A regional approach to understanding the capacity to detect, respond to and contain carbapenem-resistant organisms

ReLAVRA+ Meeting

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No conflicts of interest to disclose

Overview of multi-regional project

Goal

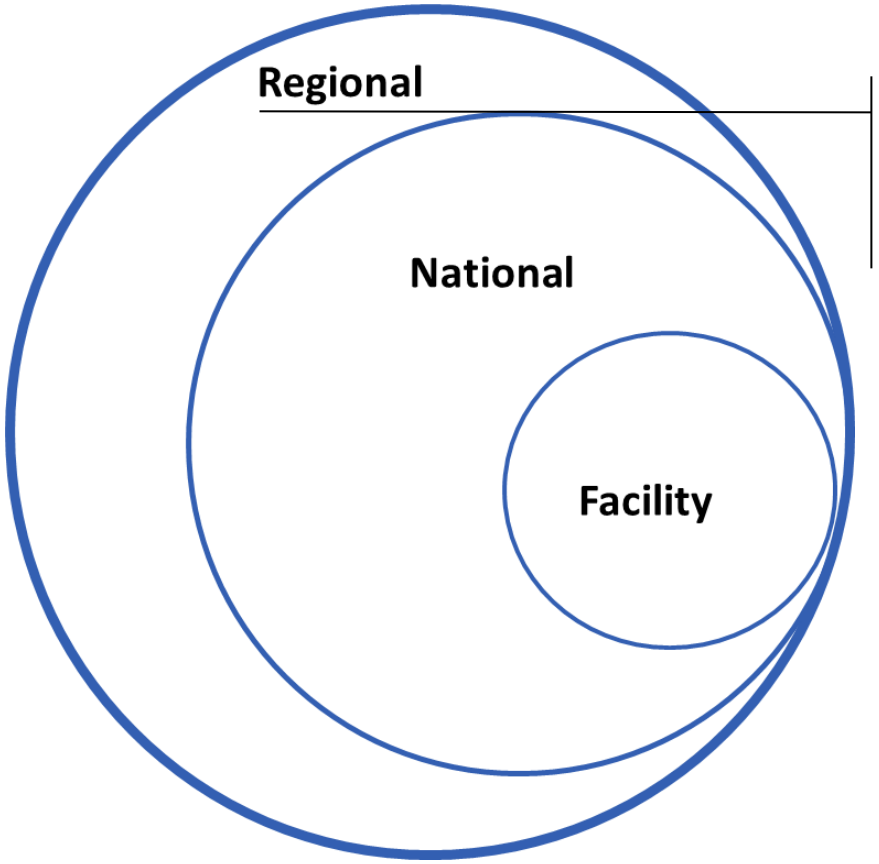
- To gain a better understanding of regional-, national-, and facility-level capacities and barriers to detect, respond to, and contain carbapenem-resistant organisms (CROs)/carbapenemase-producing CROs (CP-CROs) in resource-limited settings in order to advocate for solutions and advance preparedness and response

Objectives

- Synthesize existing epidemiologic data on CROs, focusing on CP-CROs where data are available
- Examine national-level capacities for CRO/CP-CRO detection, response, and containment
- Investigate facility-level capacities for CRO/CP-CRO detection, response, and containment
- Identify national- and facility-level barriers to implementation of recommended CRO/CP-CRO prevention and containment strategies and explore opportunities to mitigate
- Present a call to action and a framework for regional CRO/CP-CRO containment

Approach

- Phased, mixed-methods approach to generate data at the regional, national, and facility levels

