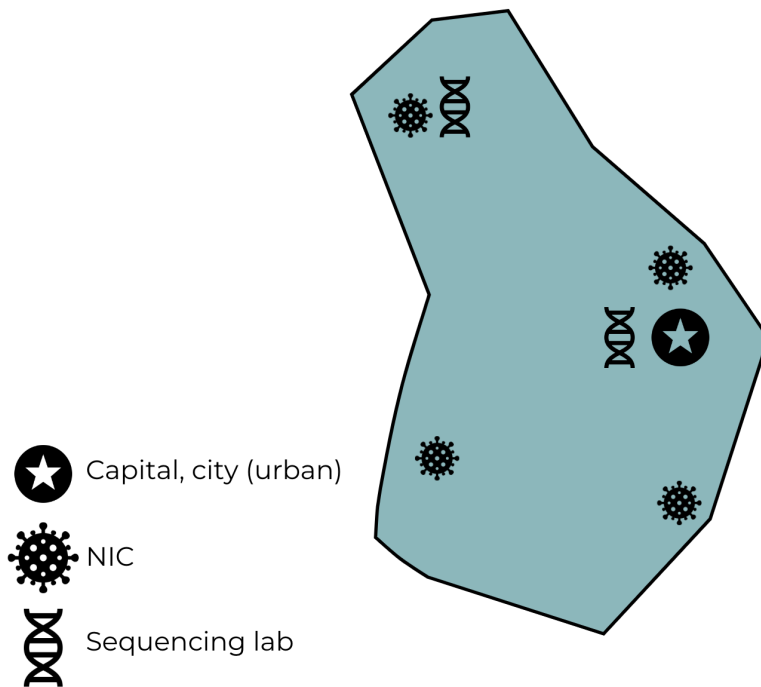


## Case Study: Respiratory and Novel Pathogens

### Scenario Background

- Has a National Influenza Center (NIC) and SARI/ILI sentinel surveillance sites
- NICs incorporated SARS-CoV-2 diagnostic testing
- Developing National Pathogen Genomics Strategy
- 12 health districts
- Sequencing capability exists at central government lab and one academic urban hospital



### Scenario Steps & Prompts

#### Part 1

A local school has a respiratory outbreak. The local NIC tested for influenza and SARS-CoV-2 via RT-PCR, and these tests are negative.

- **What are some potential next steps?**

*Cases are increasing, and a few local infants have been hospitalized. Further diagnostic respiratory panel investigation indicates this outbreak may be caused by respiratory syncytial virus (RSV).*

A few NICs also see upticks in sentinel respiratory samples that are negative for influenza and SARS-CoV-2. Some of these specimens are confirmed RSV and are

from other districts, including a village outbreak.

- **What questions arise?**
- **How can pathogen genomics potentially answer some of these questions?**

#### **Table Discussion:**

What types of **genomic surveillance sampling strategies** could you use to better understand if these outbreaks are related?

#### **Table Discussion:**

- **How can pathogen genomics support outbreak response and public health action?**
- **How does the location of labs and sequencing capacity impact outbreak response and pathogen genomics integration?**

*“An estimated 33 million RSV-associated lower respiratory tract infections (LRTI) occur in children under five every year, leading to 3.6 million hospital admissions. What’s more, over 95% of these infections occur in low- and middle-income countries.”*

<https://www.gavi.org/vaccineswork/rsv-vaccines-are-we-close-taming-one-worlds-biggest-killers-children>

### **Part 2 - 6 months later...**

There is a new pediatric vaccine for RSV. After these widespread RSV outbreaks, the Ministry of Health is thinking about working with GAVI and WHO to procure RSV vaccines.

This Minister of Health has asked your team, **how can pathogen genomics support vaccination rollout and evaluation?**

The Minister of Health decides to include RSV into the routine pediatric vaccination program.

- Is there utility to integrate RSV genomic surveillance into National planning?
- What are the key implementation and actionability considerations?
- Would this decision vary between **high, medium, and low genomic capacity** countries? How so?
- What types of experts would you consult? How would you try to integrate RSV?
- For countries currently integrating RSV, what has been the most difficult step?



