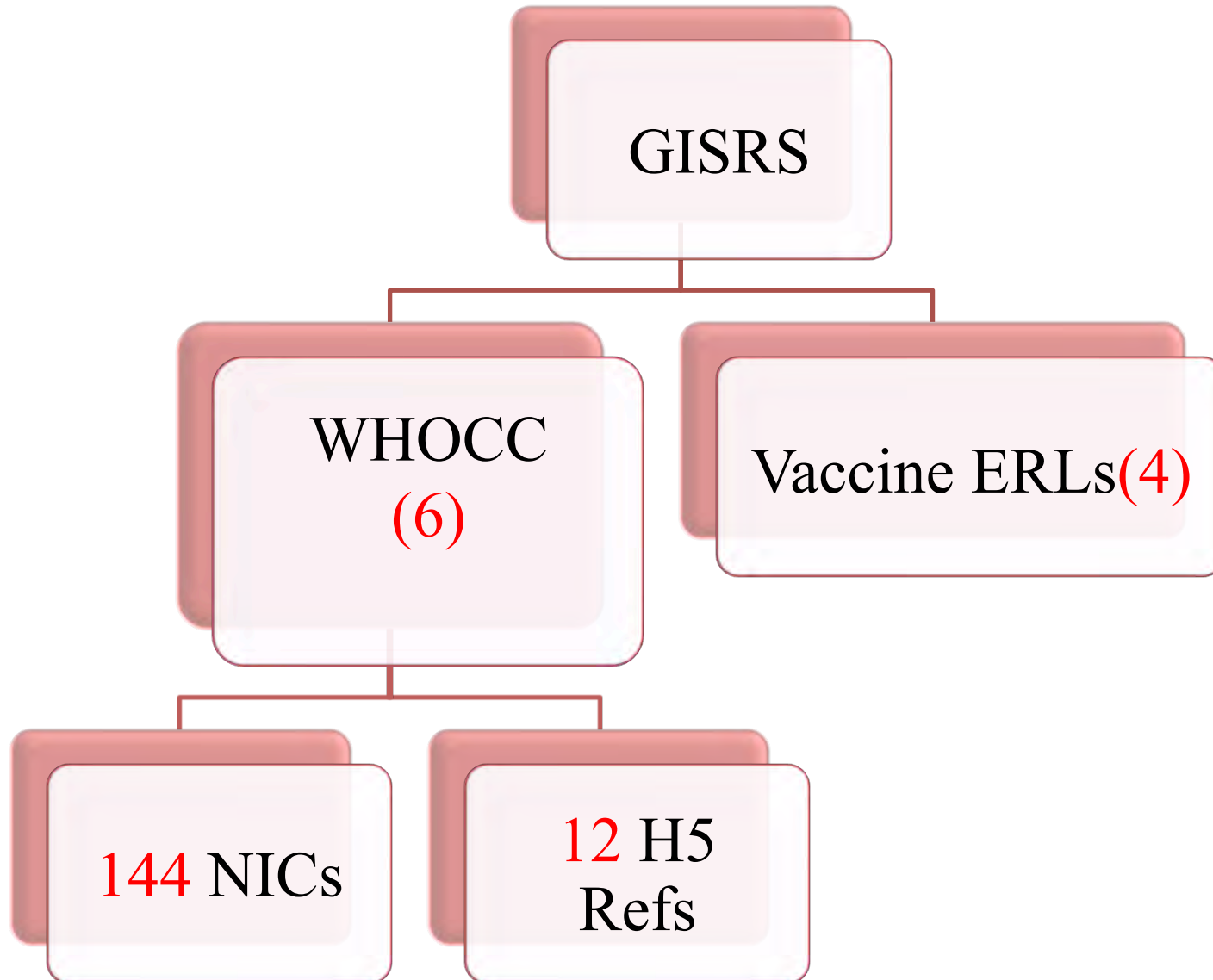


- ▲ National Influenza Centre
- WHO Collaborating Centre for Reference and Research on Influenza
- WHO Collaborating Centre for the Surveillance, Epidemiology and Control of Influenza
- WHO Collaborating Centre for Studies on the Ecology of Influenza in Animals
- ★ WHO Essential Regulatory Laboratory
- WHO H5 Reference Laboratory

