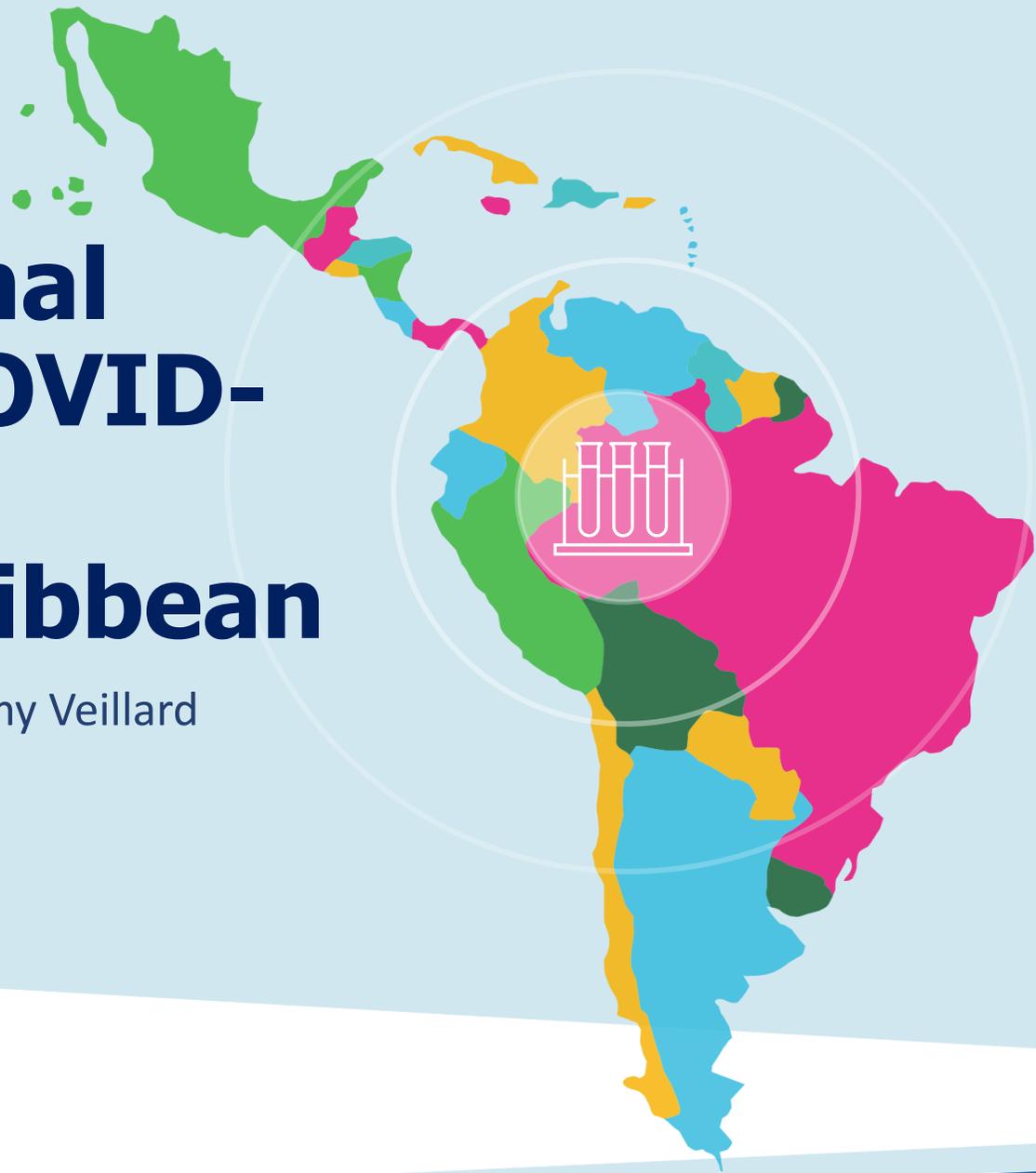


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Population-Level, National Testing Strategies for COVID-19: Latin America & The Caribbean

∴ Jonathon Campbell, Timothy Evans, Aakash Mohpal, & Jeremy Veillard



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The number of confirmed cases are largely increasing across LAC, with significant social and economic tolls



LAC remains the global epicentre of the COVID-19 pandemic

GDP

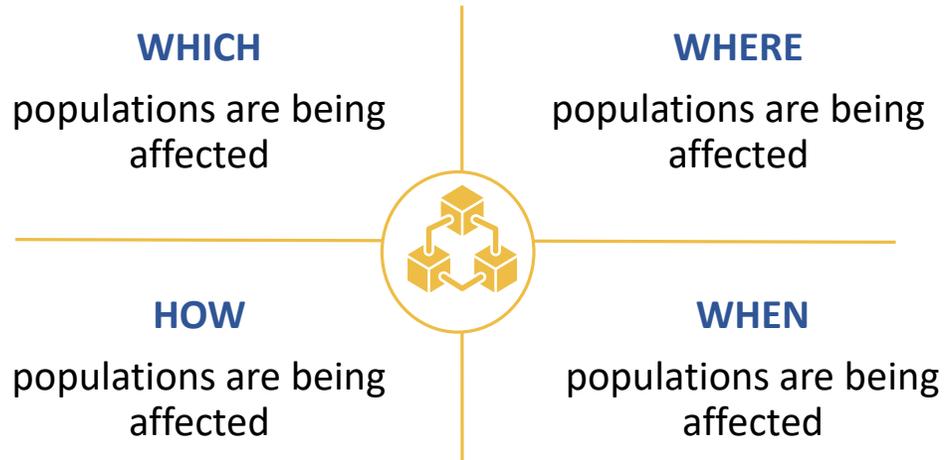
>9%

GDP is expected to contract by >9% in LAC in 2020, threatening to push millions more into poverty

