

Valuing Equity in the Innovation and Access to AMR Diagnostics

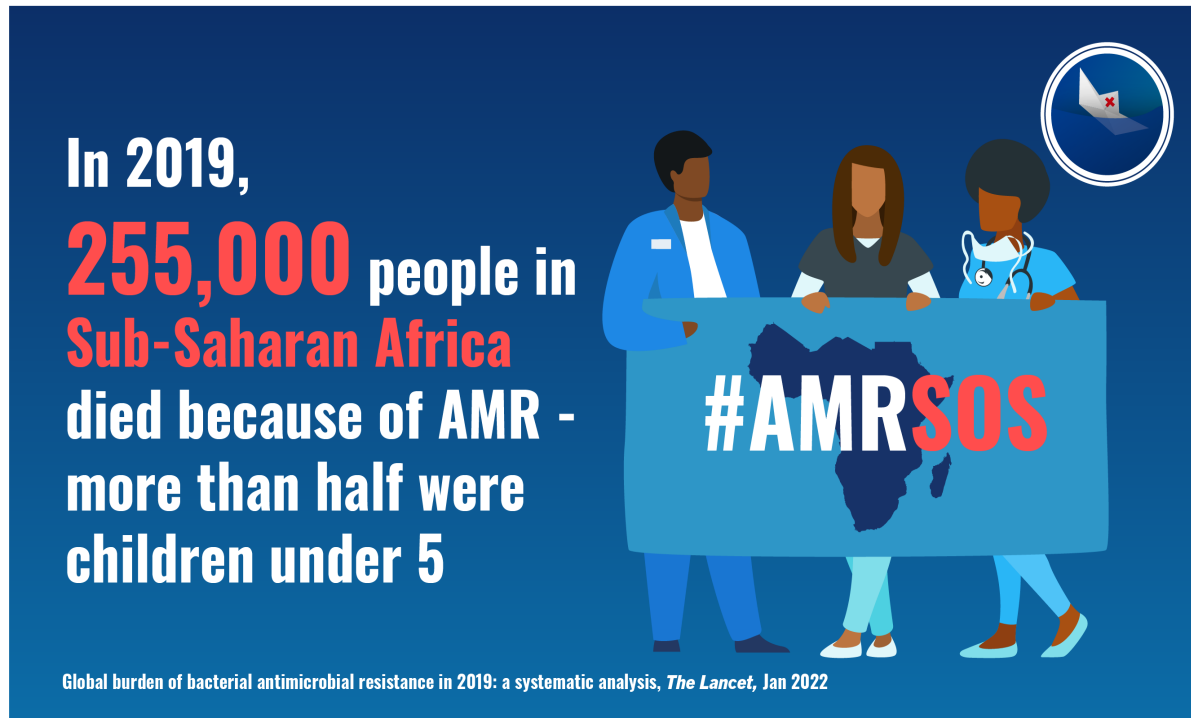
Anthony D. So, MD, MPA

Innovation+Design Enabling Access (IDEA) Initiative