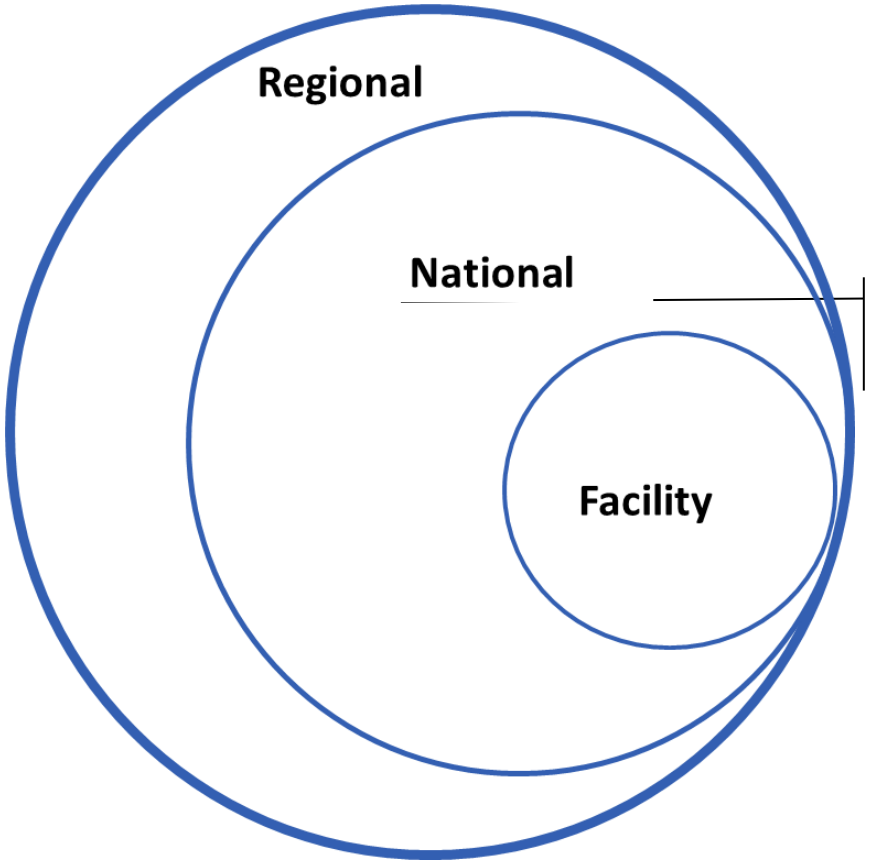


Broad focus, capturing outcome data for all countries in the region for which data exists. Accomplished via literature and AMR data review.

- **Time frame**
- **Search strategy and terms**
- **Exclusion/inclusion criteria**
- **Languages**
- **Standard data abstraction forms and table shells**

Approach

- Phased, mixed-methods approach to generate data at the regional, national, and facility levels

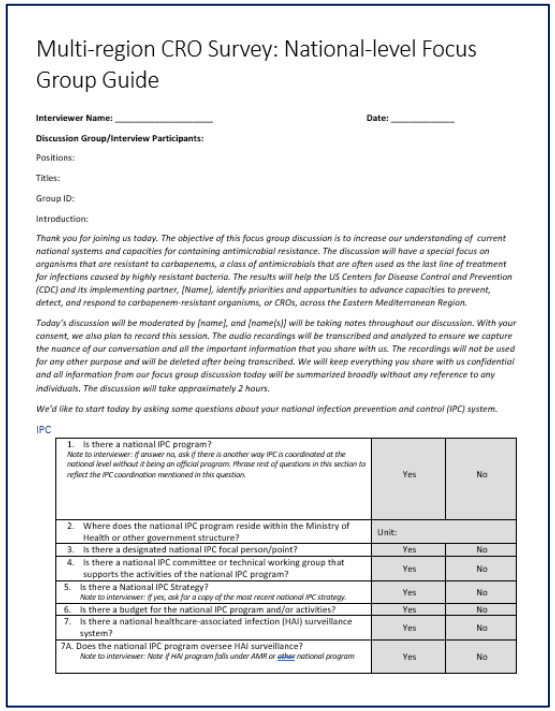


Survey of national capacities in the region.

- **Survey and database development**
- **Country selection**
- **Participants**

Approach

- Phased, mixed-methods approach to generate data at the regional, national, and facility levels



Multi-region CRO Survey: National-level Focus Group Guide

Interviewer Name: _____ **Date:** _____

Discussion Group/Interview Participants:

Positions:

Titles:

Group ID:

Introduction:

Thank you for joining us today. The objective of this focus group discussion is to increase our understanding of current national systems and capacities for containing antimicrobial resistance. The discussion will have a special focus on organisms that are resistant to carbapenems, a class of antimicrobials that are often used as the last line of treatment for infections caused by highly resistant bacteria. The results will help the US Centers for Disease Control and Prevention (CDC) and its implementing partner, [Name], identify priorities and opportunities to advance capacities to prevent, detect, and respond to carbapenem-resistant organisms, or CROs, across the Eastern Mediterranean Region.