Most of LAC has had difficulty managing the pandemic proactively, with testing system performance being suboptimal



LAC will experience subsequent waves of COVID-19. **Testing systems are key for pandemic response.** They help inform:



Proactive preventative strategies to mitigate transmission can be targeted where they might be most impactful. Testing has an important role to play in early detection of infections.

Minimizing transmission is essential for economic recovery. Robust testing systems are the key to keeping schools and businesses open.

Strong testing and information systems are essential for vaccine surveillance. There is extensive **synergy** with systems required for vaccine roll-out and testing. **Testing is a critical tool** to be used alongside vaccines:

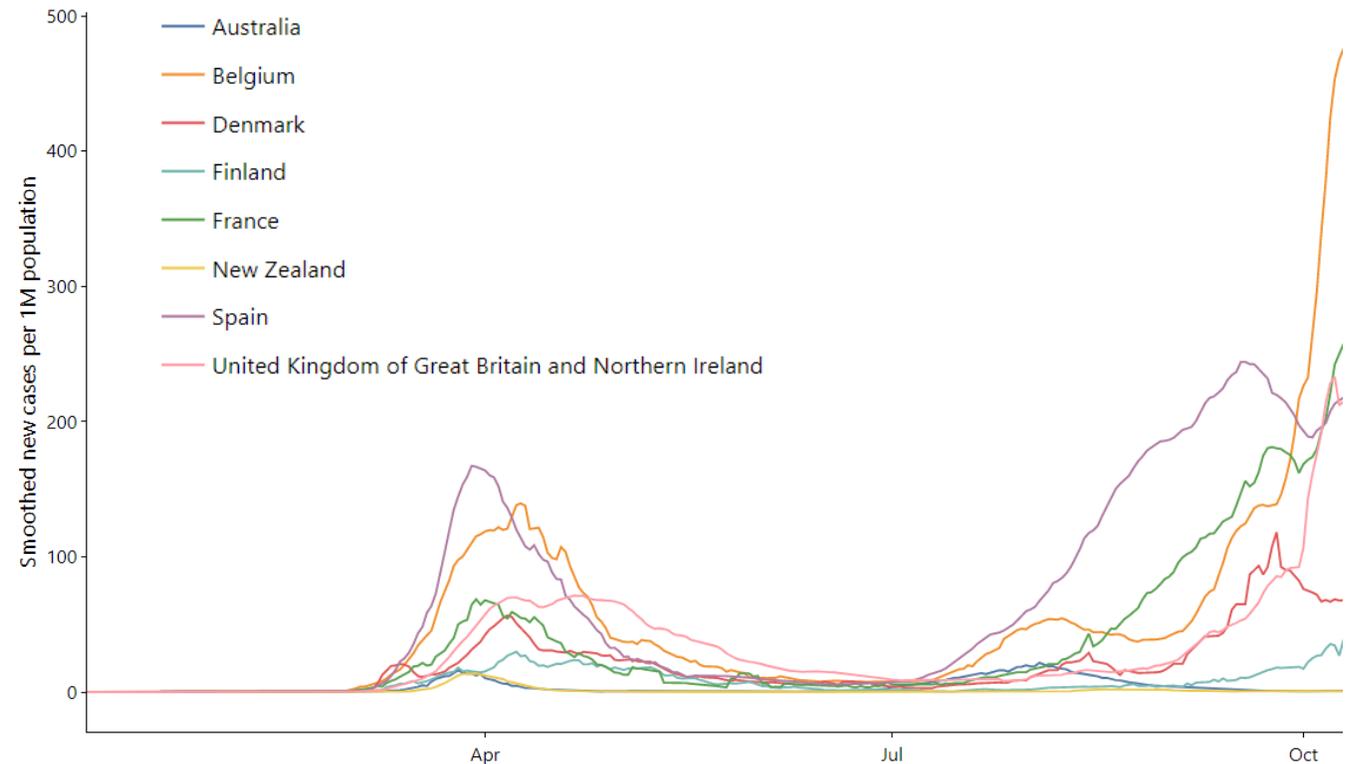
IMMUNITY	EFFECTIVENESS	MONITORING
<p>Vaccine induced immunity must be monitored with testing on a population level.</p> <ul style="list-style-type: none"> Allows targeting of revaccination among populations with waning immunity Gives indication of the duration and extent of vaccine protection 	<p>The real-world effectiveness of COVID-19 vaccines will be <i>largely uncertain</i> and possibly <i>variable</i> across settings and populations.</p> <ul style="list-style-type: none"> Important to know where support and additional measures may be required. Testing will continue to play a role in detecting transmission 	<p>Vaccine coverage will be <i>incomplete</i> and focused on <i>priority populations</i>.</p> <ul style="list-style-type: none"> Some highly vulnerable populations cannot be vaccinated. Continued testing and monitoring of COVID-19 among unvaccinated populations is imperative

Large disparities exist between countries in their management of the second wave of COVID-19. In part, due to the **effectiveness** of their testing systems.

