Landscape Analysis for Severity Assessment, Triage and Home Self-Monitoring AFI Tools for LMICs

September 13, 2021
TABLE OF CONTENTS

+ Introduction
+ Project Approach and methodology
+ Research Frameworks
+ Key Findings
+ Recommendation
The overlapping etiologies, makes diagnosis & management of fever which is presented so commonly in LMICs very challenging. Failure to identify the cause often results in increased use of antibiotics, wastage of medicines and increased morbidity and mortality.

FIND is working on filling this diagnostic gap by facilitating development and validation of tools to support AFI management in LMICs.

1. To conduct landscape analysis i.e., comprehensive mapping of existing AFI tools, with focus on digital tools.
   - Tools used by healthcare workers to triage children/ adults presenting with AFI at primary care facilities
   - Tools used by patients/ caregivers for self monitoring and/or screening of clinical signs & symptoms at home.

2. To understand the scalability of tools and identify potential product introduction pathways
Project Methodology

Project Inception
Kick-off meeting to align on the project objectives, approach, and methodology

Desk Research
Secondary research to identify existing AFI tools for HCWs and patients/caregivers

Stakeholder consultation
Key informant interviews with stakeholders from selected countries (India, Nigeria, Kenya) and global organizations to -
• Understand enablers and barriers
• Understand potential product introduction pathways

Report development and dissemination
Data analysis and development of final landscape analysis report

Virtual dissemination workshop
Selected AFI tools were categorized and studied comprehensively.
The desk research identified 36 tools for severity assessment/triaging of fever. Tools are further classified as per users (HCWs and patients) and mode of administration (Paper based or Digital). Tools were selected based on the following criteria's:

1. Tools with fever management algorithms:

2. Triaging and severity assessment Functionality
Selection of countries and key stakeholders for primary research

For this study, a Semi-structured discussion guides were designed for each type of stakeholder which included respondents from diverse settings.

Based on the desk research, IQVIA selected 10 LMICs in the regions of East Africa, West Africa, and Asia where maximum number of AFI tools were piloted/implemented and Based on a scoring mechanism consisting of 11 indicators, three countries were picked for primary research.

India
Nigeria
Kenya

Key indicators used for country selection are:-

1. Number of AFI Tools implemented by each country
2. Malaria incidence per 1000 population as risk
3. Children aged <5 years with Pneumonia symptoms taken to a healthcare provider
4. Existence of health technology (medical device) national policy
5. Unit in the MOH responsible for management of medical devices
6. Health service delivery (hospital beds per 10000 population)
7. Skilled health workers per 10000 population
8. GDP Per Capita (in USD)
9. External resources for health as a percentage of total expenditure on health
10. % of population using internet (2016)
11. Countries of interest for FIND and IQVIA’s presence

Note: Number of AFI tool – India (2), Nigeria (2) and Kenya (3)
Selection of key stakeholders for primary research

IQVIA interviewed key stakeholders from global agencies working in AFI’s such as UNITAID and ASLM and at least 5-6 respondents from each selected country with a total of 19 interviews. The respondents for the interview were selected purposively.

**List of Stakeholders**

**Global**
1. Director of Science and New initiatives- ASLM
2. Technical Officer, Strategy Team- UNITAD

**Kenya**
1. IT & Management Consultant - Ministry of Health-Malaria program
2. Program Manager- Ministry of Health- Newborn Child and Adolescent Health Unit
3. Health Specialist - UNICEF Kenya Country Office
4. Chairman- Kenya Pediatric Association
5. Associate Director- Evidence Action (NGO/Donor Agency)
6. Pediatrician- Kenya Medical Research Institute

**India**
1. Co-founder Basic Healthcare Services (NGO/Donor Agency)
2. Consultant (Quality of care) – WHO country office
3. Member – AeHIN and Health Informatics Sectional Committee, BIS, India
4. Consultant- Gates Ventures-Bill & Melinda Gates Foundation
5. Deputy Director- Save the Children-Health & Nutrition unit
6. Leading Pediatrician from a reputed private hospital

**Nigeria**
1. Program Manager-Ministry of Health- Malaria program
2. Chairman- Association of Community Health Practitioners (Sub-national)
3. Digital Health Expert- WHO country office
4. Member of Pediatric Association of Nigeria
5. Member of e-Health Africa in-country team
Findings from this landscape analysis are organized across these areas

**Availability**
Available paper based and digital tools

**Features**
Basic and advanced features available in the tools

**Ranking**
Ranking and prioritization from a LMIC perspective

**Feedback**
Stakeholder feedback on desired features, bottlenecks and challenges
We identified 36 relevant AFI tools used by HCWs and Patients