Today's discussion will be moderated by [name], and [name(s)] will be taking notes throughout our discussion. With your consent, we also plan to record this session. The audio recordings will be transcribed and analyzed to ensure we capture the nuance of our conversation and all the important information that you share with us. The recordings will not be used for any other purpose and will be deleted after being transcribed. We will keep everything you share with us confidential and all information from our focus group discussion today will be summarized broadly without any reference to any individuals. The discussion will take approximately 2 hours.

We'd like to start today by asking some questions about your national infection prevention and control (IPC) system.

IPC

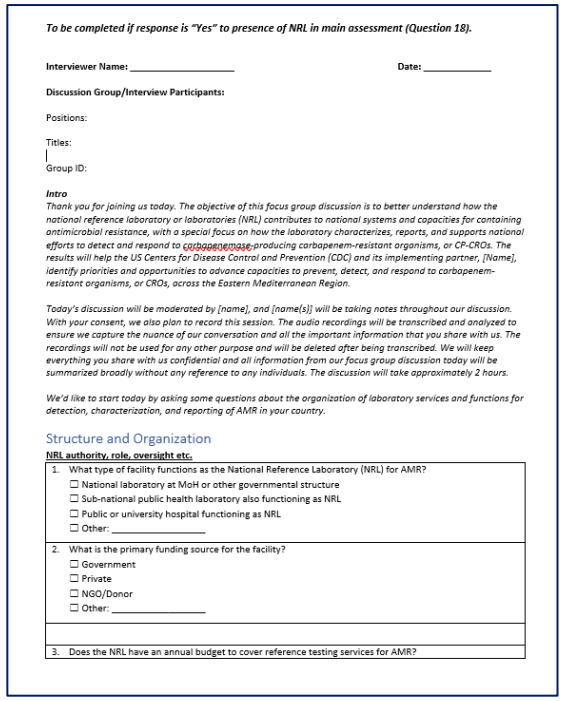
1. Is there a national IPC program? *Note to interviewer: If answer no, ask if there is another way IPC is coordinated at the national level without it being an official program. Phrase rest of questions in this section to reflect the IPC coordination mentioned in this question.*	Yes	No
2. Where does the national IPC program reside within the Ministry of Health or other government structure?	Unit:	
3. Is there a designated national IPC focal person/point?	Yes	No
4. Is there a national IPC committee or technical working group that supports the activities of the national IPC program?	Yes	No
5. Is there a National IPC Strategy? *Note to interviewer: If yes, ask for a copy of the most recent national IPC strategy.*	Yes	No
6. Is there a budget for the national IPC program and/or activities?	Yes	No
7. Is there a national healthcare-associated infection (HAI) surveillance system?	Yes	No
7A. Does the national IPC program oversee HAI surveillance? *Note to interviewer: Note if HAI program falls under AMR or other national program*	Yes	No

Information collected includes:

- National level Infection Prevention and Control programs
- National AMR programs
- National antimicrobial stewardship programs and activities
- Routine reporting of healthcare-associated infections and AMR
- Reporting of alerts and outbreaks
- Impact of COVID-19

Approach

- Phased, mixed-methods approach to generate data at the regional, national, and facility levels



To be completed if response is "Yes" to presence of NRL in main assessment (Question 18).

Interviewer Name: _____ **Date:** _____

Discussion Group/Interview Participants:

Positions:

Titles:

Group ID:

Intro

Thank you for joining us today. The objective of this focus group discussion is to better understand how the national reference laboratory or laboratories (NRL) contributes to national systems and capacities for containing antimicrobial resistance, with a special focus on how the laboratory characterizes, reports, and supports national efforts to detect and respond to carbapenemase-producing carbapenem-resistant organisms, or CP-CROs. The results will help the US Centers for Disease Control and Prevention (CDC) and its implementing partner, [Name], identify priorities and opportunities to advance capacities to prevent, detect, and respond to carbapenem-resistant organisms, or CROs, across the Eastern Mediterranean Region.

Today's discussion will be moderated by [name], and [name(s)] will be taking notes throughout our discussion. With your consent, we also plan to record this session. The audio recordings will be transcribed and analyzed to ensure we capture the nuance of our conversation and all the important information that you share with us. The recordings will not be used for any other purpose and will be deleted after being transcribed. We will keep everything you share with us confidential and all information from our focus group discussion today will be summarized broadly without any reference to any individuals. The discussion will take approximately 2 hours.

We'd like to start today by asking some questions about the organization of laboratory services and functions for detection, characterization, and reporting of AMR in your country.

Structure and Organization

NRL authority, role, oversight etc.