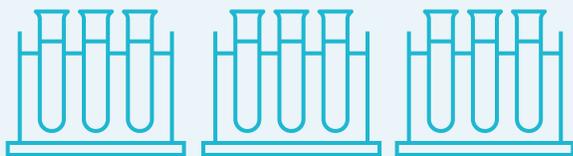
Countries that have been more successful tend to have:

- **EFFECTIVE** test, trace, and isolate systems for contacts
- **COMMITMENT** to targeted community testing where necessary

Well-designed national strategies for COVID-19 testing make a difference in overall pandemic control.



Source: COVID Intel Database, Kontis, V. et al.. *Nat Med* (2020)., <https://doi.org/10.1038/s41591-020-1112-0>



Strong testing systems **operate at scale**, monitoring key pandemic indicators and adjusting testing approaches to these indicators.

Many testing strategies rely on **passive approaches** to testing to inform pandemic response



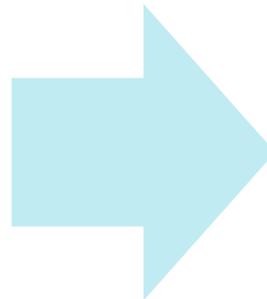
- Make use of resources or events that would occur without any additional intervention
- These approaches are **underpowered** to adequately direct preventive measures and respond **too late** to spikes in transmission
- Systems based on these approaches are **slow** and **reactive** to epidemiologic changes



TESTING CLINICALLY PRESENTING CASES

(i.e., symptoms) and persons who self-present to assessment centres or hospitals is a **passive approach**.

To enrich pandemic response, testing strategies should embrace **proactive approaches** to testing



- Require additional resources to collect data and/or samples necessary to perform testing.
- Yields data **above and beyond** what can be gathered through passive approaches and can be directed to areas of need.
- Permits **data-driven tailoring of responses** to the pandemic by giving a more complete picture of what is happening.



IMPLEMENTING CONTACT TRACING AND TESTING

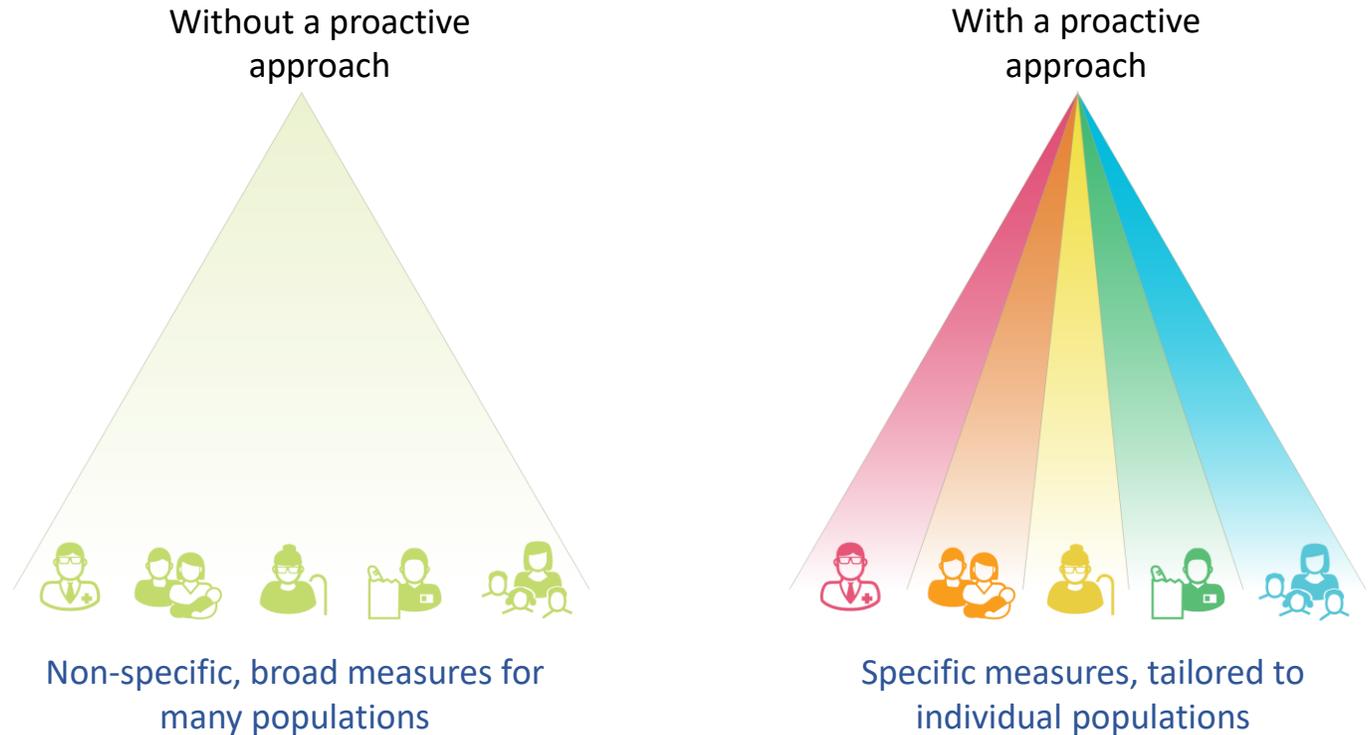
is an example of a **proactive approach**.