ReAct Strategic Policy Program

Johns Hopkins Bloomberg School of Public Health

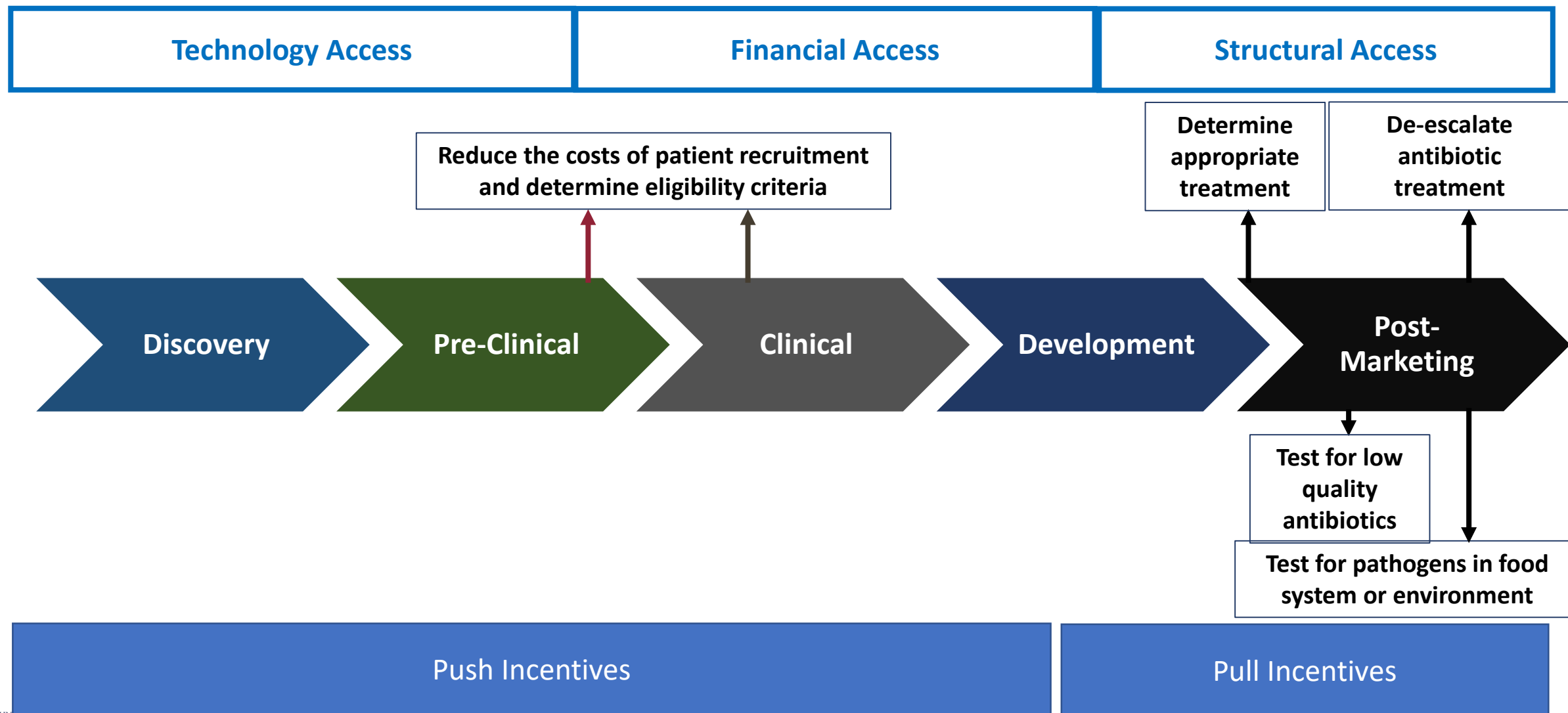
Equity Gap: AMR Burden of Disease and Diagnostic Lab Capacity