- 6 WHO CCs
- 144 NICS
- 4 ERLs
- 12 H5 reference labs

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

# WHO Global Influenza Surveillance and Response system(GISRS)



# *The ToR of WHO GISRS*

**Continually risk assessment**

**Vaccine strains recommendation**

**Diagnostic methods development**

**Antiviral drugs susceptibility  
surveillance**

**Capacity building for pandemic  
response**

# The functions of GISRS

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- Monitoring the evolution of influenza viruses and integration of epidemiological data to provide recommendations in areas including **diagnostics, vaccines, antiviral susceptibility and risk assessment**
- Serving as a global alert mechanism for the **emergence of the novel influenza viruses with pandemic potential**
- Providing laboratory and epidemiological technical supporting for other emerge infectious disease response

# The contributions of GISRS

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- 2-3 millions samples tested per year
- Over 20,000 viruses shared with WHO CCs per year
- Over 10,000 viruses characterized by CCs per year

# The contributions of GISRS

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- **seasonal influenza vaccine viruses recommendation**
  - 1973, 1st formal recommendation issued
  - Feb 1986, 1st documented WHO annual consultation
  - 1998, biannual formal WHO recommendations for northern and southern hemispheres
  - 2012 , fourth vaccine virus components (QIV) recommended by WHO
  - 2016 ,1st cell-propagated Candidate Vaccine Viruses recommended
  - 2016 ,guidance on vaccine formulation recommendation for tropics and subtropics
- **Zoonotic vaccine viruses viruses recommendation**
  - H5(H1,N6), H7(N7,N9), H9N2, and swine variant viruses
- **Pandemic vaccine viruses viruses recommendation**
  - 1957 H2N2, 1968 H3N2 and 2009 H1N1



WHO Consultation on the Composition of Influenza Virus Vaccines for the Southern Hemisphere 2013  
17-19 September 2012, BEIJING, CHINA



# The contributions of GISRS

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## ■ providing diagnostics for NICs

- WHO CC Atlanta regular providing reagents for NICs
- WHO CCs providing diagnostics kits for NICs during 2009 pandemic
- WHO CC Beijing providing H7N9 diagnostics kits for NICs

## ■ Providing trainings for GISRS

- WHO CCs providing trainings for NICs regularly

# Providing diagnostics to NICs during 2009 pandemic response



Country /areas
Singapore
Papua New Guinea
Mongolia
Cuba
Macau
Vietnam
Laos
Cambodia
Brunei
Indonesia
Malaysia
Philippine
Thailand





# 病毒病预防控制所

National Institute For Viral Disease Control and Prevention

## Training Workshop on Influenza Laboratory Surveillance Techniques

18-20 November 2015. Beijing, China



# The contributions of GISRS

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## ■ providing antiviral susceptibility data for clinic treatment guidance development

- Expert Working Group on Antiviral Susceptibility for the WHO GISRS
- Molecular-bases assays (genotyping)
- NA inhibition assays (phenotyping)

# The functions expansion of GISRS

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- Disease burden associated with influenza
- Vaccine effectiveness estimation
- Pandemic Influenza Severity Assessment (PISA)
- Tool of Influenza Pandemic Risk Assessment (TIPRA)
- Global RSV Surveillance-based on GISRS

# How to improve the functions of GISRS

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- Improve the capacity for novel pathogen discovery
  - **Rapid and sensitive detection assays for patients**
  - **Next-generation sequencing for novel virus discovery (H7N9, H10N8, H5N6)**
  - **Improve the surveillance capacity especially in developing countries such Africa and Southeast Asia**
- Better vaccine strains selection
  - **Timely virus and information sharing**
  - **Modeling methods**
- Better Vaccine
  - **universal vaccine development**

# How to improve the functions of GISRS

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- Improve data and virus sharing
  - **PIP framework**
  - **GISAID**
  - **Flumart**



# PIP Framework

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- **Adopted by sixty-fourth WHA 2011**
- **Two objectives**
  - Improve sharing of influenza viruses with pandemic potential (IVPP)
  - Achieve more predictable, efficient, and equitable access to benefits arising from the sharing of viruses, notably **vaccines and antiviral medicines**

