Coordinating SARS-CoV-2 sequencing efforts in Latin America

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Implementation of a SARS-CoV-2 genomic surveillance network in the Americas region
Regardless of geographic location, an outbreak or epidemic represents an emergency and a potential international threat.

There are no countries or institutions that have the complete capacity to respond by themselves to epidemics, especially those generated by new (emerging) pathogens with pandemic potential.

For this reason, a system is required that coordinates alert and response mechanisms at the global and regional levels.
Beyond surveillance of endemic pathogens, WHO Member States should be prepared to detect and characterize in a timely manner the emergence of new agents with epidemic potential.*

Mechanisms for a timely access to National and Regional reference laboratories as well as laboratory networks, must be granted.

Quality of the results should be ensured.

*Core capacity #8 IHR
BACKGROUND
The response to COVID-19 pandemic

- Notification of unknown aetiology cluster of pneumonia to WHO (Dec 31)
- Firsts genomic sequences released in open platform (Virological and GISAID) (Jan 10)
- First Molecular Protocol (Charité-Berlin) available on WHO webpage (Jan 14)
- Charité Protocol Primers and Probes Ordering (Jan 17)
- First SARS-CoV-2 molecular diagnostic implementation in Latin America (Jan 30)
- WHO declares Public Health Emergency of International Concern (PHEIC)
BACKGROUND
Phylogenetic analysis of SARS-CoV-2
BACKGROUND

SARS-CoV-2 sequences in GISAID

• Some regions were underrepresented

• Some regions were overrepresented
WHO Global Influenza Surveillance and Response System (GISRS)

- World Health Organization Global System for Influenza Surveillance and Response.
- Monitors the influenza virus evolution and provides recommendations in several areas such as laboratory diagnostics, vaccines compositions, antiviral susceptibility and risk assessment.
- Serves as a global alert mechanism for the emergence of influenza viruses with pandemic potential.

All work under WHO terms of reference

- WHO Collaborating Centers (WHO-CC)
- National Influenza Centers (NIC)
- Special groups
GISRS in the Americas Regions

- 29 National Influenza Centers (NICs)
- 25 Countries / WHO Member States
- WHO Collaborating Center
- Centers for Disease Control and Prevention (CDC)
- SARInet
Laboratories Network in the Americas

- Sireva II Nm
- PulseNet
- RELAVRA
- RELDA/Emerging viruses
- SARInet
Molecular Diagnostics
Influenza detection – IRR reagents – WHO CC at US-CDC
SARS-CoV-2

Genetic Sequencing
Influenza Sequencing Project
COVID-19 Genomic Surveillance Regional Network

Viral isolation
Only for influenza and after SARS-CoV-2 infection have been excluded

Antigenic characterization
Standard antiserum against the influenza strains present on the vaccine composition

Antiviral resistance assays
Genetic sequencing
NA inhibition (NAI) assay

Laboratory capacity in the Americas Region
COVID-19 Genomic Surveillance Network

Main objectives:

- Develop and strengthen a COVID-19 genomic surveillance network in the Americas region
- Contribute to timely make available more genetic sequencing data (GSD) from the Latin America and Caribbean countries.

Analysis Objectives:

- Clarification on transmission patterns, especially in signal events (cruise ship-related or other cluster events, importations, etc.);
- Identification of mutations putatively involved in host adaptation, virulence or transmissibility;
- Identification of mutations potentially affecting diagnostic protocols;
Methodology:

• Next Generation Sequencing Platform: Full genome sequencing
• Samples mild, severe or death cases (Ct < 30)
• 2 Regional Sequencing Laboratory: FIOCRUZ (Brazil); ISPCH (Chile)
• Genetic Sequence Data (GSD): Timely release of sequences on open platform GISAID
COVID-19 Genomic Surveillance Network

Participating countries:

- 19 countries from each subregion:
  - **North America**: Mexico
  - **Caribe**: Bahamas, Barbados, Haiti and Jamaica
  - **Central America**: Costa Rica, Guatemala, Honduras and Panama
  - **Adrian Region**: Colombia, Ecuador, Perú and Venezuela
  - **South Cone**: Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay
Other Regional Sequencing Project – Influenza

Outcomes

- Southern Hemisphere Influenza Season Summary Report for WHO Influenza Vaccine Compositon Meeting in September
- Empowerment of the National Influenza Center in the National Surveillance Context
- More high quality Genetic Sequence Data

Abstract

Regional genetic evolution analysis of influenza virus circulating in Latin America.
COVID-19 Genomic Surveillance Network

**Responsibilities**

- Support shipping to the reference sequencing laboratories
- Reagents for NGS at the reference sequencing laboratories
- Sustainability of the network
- Develop together with the countries a regional analysis with metadata for data sharing through the scientific community

**In house sequencing laboratories**

- Sequence by NGS
- Timely release GSD to GISAID
- Send reporting Excel File to PAHO

**External sequencing laboratories**

- Ship samples to one of the reference sequencing laboratories.
- Send reporting Excel File to PAHO

**Reference Sequencing Laboratories**

- Provide necessary documents for samples shipping.
- Sequence by NGS
- Timely release NGS to GISAID
- Send a genetic information report to the submitter laboratory (English or Spanish).

Genomic sequence data belongs to the country
Additional COVID-19 Genomic Surveillance Project Activities

- Teleconference with each country for participation in the Project
- NGS virtual trainings for country as requested by the ISP-Chile and FIOCRUZ
- Metadata sent by countries
- Countries shipping samples to FIOCRUZ and ISP-Chile
- Regional NGS training by ISP-Chile
- ISP-Chile providing primers to countries in the project
- Argentina, Brazil, Chile, Colombia, Costa Rica, Paraguay, Peru, and Uruguay in house sequencing and uploading to GISAID
- Regional analysis in collaboration with participating laboratories/countries
Critical actions for **response to COVID-19 pandemic in the Americas**

**SAVE LIVES**
- Reorganize health services & plan workforce surge
- Maintain infection prevention & control (IPC) in all health services
- Optimize clinical management along a continuum of care
- Assure supply chain

**PROTECT HEALTH CARE WORKERS**
- At work & in community

**SLOW SPREAD**
- Detect & isolate cases, trace & quarantine contacts
- Engage actively with community on basic IPC practices & following measures
- Implement social distancing & travel-related measures

Keep up surveillance & reference laboratory | Generate evidence for action
Final Remarks

• Increase genetic sequence data of SARS-CoV-2 circulating in the Americas Region available to the global community to support development of diagnostic protocols, information for vaccine development.

• Phylogenetic analysis to better understand the genetic evolution and molecular epidemiology of SARS-CoV-2

• Strengthening of laboratory response capacity in participating countries

• Regional analysis with metadata for dissemination through scientific community

• Regional Genomic Surveillance Network for SARS-CoV-2

• Generate data that can be used for developing mecanism to mitigate the COVID-19 pandemic
Stop the spread. Save lives.

COVID-19

Together we can overcome this public health emergency.

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• PAHO Laboratory Response Team
• PAHO Influenza Team

Influenza Regional Reports: http://www.paho.org/influenzareport
Severe acute respiratory infections network – SARInet: http://www.sarinet.org