1. What type of facility functions as the National Reference Laboratory (NRL) for AMR? ☐ National laboratory at MoH or other governmental structure ☐ Sub-national public health laboratory also functioning as NRL ☐ Public or university hospital functioning as NRL ☐ Other: _____
2. What is the primary funding source for the facility? ☐ Government ☐ Private ☐ NGO/Donor ☐ Other: _____
3. Does the NRL have an annual budget to cover reference testing services for AMR?

National Reference Laboratory information:

- Structure and organization
- Quality and standards
- Testing capacity for multidrug-resistant organisms
- Testing capacity for CRO/CP-CRO
- Reporting and analysis

Approach

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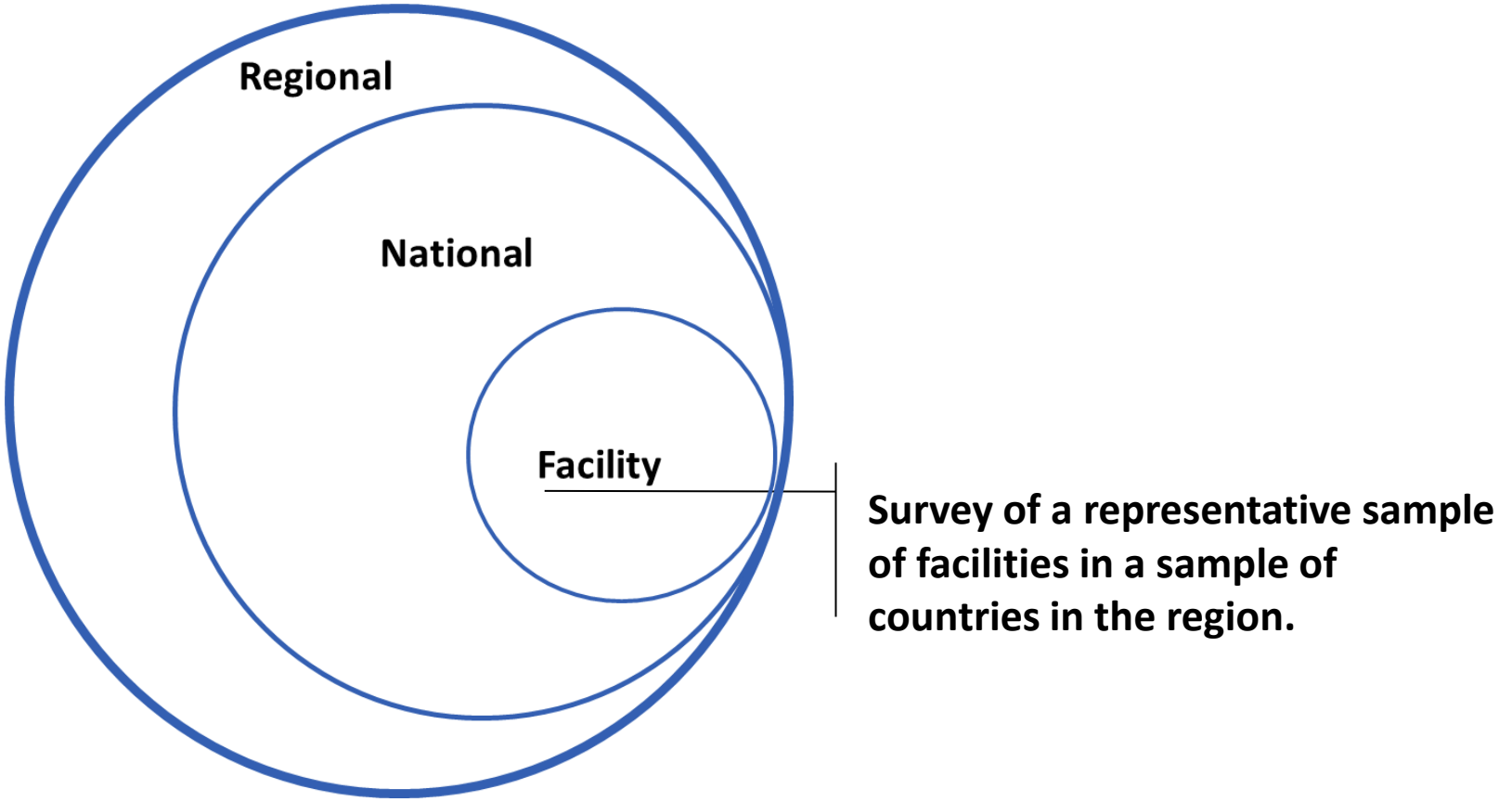