## **Pandemic influenza preparedness Framework**

for the sharing of influenza viruses  
and access to vaccines and  
other benefits



# Global Initiative of Sharing all Influenza Data GISAID

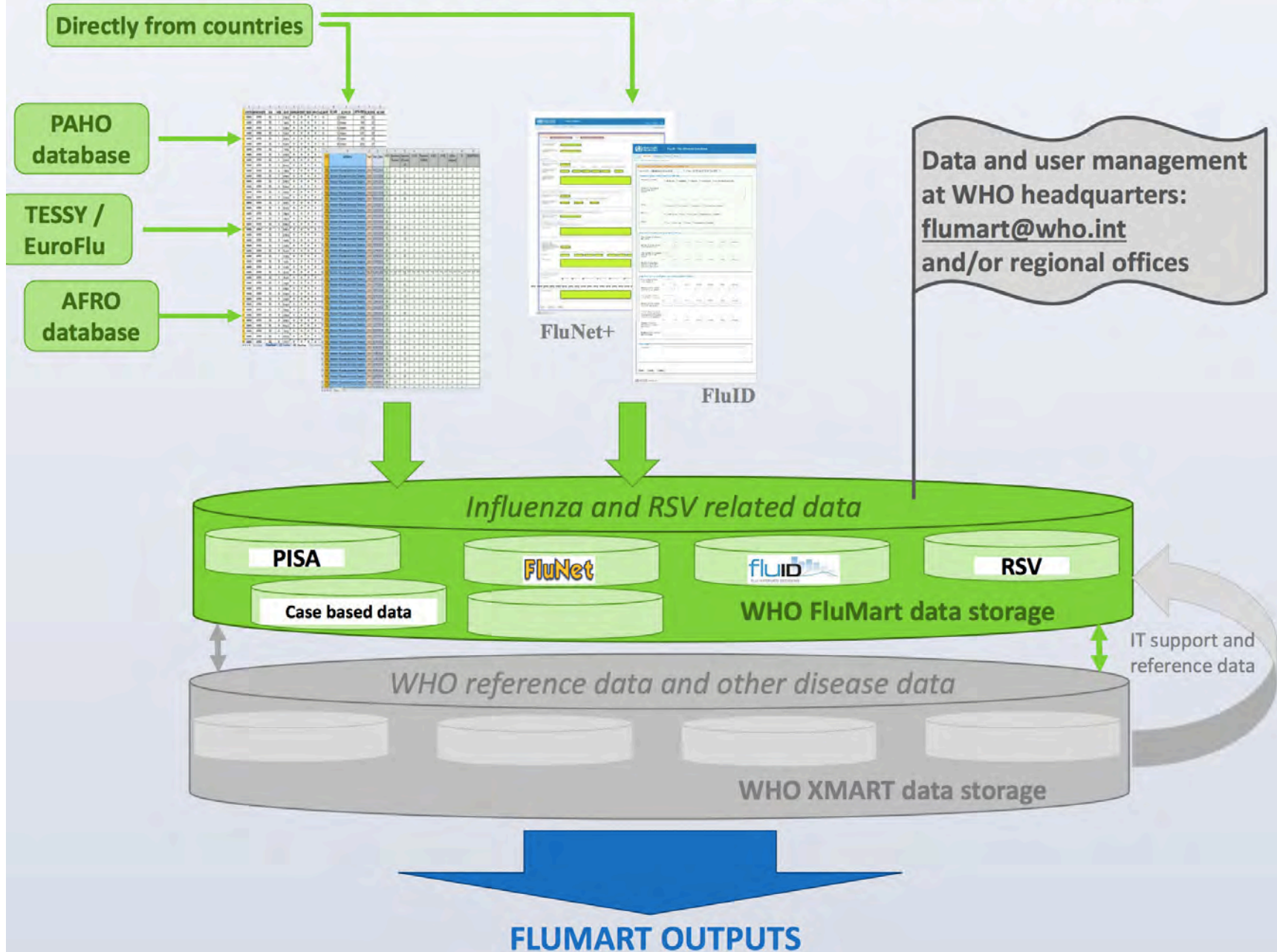
The screenshot shows the GISAID website interface. At the top left is the GISAID logo with the text '2008 - 2018' below it. To the right is a search bar with a magnifying glass icon and the word 'Login' above it. Below the search bar is a horizontal navigation menu with the following items: 'Home', 'EpiFlu™ Features', 'Events', 'Collaborations', 'References', 'Registration', and 'Help'. On the left side, there is a vertical menu under the heading 'About us' with the following items: '» Mission', '» History', '» Governance', '» Public-Private Partnerships', '» Grants', '» Technical Partners', '» Acknowledgements', and '» Imprint'. The main content area features a dark green header for the article 'A Decade of Innovative Contribution to Global Health'. Below this header is a paragraph: 'The GISAID platform went live in 2008, offering ever since the trusted data sharing mechanism for influenza researchers, scientists and health officials to share all influenza genetic and related data'. There are two quote blocks, each with a quote on the left and the author's name and title on the right. The first quote is by Prof. Jane Halton AO PSM, Chair, Coalition for Epidemic Preparedness Innovations CEPI. The second quote is by Dr med David Nabarro, United Nations System Coordinator for Avian & Human Influenza (ret).

