

Cholera Detection: Gaps and Aims

Ankur Mutreja

- **Diseases evolve and so should diagnostics**
 - With continuous and real time data analysis, our diagnostics would mold to changing disease landscape

- **Rapid Diagnostic Tests (RDTs) should be “rapid”**
 - Ours is a fast one test confirmatory approach

- **Cost of the test should not be prohibitive**
 - Our approach, being molecular instead of antibody based, is cost effective

- **Accuracy should not be limited to clinic**
 - Our methods are designed to be equally robust in the field

- **Execution and interpretation of the test should be simplistic and dilemma free**
 - Our platform is simple and easy to follow

- **Test result should be actionable**
 - Our diagnostic results guide public health decision making

Rapid Detection Test

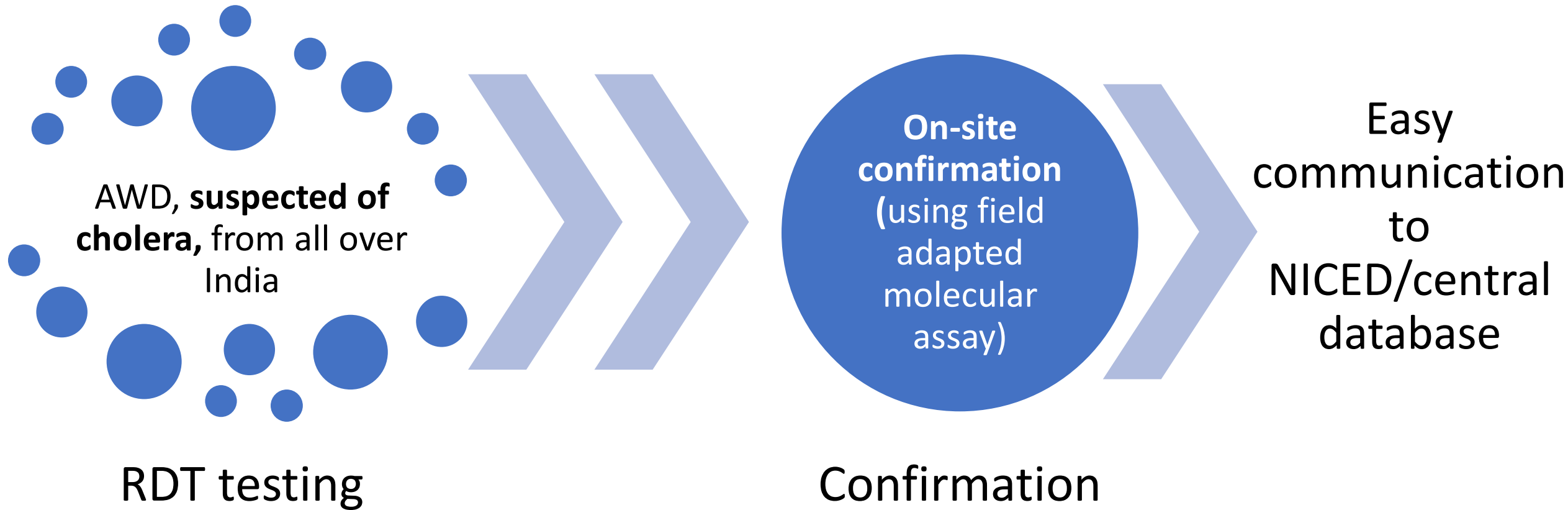
