Innovation in Surveillance/Early Warning Systems

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ASLM
COMMUNICABLE DISEASE CONTROL SYSTEM

Functions

- Surveillance and laboratory testing
- Preparedness and response
- Evidence-based prevention policy
- Public health communications

Enablers

- Leadership and governance
- Skilled people
- Information systems and research capacity
- Financing and infrastructure
- Partnerships and networks

Public Health Surveillance – Why?

Core element of public health practice

- Identifies the emergence of an outbreak
- Categorizes its nature
- Identifies those affected

Contain the outbreak
Public Health Surveillance – What?

Data collection
- Notifiable diseases
- Lab specimens
- Vital records
- Sentinel surv.
- Admin data
- Registries

Data tabulation
- Time
- Place
- Person

Data analysis
- Descriptive
- Analytical

Data interpretation
- Understanding causes for increase in cases

Data dissemination
- Link to action – interventions; policy; etc...

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Ideal Surveillance/Early Warning System

1) Delivers real-time data showing the number and locations of persons with the specific illness in the affected area; and

2) Enables rapid collection and analysis of patient epidemiological information to determine source(s) of exposure to agent.
Innovation?
Innovation in Surveillance
What Innovation is happening now?

- **New Assessment Tools** – systems/networks vs. facilities
- **Community involvement** – active contact tracing; symptom recognition & reporting
- **Mobile phone technology** – SMS reporting
- **Electronically linked reporting systems** – *i.e.* LIMS & eIDSR
- **mHealth** – *i.e.* participatory surveillance; call data records and satellites
- **Drone technology** – sample & supply transport
What Innovation is happening now?

- **Novel Data Collection**
  - **Geospatial data** - generates comprehensive estimates of disease transmission
  - **Mobile phone data** - provides information about the location and movements of subscribers in real time
  - **Genome sequencing** - provides complementary insights into transmission chains and pathogen gene flow between locations
ASLM – African Society for Laboratory Medicine

Established since 2011 in Addis Ababa to enhance professional laboratory practice, science and networks in Africa
ASLM - Innovations in Laboratory System Strengthening

- Accurate, timely & quality-assured laboratory-based information is key to surveillance
- National, referral networks still weak in many places

Geomapping → Assessing Systems → Evidence-based optimized laboratory networks → Improved Surveillance/Disease Control
Laboratory Network Mapping – Geospatial data

- e.g. TB prevalence
- e.g. Road network
- Country lab data
- e.g. SLIPTA data

ASLM interactive platform

- Simulation of optimized networks
- Evidence-based decision making
- Improved performance of the laboratory systems & networks

Visualization of data
What data are being collecting?

- Laboratory and health facility location, identity and level
- Testing capacity, test menus and test demand/volumes
- Equipment capacity and technologies, connected instruments
- Facility readiness, and capability e.g. SLIPTA level
- Linkage to networks e.g. EQA, DBS sample referral, RISLNET, ...
- Human resource capacity
- Etc...

Niger

Ethiopia

Apply methodology to the whole continent
Example 1: Enables design of an integrated, <48-hr TOT sample transportation system

Algorithm

Sample referral system that is fast, cost effective, with wide coverage
Example 2: Improves case detection and treatment by optimizing placement of instruments

- Procurement
- Enough patients
- Treatment available
- Adequate infrastructure
- Biosafety level

Optimized placement of GeneXpert instruments
LabNet Scorecard – New Assessment Tool

A new matrix for scoring the functionality of national laboratory networks in Africa: introducing the LABNET scorecard
LabNet covers the essential normative standards for the laboratory systems and networks

**WHO-Maputo declaration** for strengthening of laboratory systems in RLS

**WHO-IHR**: binds all countries to be alert and ready to respond collectively to public health threats, also across borders.

**WHO-IDS**: Makes the best use of country resources to conduct integrated surveillance of priority diseases. → Implement IHR

**FAO-OIE-WHO** One-health concept note: prevent, detect, respond to public health and animal risk through inter-sectoral collaboration.

**GHSA**: international effort of nations and organizations to accelerate progress toward a safe world, by speeding up the implementation of IHR and OIE PVS. → Implement IHR

Aligned with WHO JEE tool
LabNet measures capability maturation of 9 essential functions of the laboratory network

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>Absence of key attributes</td>
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<tr>
<td>1</td>
<td>Foundation level</td>
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<tr>
<td>2</td>
<td>Moderate level</td>
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<tr>
<td>3</td>
<td>Advanced level</td>
</tr>
<tr>
<td>4</td>
<td>Strong technical or managerial level</td>
</tr>
<tr>
<td>5</td>
<td>Attainment of international standards</td>
</tr>
</tbody>
</table>

- 1- Political, legal and regulatory framework
- 2- Structure and organization
- 3- Network coverage and rapid response
- 4- LIMS
- 5- Infrastructure
- 6- Human resources
- 7- Quality of the laboratory system
- 8- Biosafety/biosecurity
- 9- Priority diseases

Color-coded scoring system
<table>
<thead>
<tr>
<th>Cap 1: Pol. Leg. Reg</th>
<th>Legislation</th>
<th>Policy &amp; plans</th>
<th>Governance</th>
<th>Finances</th>
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<tbody>
<tr>
<td>Cap 2: Struct. &amp; gov.</td>
<td>Structure of the tiered network</td>
<td>Coordination et management</td>
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<td>Cap 3: Coverage &amp; rapid.resp</td>
<td>Network coverage</td>
<td>Rapid response &amp; preparedness</td>
<td>Sample referral system</td>
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<td>Cap 4: LIMS</td>
<td>Data collection</td>
<td>Data analysis &amp; sharing</td>
<td>Surveillance /Epi</td>
<td>Reporting</td>
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<tr>
<td>Cap 5: Inf./equip/reag</td>
<td>Infrastructures</td>
<td>Supply chain management</td>
<td>Equipment</td>
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<td>Cap 6: Workforce</td>
<td>Training and education</td>
<td>Recruitment</td>
<td>Strategy for HR development</td>
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<tr>
<td>Cap 7: Quality</td>
<td>QA</td>
<td>QMS</td>
<td>Certification &amp; accreditation</td>
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</tr>
<tr>
<td>Cap 9: Priority Diseases</td>
<td>Priorization</td>
<td>Tests</td>
<td>AMR</td>
<td></td>
</tr>
</tbody>
</table>
Example 1: Helps target interventions – i.e. Senegalese laboratory network

Cap 2: structure & governance.

Structure of the tiered network

Coordination et management

The tiered network does not incorporate diagnostic activities at community level

Targeted interventions

Stage 3

There is no AMR prevention strategic plan

Targeted interventions

Stage 2

Cap 9: Priority Diseases.

Priorization

Tests

AMR
MERCI! THANK YOU! OBRIGADA!