When transitioning to more proactive approaches to testing it is important to consider:

- The distribution of population-level risk and probability of unfavorable outcomes
- The varying presentation of COVID-19—recognizing severe clinical disease is a **minority** of all cases.
- The complexity of asymptomatic and pre-symptomatic transmission in COVID-19 control.

The aim of proactive approaches is to **get ahead of the epidemic curve.**

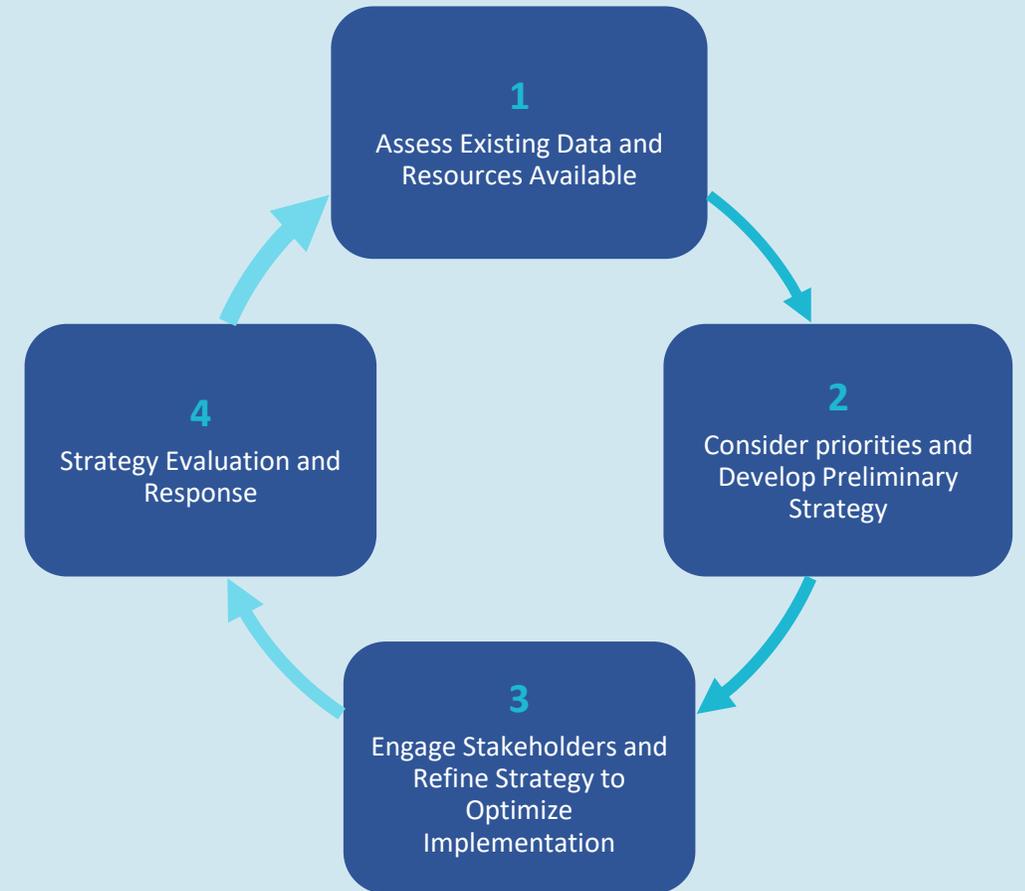
Countries need to begin reconsidering the design and implementation of testing systems to move towards a more **rapid** and **proactive** approach to COVID-19 testing



The process of designing proactive testing strategies at a national level is **cyclical with four key stages, informed by:**

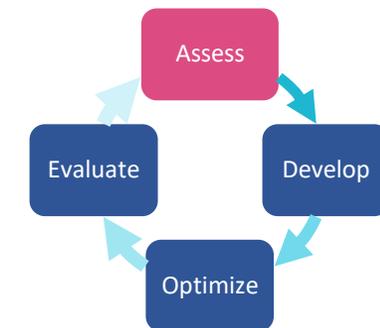
- Already Available Data
- Available Capacity within the Health System
- Ability to Successfully Implement Strategies

It is key to consider how proactive testing can add value to current national strategies and how existing testing systems can be adapted to support its implementation.



Process of Designing Proactive Testing Strategies at a National Level

Prior to revitalizing national testing strategies, an honest inventory of its current status must be conducted. This can identify current “pinch-points” and areas of weakness:



How is the **CURRENT TESTING CAPACITY** being utilized (human resource/ laboratory)?

- Who is targeted and where is it being deployed? Is testing largely *reactive*?
- Is a large proportion of the capacity being leveraged each day?
- Is the capacity being used efficiently? What are existing bottlenecks?