or

Rapid Detection Confirmatory Test

In India - the process - how it is



In India - the process - how it should be

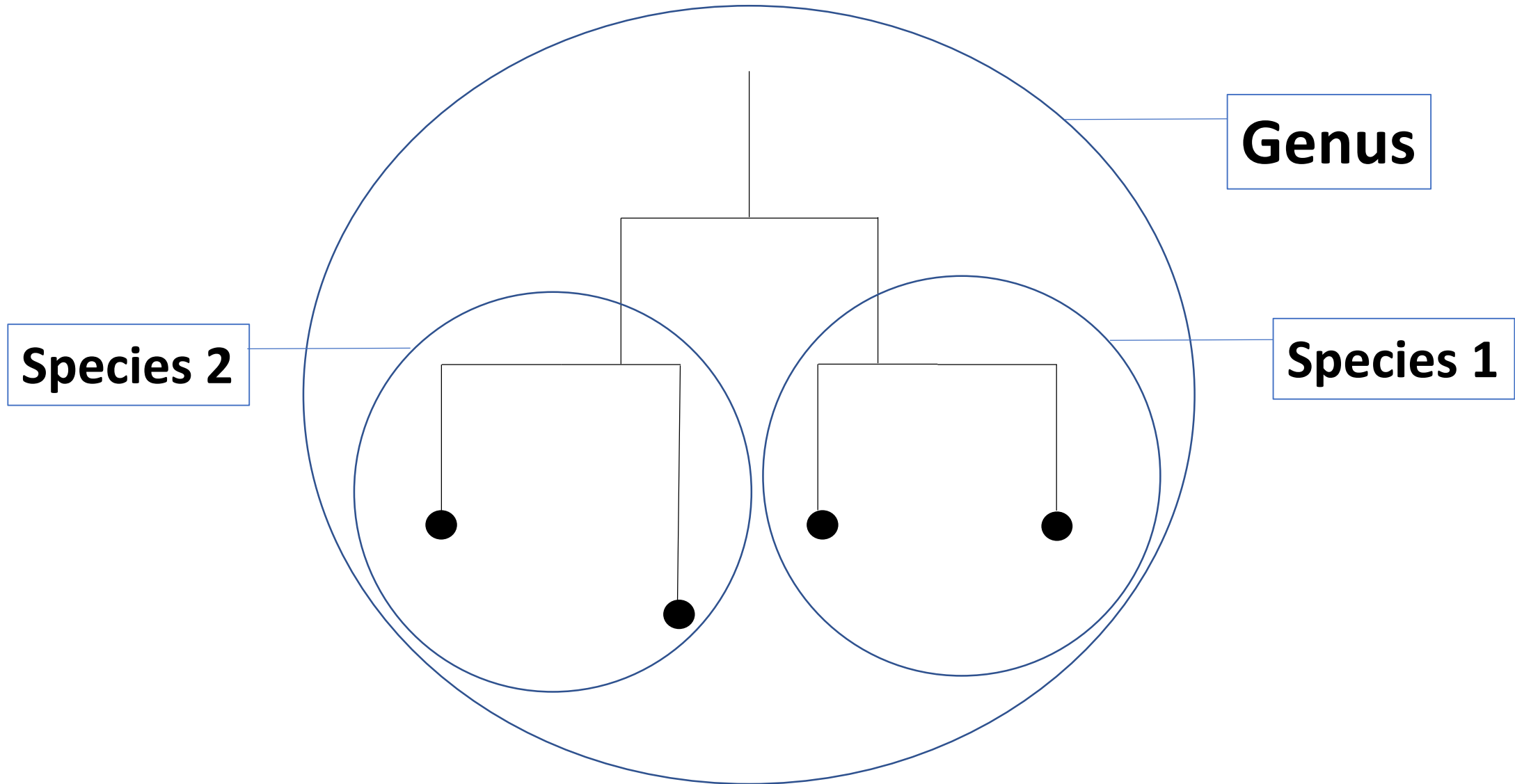


PPC and TPP: Areas

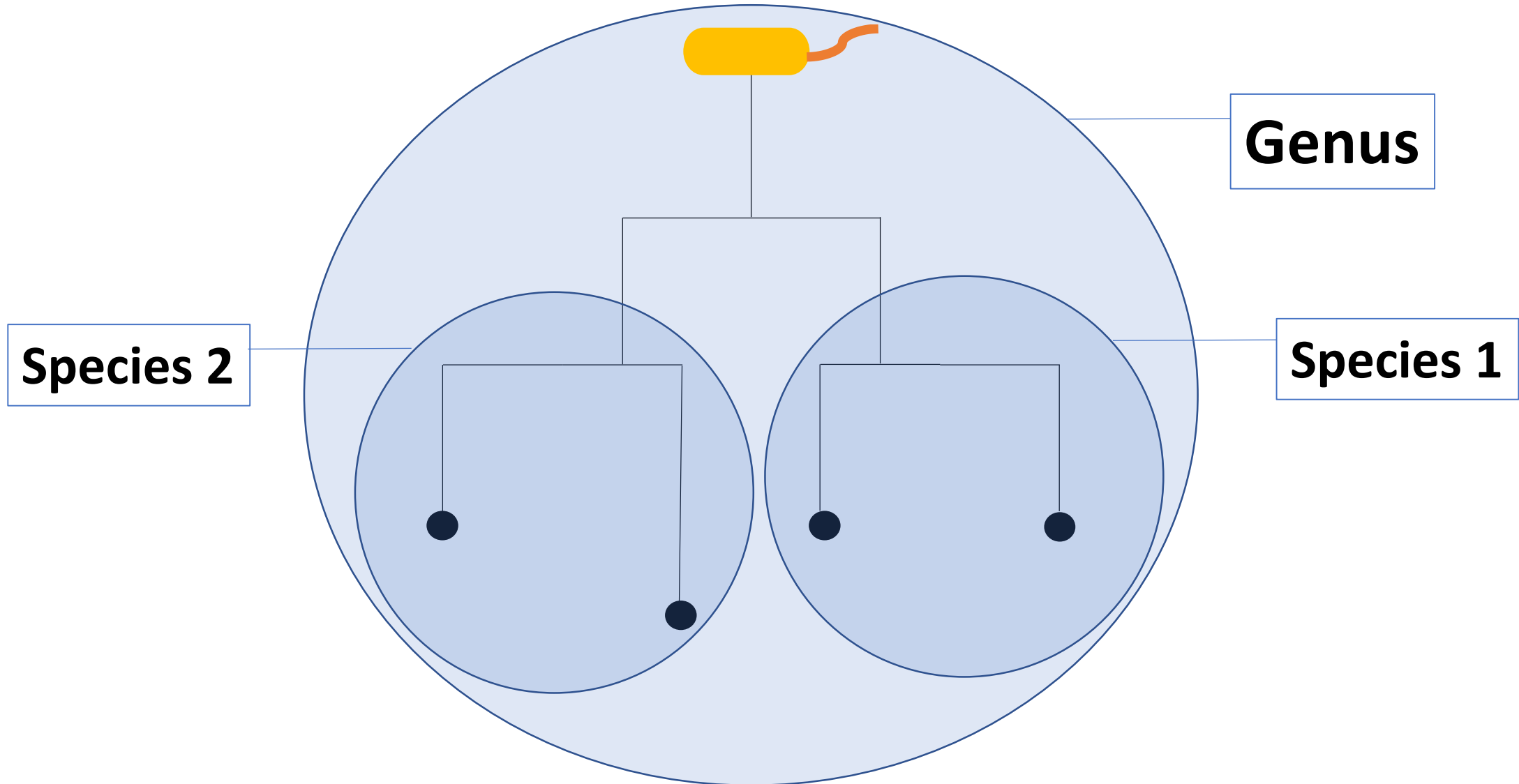
Resolution and Throughput

- AWD - Cholera vs other enterics?
- Toxic vs Non Toxic?
- O1 vs O139?
- Pandemic vs Sporadic?
- Multiple answers in one test?
- Multiple sample tests in one assay?