Regions

- Latin America and the Caribbean
- Middle East and North Africa
- Eastern Europe and Central Asia
- Southeast Asia

CRO project implementation in Latin America and the Caribbean

CRO project in Latin America and the Caribbean

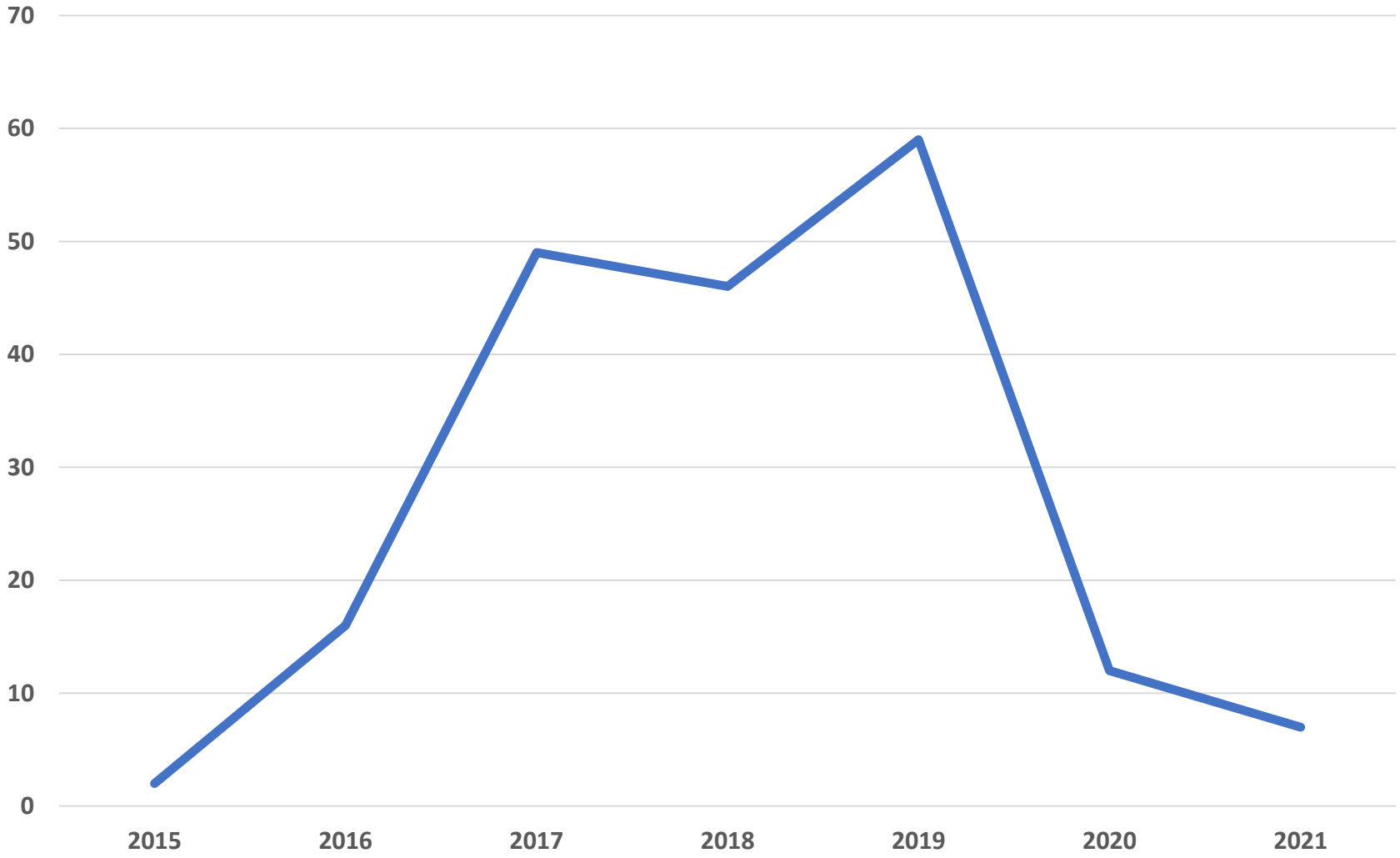
- Implemented by PAHO
- Status of the different phases in the region:
  - Regional level
    - Literature and data review already done
  - National level
    - Currently in process
  - Facility level
    - It will take place in the second half of 2023

Literature review: objective and methodology

- Objective:
  - To identify articles and cases published in 2015-2021 that discuss carbapenem resistance in *Enterobacterales*, *Acinetobacter baumannii* (AB) and *Pseudomonas aeruginosa* in the Latin American and Caribbean region.