What are the **INFORMATION SYSTEMS**?

- How are information systems structured?
- What is the turnaround time for results?
- How quickly are surveillance reports produced?
- How complete and efficient is transfer of information between departments involved in surveillance?
- What is the *quality* of the data being collected and what processes for quality assurance exist?

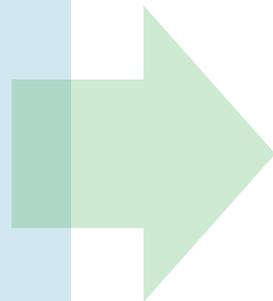
Within the current framework and institutional setup, how can proactive testing be implemented? What needs to be addressed?

These foundational questions will help guide assessments of other areas, supporting the stepwise improvement and sustainability of proactive approaches within national testing strategies.

The primary objective of assessing available data and resources is to answer three questions.

1

What you currently know

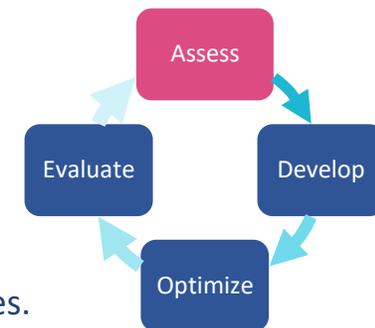


What data on the pandemic might already be available?

- Mortality data, hospitalization data, case numbers, recovery rates.
- Syndromic surveillance data or outbreak information
- Regional or population-specific assessments

What is the utility and completeness of available data?

Are there other country experiences or modelling work available?



2

What you currently *do not* know

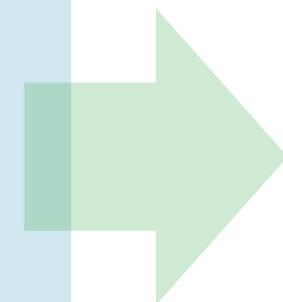


Where are the current “blind spots” in terms of the extent and dynamics of the pandemic?

Where is data utility compromised by potential biases stemming from over or under-ascertainment?

3

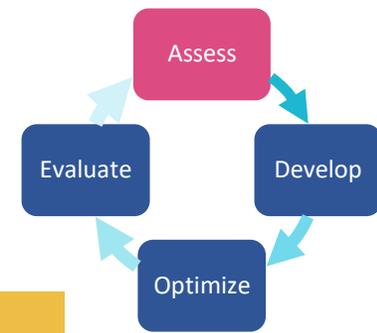
What you would like to *know more* about



Within the context of your current national system and realistic, stepwise improvements. Consider:

- Cash flow; human resources; sampling and lab materials; laboratory capacity available; and system governance

Consider the range of tests for COVID-19 available and their methods of procurement



Tests for Acute (Current) Infection

How COVID-19 is affecting populations now

Reverse Transcription
Polymerase Chain
Reaction (RT-PCR)

Rapid, Antigen-Based,
Point of Care Tests

Utility is more **short-term** and useful for both **individual and population** trends for surveillance if used appropriately.

Tests for Previous Infection

How COVID-19 affected populations previously

Antibody tests

Utility is more **mid- to long-term** and useful for **population** trends for surveillance.

How might each of the tests help you gather the data required in the context of your strategic objectives?

- *What are the advantages and limitations of each test? For which purposes are they intended?*

How can they add value to your testing system? In terms of:

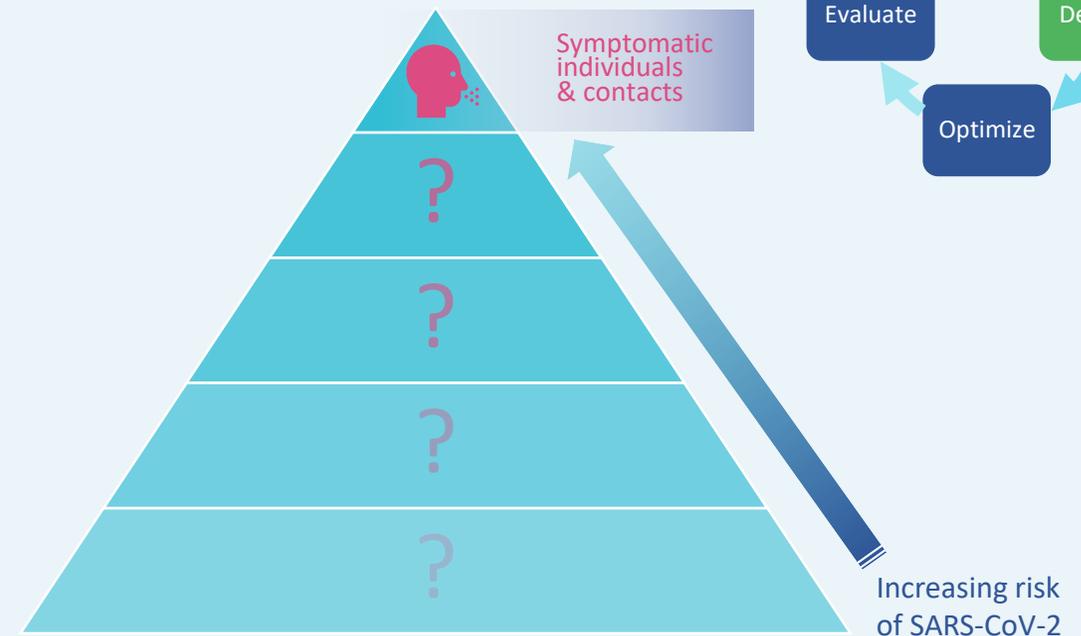
- *Cost; human resources; and logistics.*

How can these tests best be deployed in the context of testing system capacity?