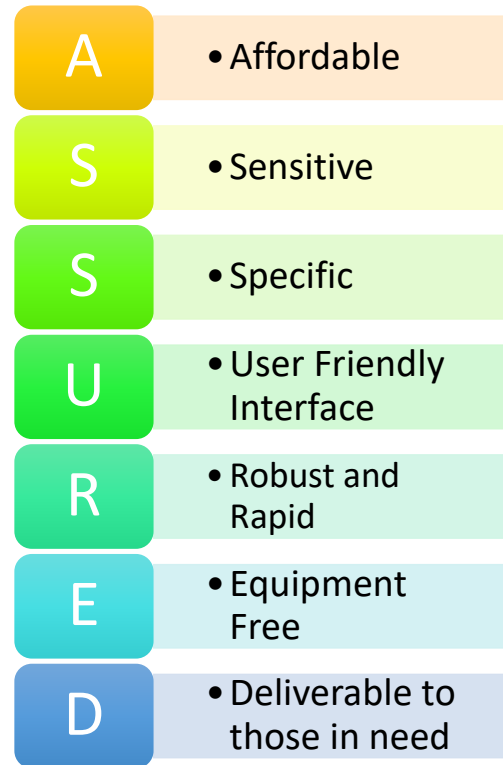
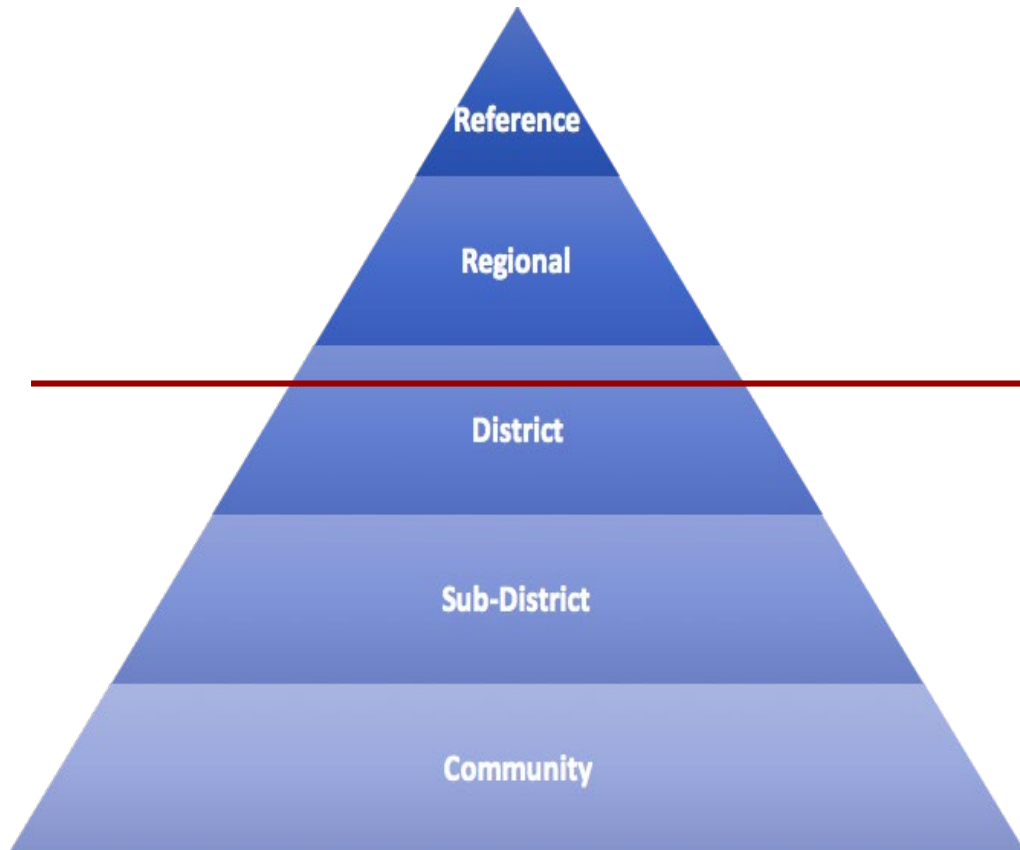
- Only 1.3% of the 50,000 medical laboratories in the 14 countries studied conducted bacteriology testing.
- In 8 out of 14 countries studied, bacteriology labs were geographically accessible to less 50% of the population.
- 80% of the 205 labs surveyed performed fewer than 1000 antimicrobial susceptibility tests per year.

Source: MAAP. *Incomplete Antimicrobial Resistance (AMR) Data in Africa: The Crisis Within the Crisis*, 2022.