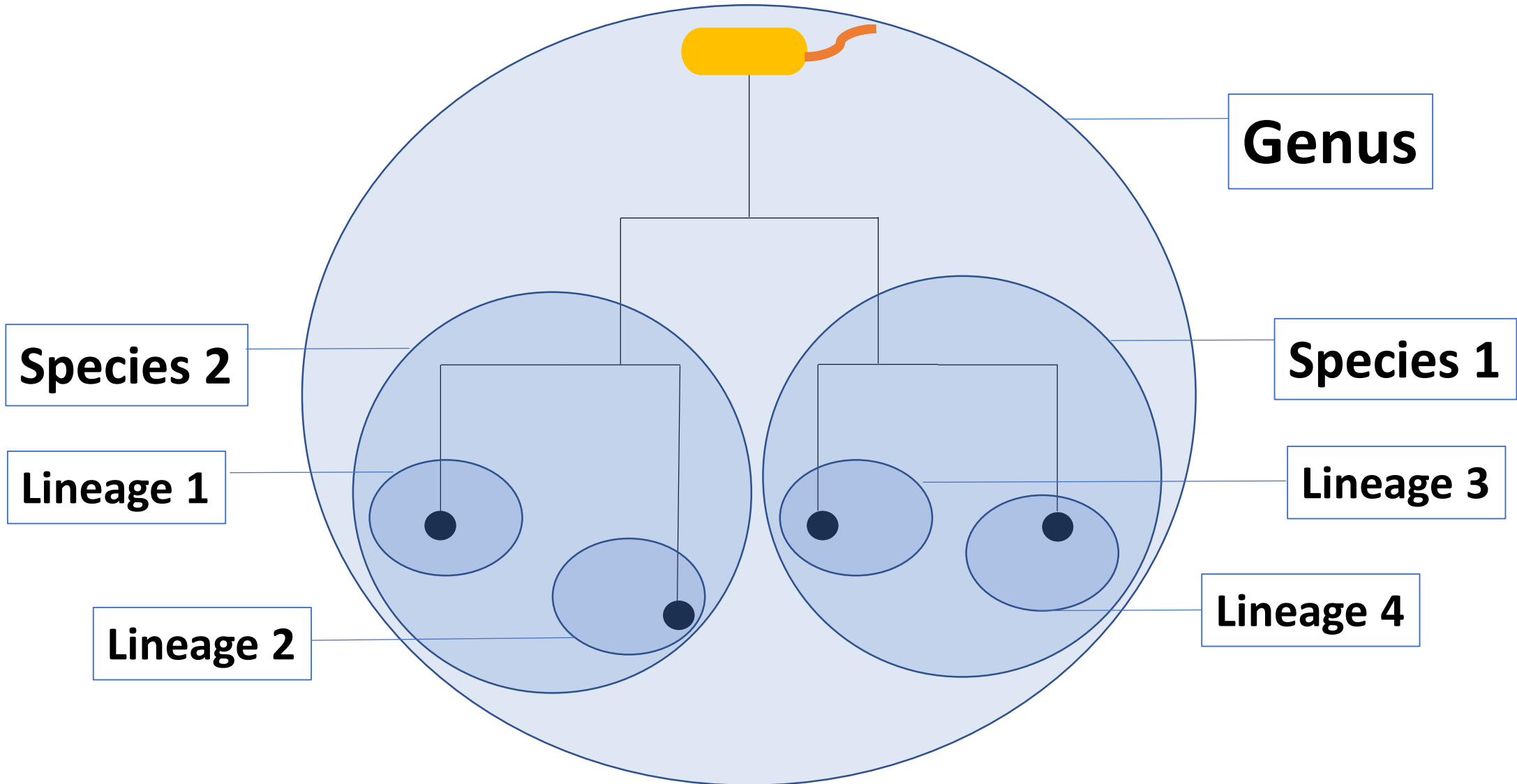
Key - Understand the Pathogen 🧪



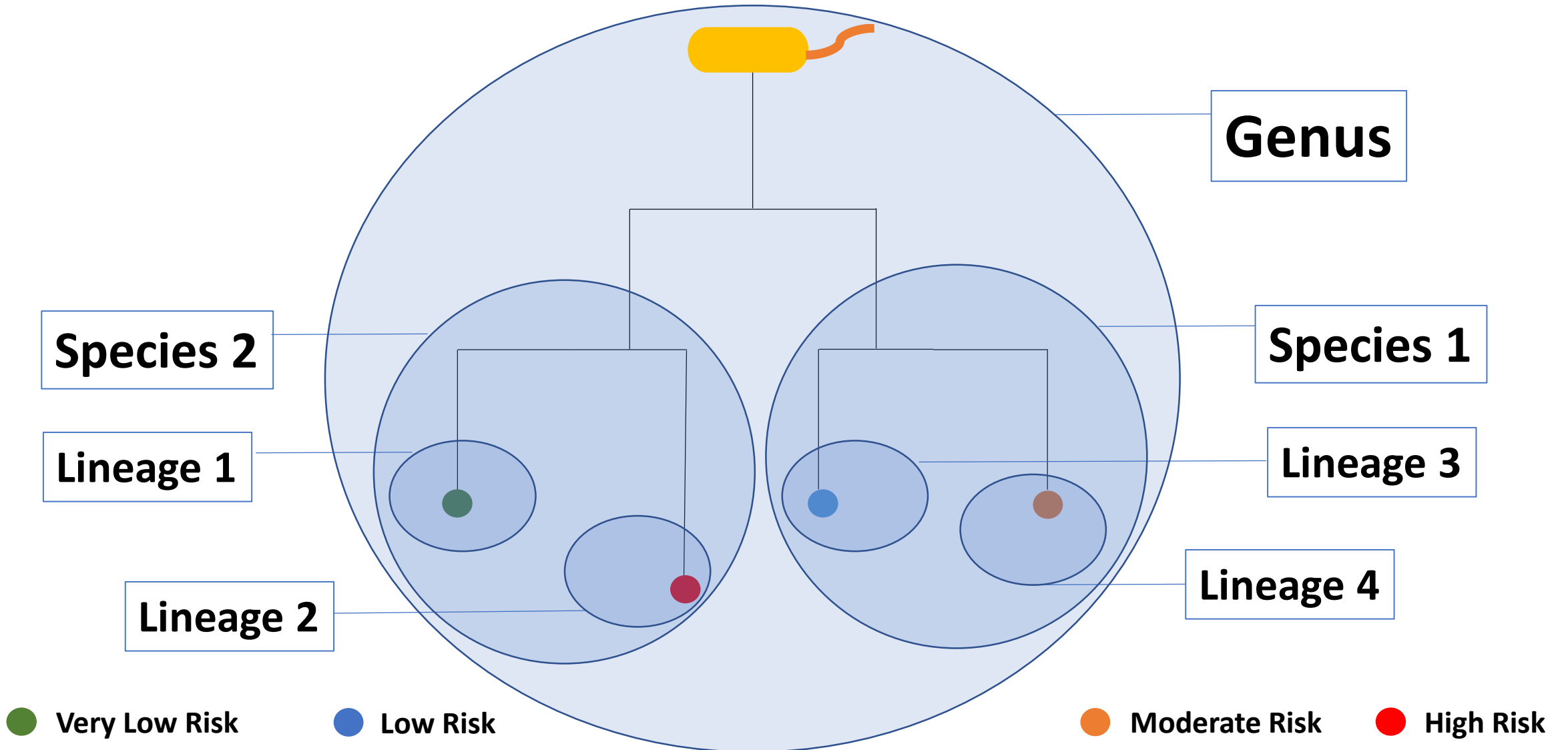
Pathogen – as detected by current molecular tests



Pathogen – there is more to it



Pathogen – there is even more to it



Sensitivity and Specificity

- Sensitivity - as high as possible – better than current antibody dipstick tests
- Specificity – 100% should be the mandate

Actionable Outcome

- One test confirming or rejecting the disease
- No need for further culture confirmation
- Generate reliable results that are easy to communicate/share
- Advises vaccine programs/drives

Cost

- As low as possible without compromising on quality

Speed

- As fast as possible – ideally in a couple of hours – before the camp set up is folded for the day
- Data communication speed – very important

Portability and Deployability

- Should be easy to stockpile
- Should be easy to deploy on an urgent basis
- Reasonable shelf life
- Thermostability
- PHCs (in India) or equivalent – one PHC per 30,000 population
 - Each PHC has 5-6 sub centres for easy accessibility
- Alignment with surveillance (both clinical and environmental)
- Alignment with WASH and vaccination programs
- AC power independent

Skill set

- Requirement of minimum training
- Easy to follow universal language SOPs
- Video based guide(s) for process flow and troubleshooting

Disposal of kits and contents

- Health risk free disposal on site or off site
- Easy defusal
- No amplification of actual bacteria (the problem pathogen)

DIAGNOSTIC PRODUCT SPECIFICATIONS

TPP CHOLERA

TARGET POPULATION GROUP/PATIENT:

Patients clinically suspect of cholera

HEALTH FACILITY WHERE THE TEST WILL BE USED:

Primary health care level with no access to standard laboratory facility or settings and no access to electricity. Community settings outside health facilities where cholera outbreak is suspected

ATTRIBUTES definitions	DESIRED	ACCEPTABLE
Priority features		
Intended use of the test	Early detection, declaration, and monitoring of outbreak without need for cholera confirmation First intention test to be used on a predefined number of cholera suspect cases	Test to declare a cholera alert, to be confirmed by culture and/or PCR



Only Molecular Test can achieve this

Poll workers journey to reach India's most remote voters



Thanks

In this April 10, 2019, photo, Indian election officials and paramilitary soldiers with election materials walk along the river Brahmaputra to board on a country boat on the eve of the first phase of general election in Majuli, Assam, India. (Anupam Nath, File/Associated Press)