Assessing your current national strategy, where you are in the pandemic, and the data and resources available to you permits **evidence-based decision making regarding priorities**.

Proactive testing strategies must be sensitive to the variable distribution of risk among the population and how risk can cluster outside of symptomatic persons and contacts.

- Considering this spectrum in a **hierarchy** can make priorities explicit. How this hierarchy takes shape depends on country-specific context. Strategies should be tailored to each priority population and their current situation.
- Proactive strategies can be **readily adapted** to move through these priority groups as required based on changing risk and feasibility of testing within existing systems.

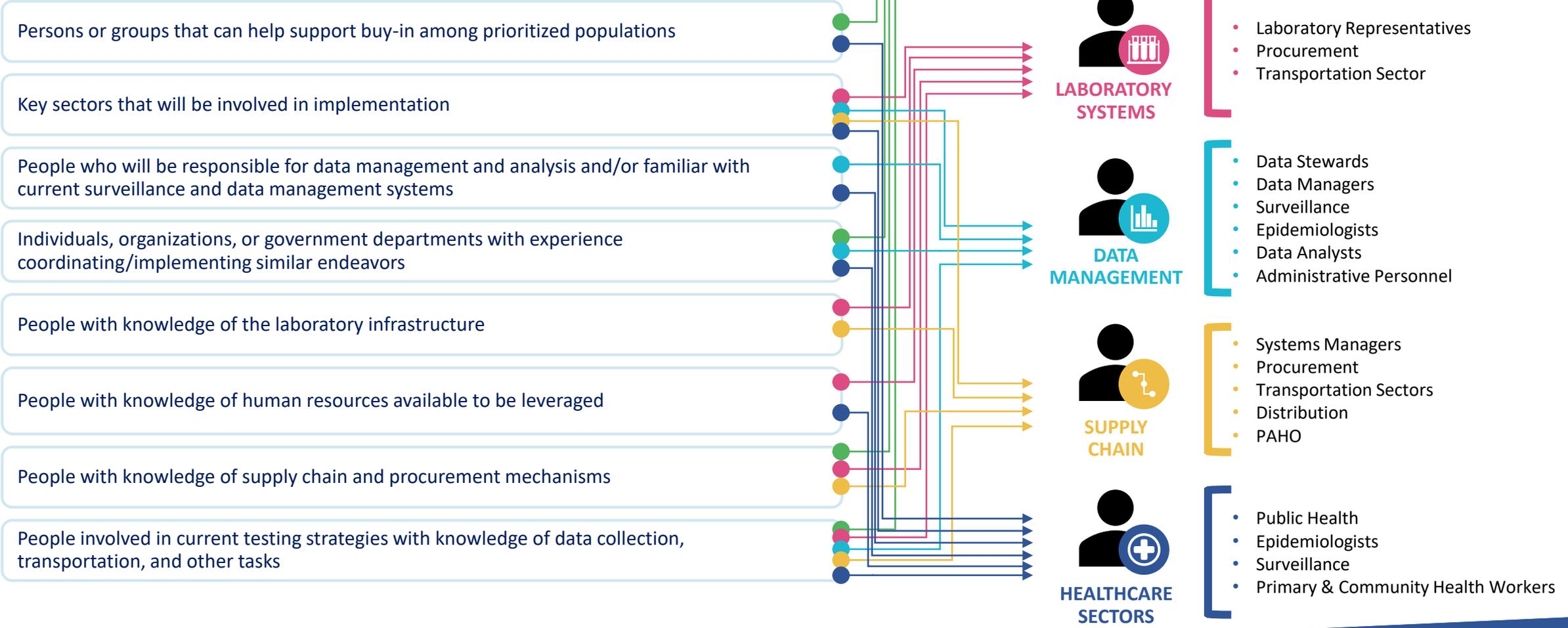


Well-designed, population-level **serological surveys** aimed to evaluate the **undetected** spread of COVID-19 in countries has immense value for priority refinement and development. They are key to help direct where proactive testing will have the greatest return.

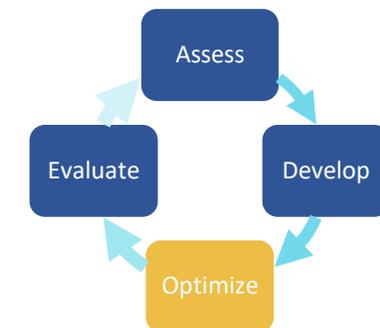


Example of impacted populations identified by a survey

Testing systems are **human resource intensive**. They require the diverse groups of individuals with different areas of expertise in the right numbers. The scope and scale of human resource needs must be actively managed within the context of national strategies.