- Review conducted by identifying articles and cases in PubMed, SciELO, Lilacs, Embase, Cochrane, Google Scholar databases and other sources.

Number of articles identified in the region, by year



Unpublished preliminary data

Literature review: main findings

225 CROs/CP-CROs articles identified:

- Most of the articles were from Brazil, Colombia, Argentina and Mexico
- Data from 198 (88%) of the articles was from inpatient units in hospitals
- Carbapenemase production was described in 177 (79%) of the articles
- Most studies used CLSI guidelines and PCR for carbapenemase-specific gene/enzyme detection

Unpublished preliminary data

Literature review: main findings

The focus of the 225 articles was:

- *Enterobacterales:* 125 (56%)
- *A. baumannii:* 44 (20%)
- *P. aeruginosa:* 27 (12%)
- Combinations of the most critical carbapenem-resistant bacterial families, resistance mechanisms, and global impact of the spread of these pathogens: 29 (13%)

Unpublished preliminary data

Carbapenemases detected in *A. baumannii,* based on literature from Latin America and Caribbean, 2015-2021

No. CRO isolates	Tested carbapenemase	NDM n (%)	KPC n (%)	OXA n (%)	IMP n (%)	VIM n (%)	Other n (%)	2 or more n (%)
4279	3022 (70)	34 (1)	45 (2)	2791 (92)	21 (1)	2 (0)	1 (0)	128 (4)

Unpublished preliminary data – data under review

Carbapenemases detected in *P. aeruginosa*, based on literature from Latin America and Caribbean, 2015-2021

No. CRO isolates	Tested carbapenemase	NDM n (%)	KPC n (%)	OXA n (%)	IMP n (%)	VIM n (%)	Other n (%)	2 or more n (%)
920	316 (34)	0 (0)	67 (21)	1 (0)	39 (12)	153 (48)	79 (25)	37 (12)

Unpublished preliminary data – data under review

Carbapenemases detected in *K. pneumoniae,* based on literature from Latin America and Caribbean, 2015-2021

No. CRO isolates	Tested carbapenemase	NDM n (%)	KPC n (%)	OXA n (%)	IMP n (%)	VIM n (%)	Other n (%)	2 or more n (%)
3231	1431 (44)	176 (12)	1152 (81)	0	0	0	66 (5)	38 (3)

