Genomic Surveillance Regional Networks for Epidemic and Pandemic Preparedness and Response

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Regional Meeting
Human Genomics for Health: Enhancing the Impact of Effective Research
Several networks in the PAHO Region support viral diseases surveillance and response

**RELDA** (Arbovirus Laboratory Network)
**SARInet** (NICs and other NPHLs)
**CariPHLN**
**Virored**

**PAHO/WHO Collaborating Centers**
- CDC, Fort Collins, USA
- CDC, Atlanta, USA
- InDRE, Mexico
- IPK, Cuba
- INEVH, Argentina
- IEC, Brazil
March 2020: establishment of the regional SARS-CoV-2 genomic surveillance network COVIGEN

**Situation A.** Sequencing capacity already established at country level
→ PAHO, together with Reference Labs, provides protocols, reagents, training & analysis when required

**Situation B.** Limited or no capacity for sequencing at country level
→ Shipping of samples to any of 8 seq reference labs
2022: Strategy on regional genomic surveillance for epidemic and pandemic preparedness and response

**Strategic lines of action**

a) Expand and consolidate a **regional genomic surveillance network of public health, animal health, and environmental health laboratories** for early detection and monitoring.

b) Strengthen **technical capacity** for genomic sequencing, including in bioinformatics.

c) Strengthen genomic data **reporting**, including linkages to case data, and its **integration** with public health systems.

d) Build capacity and **define best practices** for the **use of genomic data** in the response to outbreaks, epidemics, and pandemics.

**Process**

- May 2022: Draft strategy, consultation with Member States
- June 2022: Executive Committee recommends adoption of the Strategy by the Pan American Sanitary Conference
- Sept 2022: Adoption by the Pan American Sanitary Conference

**Aligned with WHO Global GS Strategy**
The Regional Strategy provides the framework to promote integration and enhance sustainability.
Expanding the scope – Chikungunya in Paraguay

- What is the circulating genotype?
- Is the mutation associated with increased transmissibility by *Aedes albopictus* present?
- Genetic basis for the perceived increase in severity and CFR?
- East/Central/South African (ECSA) genotype
- *E1* protein A226V mutation was not detected
- No evidence. Two synonymous mutations at positions 5098 and 7393 in the *nsP3* and *nsP4* genes were detected.
Dengue in the Americas

DENV–2, Cosmopolitan genotype, 2019–2022

- Peru
- Brazil
- CDC Dengue Branch

DENV–3, Genotype III, American lineage II (2023)

- Costa Rica
- Honduras
- Nicaragua
- Dominican Republic

Cholera in Haiti and DR

- Haiti
- Dominican Republic
- Costa Rica

Training at CNGB (Argentina) facilitated by PulseNet Latin America and the Caribbean
Some challenges...

• Limited **access** to (or higher pricing of) equipment (incl. installation and maintenance), reagents, and supplies in Latin America and the Caribbean

• **Quality** of the reported data is fundamental but external quality assessments are not available or expensive

• **Bioinformatics/data analysis** capacity remains a gap in our public health workforce

• How to ensure the generated sequence information is fit-for-use and used?
  • “**Sequencing**” is not “**Genomic Surveillance**”
  • The objectives of genomic surveillance are pathogen- and context-specific and guidance on sample selection and sequencing methods need to be defined accordingly
  • Coordination between laboratory systems, epidemiological surveillance, and health care providers should be a priority (**information systems**)

• How to ensure **sustainability** as more investment and resources are required (in the context of competing priorities)?
Some potential solutions...

• Advocacy
• Pooled procurement at national and regional level
• Workforce training and development
• Networking
  • Build on existing networks when possible
  • Promote bilateral and multilateral collaboration within a regional framework
  • Act at subnational, national, regional, and global levels
  • Involve different sectors (public health, animal health, academia, forensics...)
  • Share protocols, knowledge, experiences, best practices
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