With persons involved in implementation of the strategy—both on the ground and in advisory roles—several considerations (in addition to human resources) may shape the scope of your testing strategy and should be revisited. Considerations within each category are not mutually exclusive and many are cross-cutting.



1

Laboratory Infrastructure and Capacity

Consider the laboratory needs for your strategy: do you require RT-PCR, antibody testing, or both?

Think about:

- Can laboratories manage additional demand for RT-PCR or antibody testing? Are there mechanisms to expand capacity? Should sample collection be staggered or adjusted? Is there a streamlined process for receipt of samples and reporting of results?



2

Supply Chain

Implementation of a testing strategy requires secure supply chains for purchase, procurement, and distribution of necessary materials—including swabs, test kits, reagents, and personal protective equipment.

Think about the nature of the procurement system for supplies:

- Is procurement decentralized or centralized/pooled?
- Is there capacity for local manufacturing or production of supplies?

3

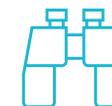


Transportation Networks

Efficient movement of samples collected in appropriate storage to the labs for analysis is necessary. This supports high quality samples being received and rapidity in turnaround.

- A strategy should be designed to mesh with existing transportation networks or new networks should be developed to support the strategy.

4

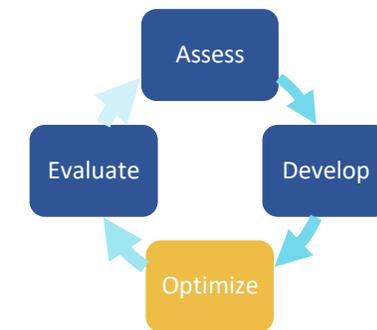


Surveillance Infrastructure and Data Communication

To make surveillance testing useful and actionable, reliable and integrated infrastructure must be in place. This will ensure data generated by testing can be actioned in a timely fashion.

- Linked with laboratory capacity—rapid turnaround of test results and reporting is vital. Data communication must be efficient between labs, public health, and persons sampled.
- Subsequent collation and analysis of results with attendant mobilization of a response to the findings is equally important. Adequate staffing and communication between groups involved is necessary.

The success and impact of national testing systems relies on rapid and reliable implementation of testing strategies. Priority populations must be reached to be tested and the data must be analyzed in a timely fashion to allow meaningful responses. Planning to maximize the probability implemented strategies produce the data required is necessary.



SELECTION	SAMPLE SIZE	EXPECTED UPTAKE	DATA COLLECTED	DURATION	RESPONSE
<ul style="list-style-type: none"> How will you plan to proactively sample the populations prioritized within the national strategy? What sampling techniques will be utilized? 	<ul style="list-style-type: none"> How many people will you need to test to ensure the acquired data is useful (i.e., representative?) How can this sample size be obtained within current frameworks and in the context testing going on in parallel? 	<ul style="list-style-type: none"> What do you expect to be the overall uptake of testing among proactively tested populations? Has sample collection been optimized to ensure adequate uptake? 	<ul style="list-style-type: none"> Which data is important to collect from persons who are sampled in the context of your strategic goals? How will the collected data act to inform future approaches? 	<ul style="list-style-type: none"> Over what period of time will samples be collected from populations proactively tested? How does this duration fit within current testing system capacity and strategic goals? 	<ul style="list-style-type: none"> What are the possible responses to data collected from proactive testing? How can data be analyzed and actioned in order to be impactful?

Data obtained from testing need to be analyzed in the context of the goals of national testing strategies.

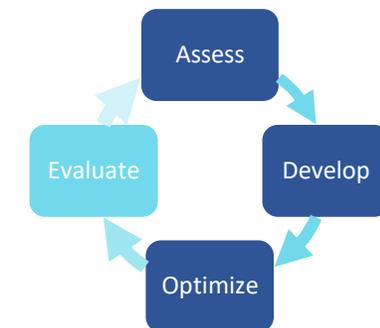
This data analysis can be done within existing public health systems in the same way other surveillance data is handled.

Beyond the goal of identifying infections early to break chains of transmission, data have been collected for other, specific purposes.

- To inform public health measures and better understand extent and dynamics of infection in specific populations.

Data collected from proactive strategies should also be analyzed in the context of other available data.

- Understanding what the complete picture of data is saying is necessary to plan informed, effective responses.
 - Responses to will vary depending on the population(s) targeted.
 - Responses should be informed by data analysis that is performed to a high standard and accounts for potential sources of bias such as non-response and missing data.

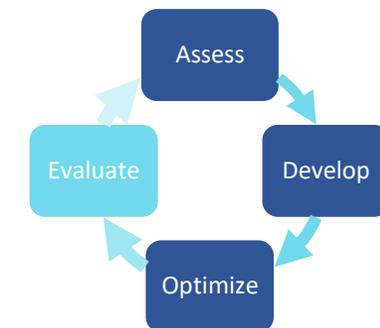


Responses should also include consideration of the need for repeated testing and its frequency.

- Repeat testing is often required to measure *changes in prevalence and/or risk* caused by measures implemented in response to findings.
- Tests may be frequently repeated if the intended to prevent outbreaks in settings with high transmission potential.