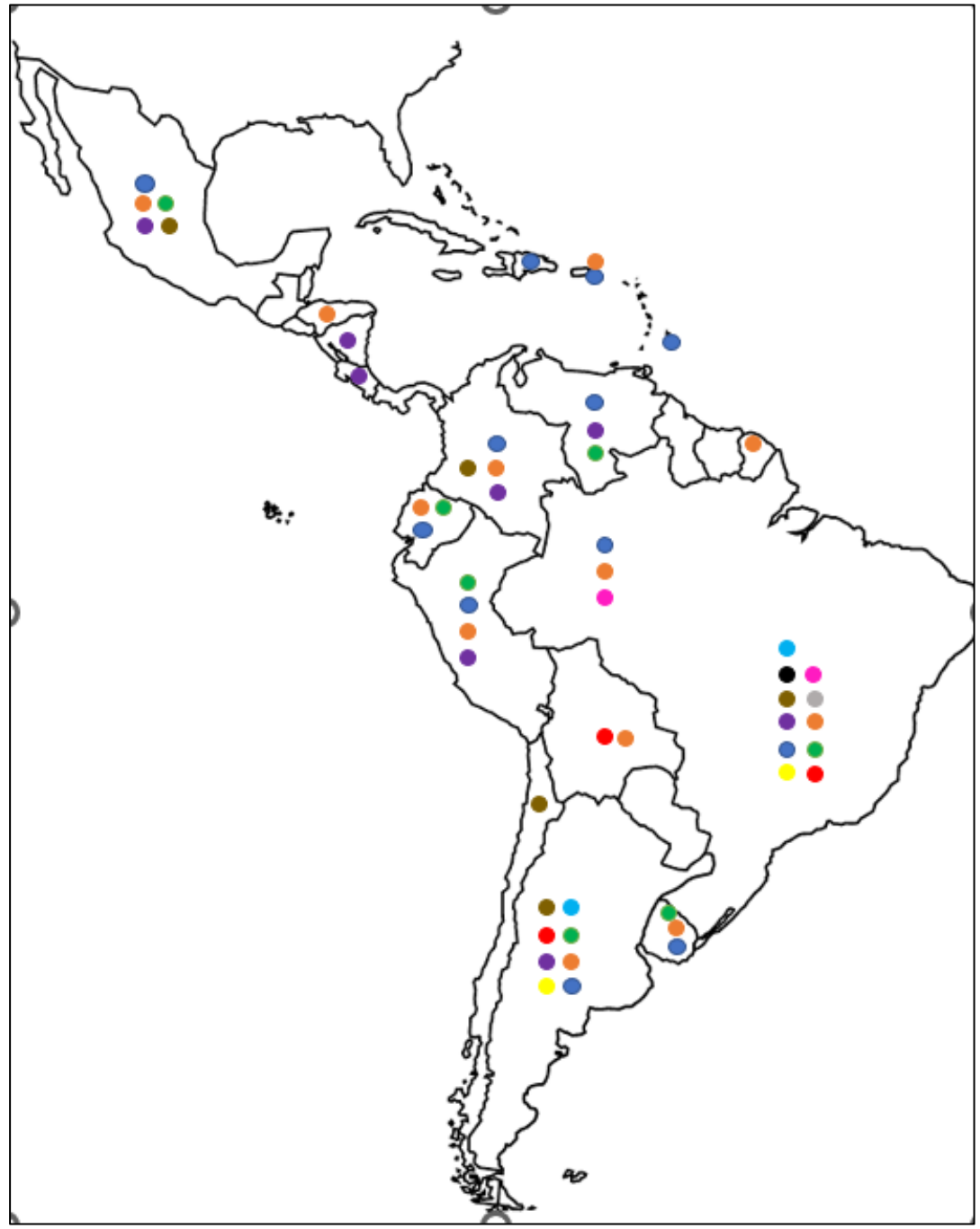
Unpublished preliminary data – data under review

Carbapenemases detected in *E. coli*, based on literature from Latin America and Caribbean, 2015-2021

No. CRO isolates	Tested carbapenemase	NDM n (%)	KPC n (%)	OXA n (%)	IMP n (%)	VIM n (%)	Other n (%)	2 or more n (%)
2298	1031 (45)	104 (10)	673 (63)	2 (0)	0	0	163 (16)	89 (9)

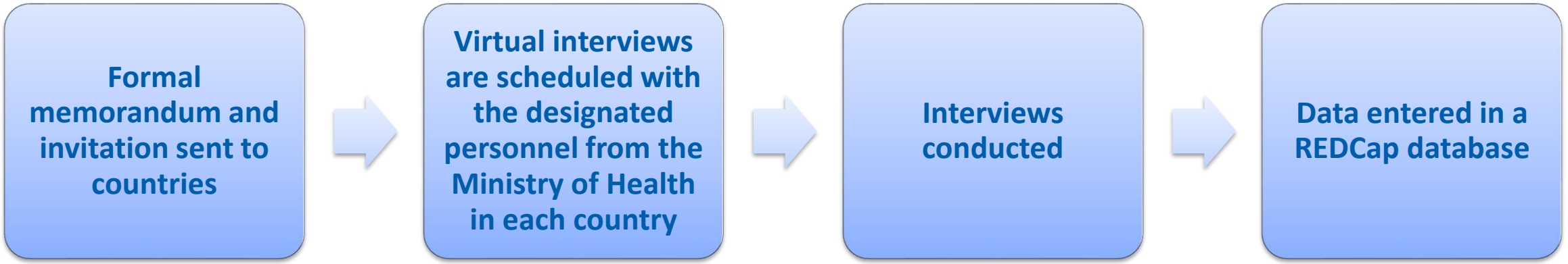
Unpublished preliminary data – data under review

Carbapenemases reported in the articles by countries in the region, 2015-2021



Unpublished preliminary data – data under review

National level assessments in the Latin American and Caribbean region



Status of national level assessments in the region

	Number of countries
Completed	7
In progress	2
Pending to be completed	12

Next steps

- Selecting countries for facility level CRO assessments
- Conducting facility assessments
- Analyzing data
- Developing final documents

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.