USE OF hAMRonization IN LATIN AMERICAN SURVEILLANCE NETWORKS

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AMR SURVEILLANCE IN THE AMERICAS
PROGRESS AND CHALLENGES

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DECISION-MAKING ON AMR
Informing practices, programs and policies

GLOBAL LEVEL
- Global prioritization
- Global guidelines & recommendations
- Advocacy & resource mobilization

REGIONAL
- Assess regional AMR trends
- Guide technical cooperation to countries
- Prioritize regional strategies
- Advocacy & resource mobilization

NATIONAL
- Inform decision making on AMR interventions
- Guide NAP development/implementation/evaluation
- Inform technical guidelines (surveillance, clinical management/treatment)
- Inform updates to Essential Medicines Lists

LOCAL
- Inform patient care, empirical treatment,
  Antimicrobials procurement at the facility
- Antimicrobial stewardship program
- Infection prevention & control

Surveillance contributes to decision-making at all levels
BUILDING CAPACITY FOR AMR SURVEILLANCE

**RelAVRA (since 1996)**
- 20 countries, designated NRLs
- Aggregated data for priority drug-pathogen combinations
- 2000-2014: ~ over 750 labs reported AST data for ~2.6 M isolates
- Online platform (PLISA)

**RelAVRA + (2018-19)**
- Enhanced AMR surveillance (isolate-level, BSIs)
- 13 participating countries (bacterial & fungal disease)
- 3 countries sharing data to date
- Support for Whonet use

**Caribbean - CCHD**
- Improve AMR diagnosis capacity in clinical labs in 9 CARICOM MS, CARPHA, select veterinary & food labs
- Establish national programs for EQA of AMR diagnosis in 14 CARICOM MS
- Data sharing and use in 14 countries

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### Priority Pathogens

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>WHO priority pathogen list</th>
<th>Pathogen included in GLASS</th>
</tr>
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<tbody>
<tr>
<td>Acinetobacter baumannii</td>
<td>Priority 1: critical (carbapenem-resistant)</td>
<td>Yes</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>Priority 1: critical (carbapenem-resistant and third-generation cephalosporin-resistant)</td>
<td>Yes</td>
</tr>
<tr>
<td>Enterococcus sp.</td>
<td>Priority 2: high (vancomycin-resistant)</td>
<td>No</td>
</tr>
<tr>
<td>Klebsiella pneumoniae</td>
<td>Priority 1: critical (carbapenem-resistant and third-generation cephalosporin-resistant)</td>
<td>Yes</td>
</tr>
<tr>
<td>Entrobacteriaceae (other)</td>
<td>Priority 1: critical (carbapenem-resistant and third-generation cephalosporin-resistant)</td>
<td>No</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>Priority 1: critical (carbapenem-resistant)</td>
<td>No</td>
</tr>
<tr>
<td>Salmonella spp.</td>
<td>Priority 2: high (fluoroquinolone-resistant)</td>
<td>Yes</td>
</tr>
<tr>
<td>Staphylococcus spp.</td>
<td>Priority 2: high (methicillin-resistant, vancomycin intermediate and resistant)</td>
<td>Yes</td>
</tr>
<tr>
<td>Streptococcus pneumoniae</td>
<td>Priority 3: medium (penicillin-nonsusceptible)</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Klebsiella pneumoniae imipenem non susceptible

As of March 2021, **3 countries (ARG, COR, COL)**, 76 hospitals, **11,288 episodes of Bacterial infections/year (2019)**

As of March 2021, **3 countries (ARG, COR, URU)**, 30 hospitals, **340 episodes of *Candida* infections/year (2019)**
Availability of WGS at country level in LAC (NRL)

LATIN AMERICA 12/19

CARIBBEAN 0/14

RELAVRA +

PULSENET LAC
LAC WGS CONSULTATION

Current situation:

- Application of WGS for specific situations (not for RAM surveillance); lack of budget and HR
- Management of WGS data on closed platforms, with decision makers (in the future they would like it to be on open platforms).

Future needs:

- Training: analysis / interpretation of results; bioinformatics; application in public health and equipment management.
- Standardized data analysis, standard workflow, reproducible results regardless of the platform used (heterogeneity of countries when sharing data)
- Information integration
- Financing: supplies, equipment, technology
- PAHO Strategic Fund for the acquisition of supplies / reagents at low cost for WGS and other methodologies is suggested (41% of the respondents do not have a budget for AMR surveillance by basic genotypic methods). RAM cartridges (FilmArray, GeneXpert)
- WGS for Candida species
- Inclusion of immunochromatographic methods for the detection of carbapenemases due to their advantages (fast, PCR quality, simple, without the need for trained personnel, etc.); disadvantage: its cost (NG Bioest and Coris)
- Regional server for information storing and seq analysis
- A roadmap will be developed for each one regardless of the individual level of AMR surveillance
- External quality assurance program
- Was the harmonization of bioethical aspects on the bacterial genome considered? Future discussion
- Collaboration with other countries (south-south cooperation)
- PAHO advocacy - country authorities to consider WGS as a priority in public health