<table>
<thead>
<tr>
<th>Healthcare provider Tools</th>
<th>Patients/ Caregivers Tool</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper Based Tools</strong></td>
<td><strong>Mobile Based Tools</strong></td>
</tr>
<tr>
<td>Emergency Triage Assessment and Treatment (ETAT)</td>
<td>Ada Check your health</td>
</tr>
<tr>
<td>Pocket Book of Hospital Care for Children</td>
<td>Babylon</td>
</tr>
<tr>
<td>IMCI</td>
<td>Healthily with Dettol</td>
</tr>
<tr>
<td>IMAI</td>
<td>Kids Doc Symptom Checker</td>
</tr>
<tr>
<td>Pediatric early warning system (PEWS)</td>
<td>Mediktor</td>
</tr>
<tr>
<td>Queensland Pediatric Guideline</td>
<td>Symptomate</td>
</tr>
<tr>
<td>Caring for the sick child, caring for newborns &amp; children in the community</td>
<td>WebMD Symptom Checker</td>
</tr>
<tr>
<td><strong>Digital Tools</strong></td>
<td>Fever App</td>
</tr>
<tr>
<td>ALMANACH</td>
<td>Avey</td>
</tr>
<tr>
<td>e-POCT</td>
<td>Fever Coach</td>
</tr>
<tr>
<td>MSFeCARE</td>
<td>Malawi iCCM. App</td>
</tr>
<tr>
<td>Niger Electronic iCCM</td>
<td>Integrated e-Diagnosis Approach (IeDA)</td>
</tr>
<tr>
<td>APE app</td>
<td>Integrated e-Diagnosis Approach (IeDA)</td>
</tr>
<tr>
<td>e-POCT+</td>
<td>Fever Dx</td>
</tr>
<tr>
<td>Fever Dx</td>
<td>Malawi iCCM. App</td>
</tr>
<tr>
<td>SL eCCM App</td>
<td>Medicor</td>
</tr>
<tr>
<td>MEDSINC</td>
<td>Isabel Symptom checker</td>
</tr>
<tr>
<td>Integrated e-Diagnosis Approach (IeDA)</td>
<td>Doctor Ai</td>
</tr>
</tbody>
</table>

The Results of the study indicate that IMCI is the most commonly used paper-based guideline.
### Key features of the AFI tools

<table>
<thead>
<tr>
<th>YEAR OF IMPLEMENTATION</th>
<th>COUNTRIES OF IMPLEMENTATION</th>
<th>KEY USERS</th>
</tr>
</thead>
</table>
| Most of the tools were implemented during the period 2010-2014. | • Paper-based tools are widely implemented in LMICs  
• The eCDAs selected as part of this study were implemented/piloted in multiple countries across Africa  
• Some of the self monitoring tools are available in LMICs, some are currently used in USA but are scalable. | • Most of the digital tools used by healthcare workers are for both children and adults  
• Out of 18 self monitoring tools, 4 focused on children's symptoms, 2 on adult symptoms while 12 can be used for patients of all age groups |

<table>
<thead>
<tr>
<th>AVAILABLE IN LMICs</th>
<th>MOST DOWNLOADED PATIENT/SELF MONITORING TOOL</th>
<th>TOOLS WITH IMPACT STUDIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015-2020</td>
<td>13</td>
<td>10+ million users, used across the globe</td>
</tr>
<tr>
<td>2010-2014</td>
<td>16</td>
<td>10+ million users, used in USA</td>
</tr>
<tr>
<td>2005-2009</td>
<td>4</td>
<td>50,000+ downloads, used across the globe</td>
</tr>
<tr>
<td>2000-2004</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
### Key features of the AFI Tools

#### ABILITY TO WORK BOTH OFFLINE & ONLINE (HCF tools)

<table>
<thead>
<tr>
<th>Mobile Application</th>
<th>Web-Based Application</th>
<th>Mix</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5</td>
<td>18</td>
</tr>
</tbody>
</table>

#### TECHNOLOGY****

- Digital tools that work both online as well as offline are:
  - ALMANACH
  - MFeCARE
  - Malawi iCCM App
  - IeDA
  - SLeCCM App
  - MEDSINC
  - Fever Dx

- Three eCDAs (ePOCT+, IeDA and SLeCCM APP) have in-built eLearning modules.
- Most of the digital tools require training either on the algorithm and how to use them.

#### COST MODEL (Patient tools)**

<table>
<thead>
<tr>
<th>Patient tools</th>
<th>Features</th>
<th>Ranking</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid tools 15</td>
<td>15 tools have provision to store PHR including personal details such as name, Dob, Gender and email address, phone number and address, medical history.</td>
<td>15 tools</td>
<td>15 tools</td>
</tr>
<tr>
<td>Free tools 3</td>
<td>Clinical information stored were vital signs***, height, weight and medical history</td>
<td>3 tools</td>
<td>3 tools</td>
</tr>
</tbody>
</table>

#### STORAGE OF PHR

- Three eCDAs (ePOCT+, IeDA and SLeCCM APP) have in-built eLearning modules.