*“ Ten years after GISAID first introduced its game-changing mechanism, breaking data sharing barriers, it continues to be a most trusted leader in pandemic preparedness & response ”*

**Prof. Dr Yuelong Shu**  
Sun Yat-sen University, Dean  
School of Public Health, Shenzhen

# DATA UPLOAD FROM ANYWHERE IN USER-DEFINED FORMAT

- Upload from EXCEL, form-based data entry, link to existing databases
- Templates for upload available, can be customized according to EXCEL formats available by data provider



# Universal influenza vaccine development strategies

- Better match between vaccine and circulating viruses (current target)
- Better vaccines for high risk groups (elderly, immunosuppression, Children, et al) (short-term target)
- Vaccines can protect drift viruses (middle-term target)
- Universal vaccines for all viruses including shift viruses (long-term target)



# How to improve the functions of GISRS

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## ■ Trust and cooperation are the fundamental principles

8/28/2018

China Has Withheld Samples of a Dangerous Flu Virus - The New York Times

**The New York Times**

## ***China Has Withheld Samples of a Dangerous Flu Virus***

Despite an international agreement, U.S. health authorities still have not received H7N9 avian flu specimens from their Chinese counterparts.



By Emily Baumgaertner

Aug. 27, 2018

# Disease X: China ignores UK request to share samples of flu virus with pandemic potential



# The truth

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- March 30,2013, the virus identified by WHO CC Beijing
- March 31,2013, Chinese government reported to WHO according to IHR
- March 31,2013, WHO CC Beijing shared the whole genome sequences through GISAID
- April 10, 2013, WHO CC Tokyo received the H7N9 virus from China
- April 11, 2013, WHO CC Atlanta, Memphis, London received the H7N9 virus from China
- April 11, 2013, UK NIBSC, Hong Kong received the H7N9 virus
- April 12, 2013, WHO CC Melbourne received the H7N9 virus
- April 8, 2013, WHO CC Beijing Shared the diagnostic methods with WHO
- China shared viruses with 11 institutions globally in 2013

# The truth

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- WHO CC Beijing continuously sharing viruses, genetic and antigenic information with other WHO CCs for vaccine recommendation
  - *A/Anhui/1/2013-like*
  - *A/Shanghai/2/2013-like*
  - *A/Guangdong/17SF003/2016-like*
  - *A/Hongkong/125/2017-like*
  - *A/Hunan/02650/2016-like*
- China shared more than 2500 H7N9 viruses sequence through GISAID
- Since May 2018, USCDC received 4 H7N9 viruses from WHO CC Beijing



# The practice

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- PIP implementations
- Remove the H5 and H7 from the select agent list
- collaboration

# conclusions

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Pandemic viruses respect no borders. All countries, rich and poor, large and small, must work together to prepare for its onset and to respond effectively. Access to adequate quantities of life-saving interventions, notably antiviral medicines and vaccines, made available in a timely and equitable manner to all countries, is essential for response.

# Acknowledgements

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- WHO
- WHO GISRS especially WHO CCs and ERLs
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