Implementation of strategies for sampling and diagnostic techniques to evaluate antimicrobial resistance patterns in sentinel bacteria
CHALLENGES & OPPORTUNITIES

STRENGTHS
- Strong regional lab surveillance Network (ReLAVRA)
- Expansion of AMR surveillance
- Use of new molecular techniques in AMR surveillance, WHO CCs
- AMR knowledge/evidence dissemination

WEAKNESSES
- Limitations of passive, lab-based surveillance
- Disconnect between lab, clinicians, epidemiologists
- Challenges in integrating AMR surv. across sectors

OPPORTUNITIES
- Models piloted in the region for One Health
- Integration of IPC and lab to promote data-driven decisions
- New collaborations & partnerships
- COVID-19 momentum for surveillance for action

THREATS
- COVID-19 response and competing priorities
- Impact of the pandemic on HAIs and AMR
- Large differences in capacity and resources for AMR surveillance between countries
THE WAY FORWARD

Modulating surveillance based on data use for AMR interventions and national priorities

- Improve geographic representativeness,
- Continue building NRL and local clinical lab capacity, increase use of new molecular technologies
- Conduct active enhanced isolate-level surveillance (including fungal AMR),
- Integrate lab & IPC,
- Leverage surveillance to estimate AMR burden,
- Evaluate impact of interventions
- Continue efforts to integrate AMR surveillance to better understand AMR emergence and spread in humans, animals, environment
- Increase data use among national and local stakeholders
- Inform patient and ASP,
- Disseminate epidemiological findings,
- Contribute to GLASS
- Translate evidence for decision-makers, advocate for AMR prioritization,
- Assess cost-effectiveness of interventions,
- Evaluate resources needed to sustain AMR efforts and return on investment
ACKNOWLEDGEMENTS

- ReLAVRA+ member countries
- PAHO regional AMR surveillance team
  - Pilar Ramon Pardo, Agustina Forastiero, Genara Romero-Thomas, Jenny Chen, Luis Gutierrez, Nathalie El Omeiri, Ivan Alvarez, Kathy Paez
- PAHO AMU/AMC surveillance
  - Jose Luis Castro, Robin Rojas
- PAHO AMR FPs in country offices
  - Tamara Mancero, (Argentina), Rogerio Lima (Brazil), Ingrid Garcia, Yamile Bustos, German Esparza (Colombia), Claudio Canales (Chile), Romeo Montoya, Beatriz Cohenca (Paraguay), Guillermo Frias (Peru), Lucia Alonso, Grisel Rodriguez (Uruguay)
- All PAHO country offices
- National reference lab, WHO CC
- AMR partners (API, ALAPAC, ACENCAI, CDC, EU, ASM, FIU, among others)
PNLAC was established in 2003 and is one of seven regional net-works within PulseNet International.

To strengthen national and regional laboratory-based foodborne disease surveillance for early detection and investigation of outbreaks, to setup control, and prevention strategies in contribution to Public Health.

DOI: 10.1089/fpd.2018.2587
**CHALLENGE:** barrier in the comparison of results across tools, modularity of tools within workflows and...
Communication of results among NRL and networks

Many AMR gene detection tools
Different output reports of detected AMR genes in non-standard or comparable formats
Data Structures Working Group

Chair: Emma Griffiths
21 Members (9 countries, 4 continents)

Goal: develop/promote data standards

• COG-UK, SPHERES, CanCOGeN, Latin American Genomics Network
Data standard for the bioinformatic detection of AMR genes from genomics data

hAMRonization
hAMRonization

- Provides standardized field names for reporting AMR gene detection results
- Automatically converts the varied outputs of the 14 AMR gene detection tools to a standardized unified report
- This tool also supports creation of summary reports across tools and data-sets in a variety of formats
- The specification and hAMRonization are open-source and freely available at https://github.com/pha4ge/hAMRonization.
PILOT in LAC

- Explore the utility for improving genomic-based AMR surveillance communication and data sharing among countries and networks
- All participants working with genomics will test hAMRronization with the different tools with a local dataset (*Salmonella Typhimurium* and *Shigella sonnei*)
- This tool also supports creation of summary reports across tools and data-sets in a variety of formats
- The specification and hAMRronization are open-source and freely available at [https://github.com/pha4ge/hAMRronization](https://github.com/pha4ge/hAMRronization).
PILOT in LAC

- Feedback from the countries to evaluate the use of hAMRonization
- Installation, use, information useful to interpret the results
Thank you to
the Data Structures WG,
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This work would not be possible without the contributions and dedication of these wonderful people.

Find us:
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