### **Part 3 - one month later...**

An adolescent is admitted to a local hospital with severe respiratory symptoms. They

are negative for influenza and SARS-CoV-2, and this is the only respiratory test able to be run at this hospital.

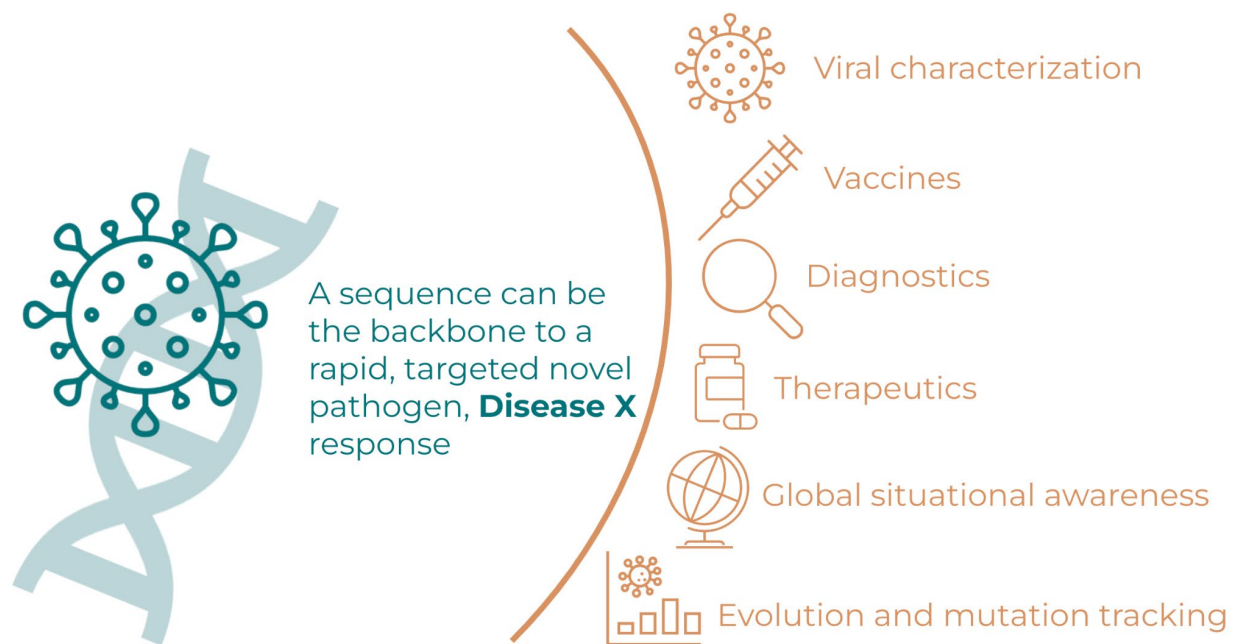
- What are some potential next steps?
- How could you layer different detection tools?
- What do you think is making the patient ill?

This patient is getting worse and tests negative on a multi-respiratory panel, which is confirmed at the central lab. All tests are coming up negative. Two healthcare workers have now fallen ill.

- What are some next testing steps?
- What capabilities are needed?

#### Table Discussion:

1. How can you confirm this is a novel pathogen? What are the implications if this is a novel pathogen, Disease X?
2. How can pathogen genomics support novel virus response at the local, national, regional, and global levels?



#### Final Exercise

Using your large notepad: Design a **regional/national early warning genomic surveillance network for novel pathogen**, Pathogen X, detection using pre-existing respiratory virus surveillance systems or network (sentinel systems, SARI/ILI, WHO network, etc.) in your countries.

- What kinds of **sites** would you use?
- How would you **layer detection tools**?

#### Ending discussion:

- How do we maintain global genomic surveillance preparedness for future pandemics and novel pathogens?
- How can SARS-CoV-2, influenza, and RSV sequencing serve as a backbone for transitioning to novel pathogen detection?
- Can and should novel pathogen surveillance tools be integrated into existing respiratory virus surveillance systems and networks before and after novel pathogen emergence?