Path-Dependent Equity

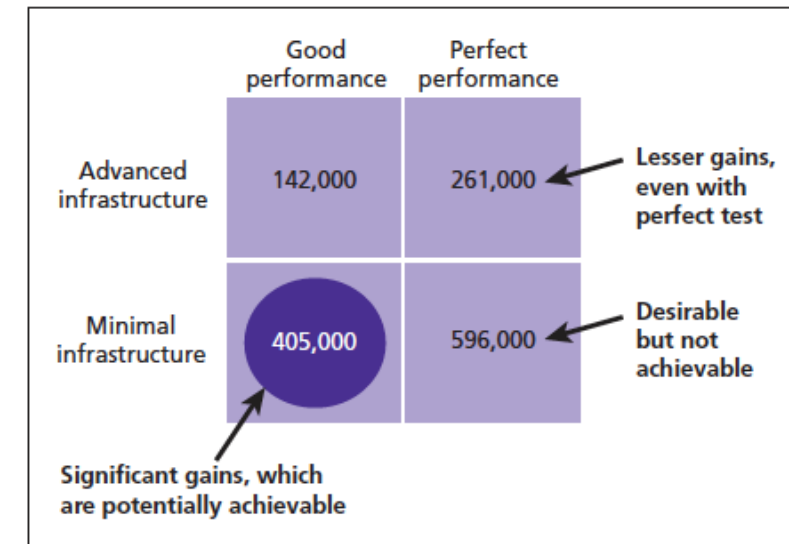


The Perfect and the Good: Reaching the Base of the Healthcare Pyramid



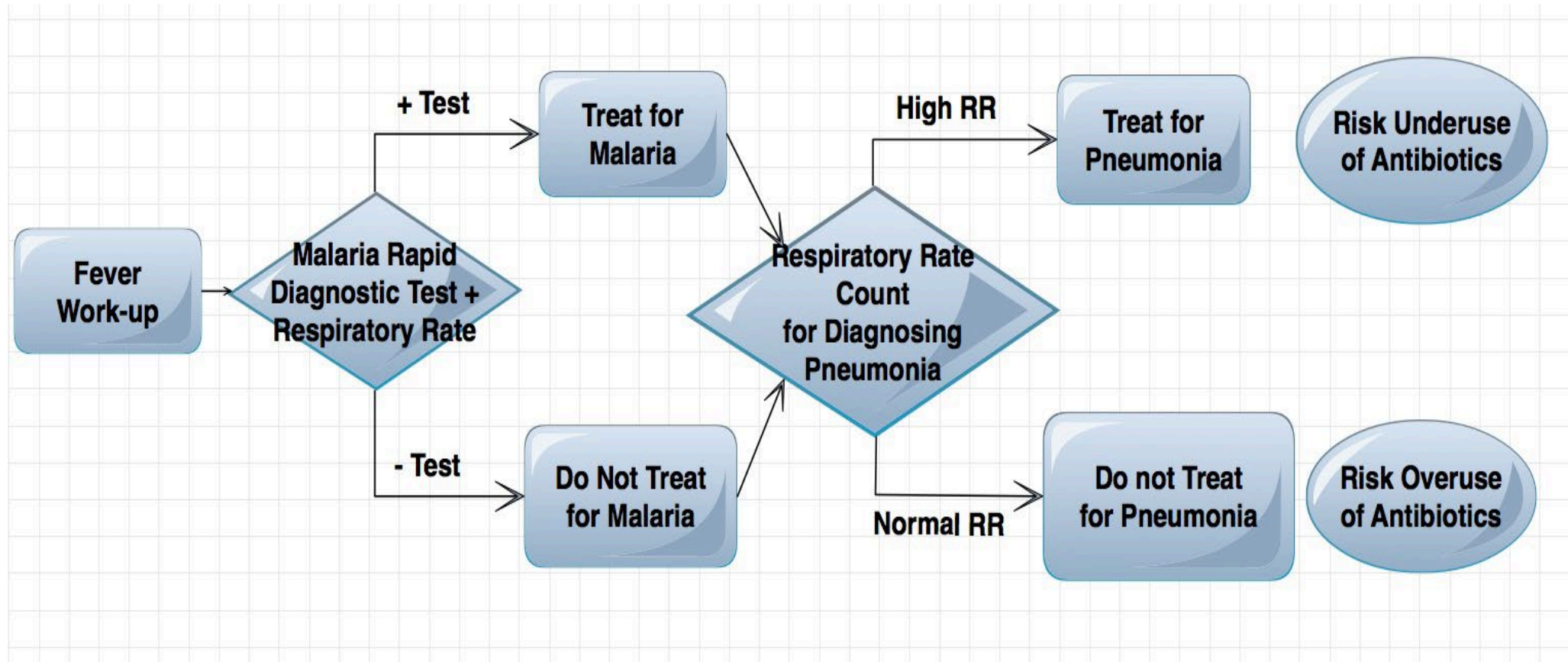
Source: Peeling RW, Holmes KK, Mabey D, et al. Rapid tests for sexually transmitted infections (STIs): the way forward. *Sex Transm Infect* 2006; 82: v1-v6.

Figure 3
Comparison of Lives Saved by a New Diagnostic for Bacterial Pneumonia



Source: RAND, “Estimating the Global Health Impact of Improved Diagnostic Tools for the Developing World, 2007.”

Malaria Rapid Diagnostic Tests and Antibiotic Use: Unintended Consequences



Lessons for GeneXpert System Scale-up for TB and Rifampicin Resistance Testing

- Publicly funding >\$250 M (Gotham, et al., 2021)
- Cost-of-goods analysis placed at \$5 all-inclusive cartridge price (MSF, 2019)

BUT potential lessons for further innovation--

- Proprietary platform vs. interoperable platform
- Fixed cost of GeneXpert machine vs. Variable costs of diagnostic cartridge
- Rapid turnaround time vs. specimen transport
- Technology lock-in with capital investment vs. switching to new technology