A **comprehensive evaluation** of implemented national strategies should be undertaken at regular intervals (e.g., monthly, quarterly) to ensure strategies remain relevant, are providing useful data, and are making efficient use of resources.

Evaluations should cover the following themes:



OVERARCHING THEME	QUESTIONS
Utility of the collected data	<p>Did the testing strategy provide the required data?</p> <ul style="list-style-type: none"> • Are there possible explanations or solutions if data is suboptimal?
Cost-Efficiency	<p>Was the implementation of the testing strategy an efficient use of resources (financial, human, lab, etc.)?</p> <ul style="list-style-type: none"> • Could costs and/or resources be spared moving forward?
Acceptability	<p>Was there sufficient uptake and was the strategy acceptable to both the persons sampled and the personnel involved in implementation?</p> <ul style="list-style-type: none"> • Are there specific factors that may be associated with suboptimal uptake?
Barriers and Facilitators	<p>What were barriers that had to be overcome? What were factors that supported implementation?</p> <ul style="list-style-type: none"> • Develop questions following these themes and get feedback from stakeholders to improve efficiency
Feasibility	<p>Would repeating the strategy (if necessary) be feasible?</p> <ul style="list-style-type: none"> • Was there excessive lab, cost, or human resource strain? • Is this sustainable long-term?

Evaluations should also consider key performance indicators, such as:

- Turnaround time for lab results
- Proportion of lab capacity utilized
- Turnaround for collation of daily testing data
- Data completeness
- Uptake of testing when prospectively offered

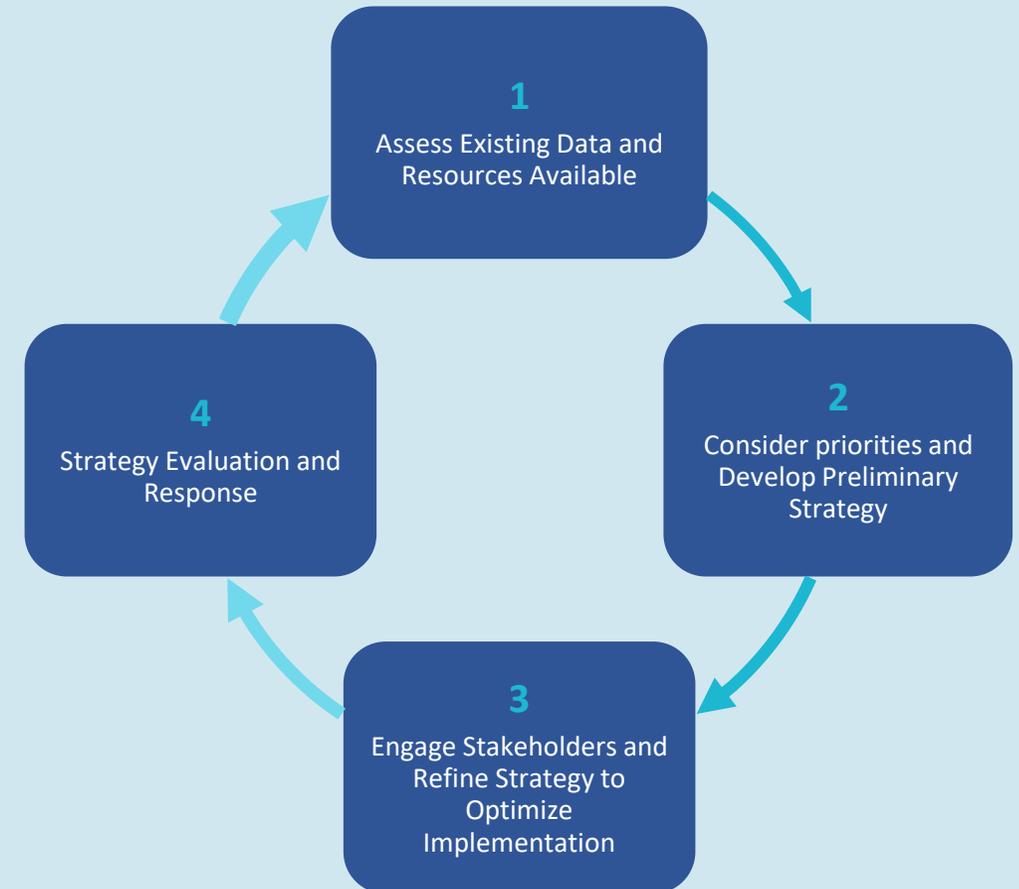
The process of designing national testing strategies is iterative, with each cycle aiming to ensure efficient delivery of scarce resources to maximize population health.

Continuous review of national testing strategies permits adapting national strategies to innovations.

- There are numerous innovative testing solutions in the pipeline which can reduce cost, human resource, and laboratory capacity requirements.
- It allows strategies to readily shift in the context of resource availability, pandemic stage, and priorities.

With vaccine availability expected in the near future, **developing proactive testing strategies through this framework will be essential to ensure effective delivery of vaccines and subsequent surveillance.**

- This will be most efficient in systems that can rapidly shift priorities and implement new strategies.



Thank you!
Gracias!
Obrigado!
Merci!