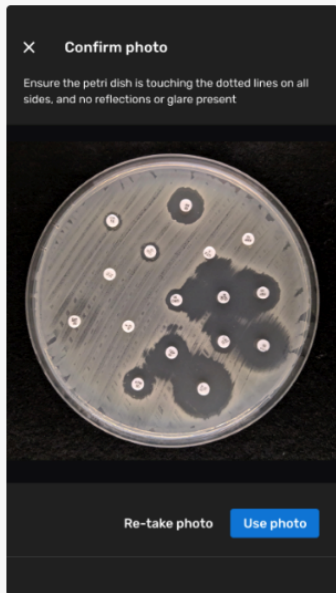


Antibiogo: Software side of diagnostics *Strengthening local capacity*

Mobile app that supports non-expert lab technicians in low resource settings in measuring and interpreting Antibiotic Susceptibility Tests (AST)

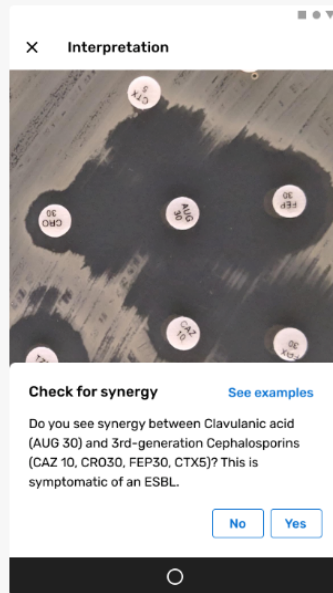
1 - MEASURE EASILY

Take a picture of the Petri dish, and measure inhibition zone diameters for each antibiotic disc.



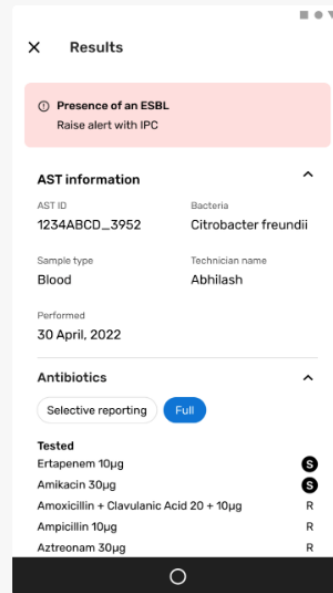
2 - GENERATE RESULTS

After image analysis, answer guided interpretation questions to generate AST results.



3 - SEND RESULTS

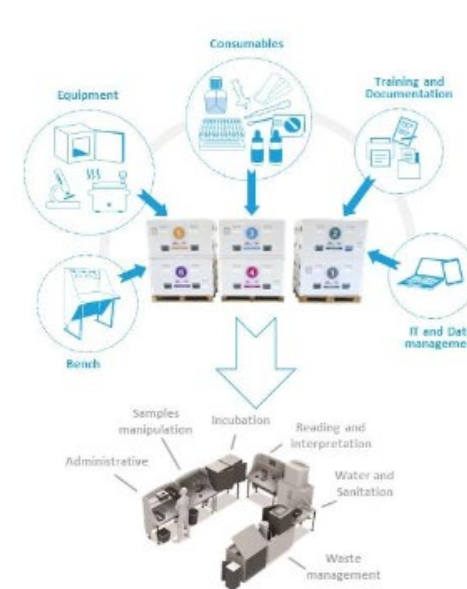
Ask for a peer's approval or share results directly with the clinician.



Mini-Lab: Hardware side of diagnostics *Strengthening laboratory capacity*

A small-scale, autonomous transportable clinical bacteriology laboratory

HOW DOES IT WORK ?



- 15-20 m²** to install the Mini-Lab (permanent structure, tent or container)
- 2 days** to install or re-pack the Mini-Lab
- 2/3 Dedicated laboratory technicians** of which one is the supervisor (can be the same of other lab services)
- 20 Days of on-site training** for the lab techs to be able to run the Mini-Lab
- 4-6 Months** of initial onsite support and regular follow-up visits
- 10 - 20 BCB / Day** (average & peak capacity until 30)

Reengineering How We Bring AMR Diagnostics to Market

- *Systems Perspective: Dual markets* for diagnostics, from a global wastewater surveillance system to monitoring foodborne pathogens
- *Bundling* the development, use or reimbursement of diagnostics with drugs
- *Service package*: Diagnostics as part of a “best buy bargain” to tackle AMR

Investing just US\$2 per capita per year in a comprehensive package to tackle AMR would avert 47,000 deaths per year in OECD countries.

The public health package could pay for itself in under a year and save \$4.8 billion per year in OECD countries.

Source: OECD, *Stemming the Superbug Tide: Just a Few Dollars More*, 2017