#### OPERATING SYSTEM of Mobile & mix patient tools

- All HCF tools are Android mobile applications (11 tools)
- All patient tools (18 tools) are working online only
- All HCF tools are Free as it’s funded by donors and the tools developers
- Vital signs are blood pressure, Body temperature, Pulse rate, Respiration rate, etc
- All HCF tools are Android mobile applications (11 tools)

*All patient tools (18 tools) are working online only
** All HCF tools are Free as it's funded by donors and the tools developers
*** Vital signs are blood pressure, Body temperature, Pulse rate, Respiration rate, etc
**** All HCF tools are Android mobile applications (11 tools)
Types of Triaging & severity assessment functionality

All the tools selected under the study have triaging & severity assessment function. Triage system in eCDAs are based on existing guidelines and algorithms mostly IMCI/iCCM.

<table>
<thead>
<tr>
<th>DIFFERENT LEVELS OF EMERGENCY</th>
<th>COLOR CODE SYSTEM</th>
<th>MIX OF SCORING SYSTEM AND COLOR- CODE SYSTEM</th>
<th>TYPES OF RECOMMENDATIONS</th>
<th>COLOR CODE SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgent &amp; requires referral to healthcare</td>
<td>Immediate care needed</td>
<td>SCORE &amp; COLOR CODE</td>
<td>STATUS</td>
<td>✓ Homecare</td>
</tr>
<tr>
<td>Urgent but can be treated</td>
<td>Urgent cases &amp; should be directed to priority ques</td>
<td>0-2</td>
<td>No change</td>
<td>✓ Seek medical service at earliest</td>
</tr>
<tr>
<td>Non urgent cases &amp; can be managed at home</td>
<td>Non-urgent cases</td>
<td>3-4</td>
<td>Worse</td>
<td>✓ Visit emergency room immediately</td>
</tr>
<tr>
<td>• Pocket book of hospital care for children</td>
<td>• Emergency triage assessment and treatment (ETAT)</td>
<td>5</td>
<td>Deteriorating</td>
<td>• Thermia</td>
</tr>
<tr>
<td>• Caring for the sick child, caring for newborns and children in the community,</td>
<td>• Pediatric Early Warning System (PEWS)</td>
<td>6+</td>
<td>Quick Intervention</td>
<td>• Buoy API</td>
</tr>
<tr>
<td>• Queensland Pediatric Guideline</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Integrated Management of Adolescent and Adult Illness (IMAI)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional features identified in the AFI tools

**PoCTs (8 tools)**
Most eCDAs integrated PoCTs like Hemoglobinometer, Pulse oximeter, Rapid diagnostic tests (Malaria, HIV, C-reactive protein), Urine dipstick

**Informative content on medical conditions, Disease database & Nutrition advice (4 tools)**

**Telemedicine or Video consultation (7 tools)**

**Locating Nearby GPs and Pharmacies (7 tools)**

**Body Map Index (4 Tools)**

**Information on Dosage of drug (3 tool)**

**Health calculators**
Calculation of Blood Alcohol Content level, Smoking cost and BMI estimation (1 tool)

**Integrating Lab results (1 tool)**

**Additional features identified in the AFI tools**
### Ranking of the AFI tools

To differentiate and select the best suited digital tool, a selection matrix was established to rank these tools based on the parameters that define the ease of implementation of these tools in LMICs.

<table>
<thead>
<tr>
<th>Healthcare Facility Tool (HCWs)</th>
<th>Features</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implemented in LMICs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implemented in multiple countries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Available in open source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specifically for fever management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Works both offline and online</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of e-learning module</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently in use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrating POCTs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Following IMCI/ICCM guidelines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of existence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Self-Monitoring patients' tools

<table>
<thead>
<tr>
<th>Features</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implemented in LMICs</td>
<td></td>
</tr>
<tr>
<td>specifically for fever management</td>
<td></td>
</tr>
<tr>
<td>Free to use</td>
<td></td>
</tr>
<tr>
<td>Multiple Languages</td>
<td></td>
</tr>
<tr>
<td>Provide Educational information</td>
<td></td>
</tr>
<tr>
<td>Technology Platforms</td>
<td></td>
</tr>
<tr>
<td>Operating systems (Android/iOS)</td>
<td></td>
</tr>
<tr>
<td>Telemedicine</td>
<td></td>
</tr>
</tbody>
</table>

**Top 3 Healthcare Facility Tools**

1. **iEDA**
2. **ALMANACH**
3. **APE App**

**Top 3 Self-Monitoring patients’ Tools**

1. **Symptomate**
2. **Mediktor**
3. **Ada Check your health**

*For Self-monitoring and diagnostic Tools for Patients it does not propose treatment but only advice to seek medical care.*
**Brief profiles of the top three tools for healthcare providers**

1. **IeDA**
   - **Brief:** Developed by Terre Des Hommes (2014) for providing quality care to children under-five by supporting HCWs through a digital job aid called REC as well as integrating data through e-learning module. The algorithm is based on IMCI guideline
   - **Location:** Burkina Faso, Mali, and Niger
   - **Technology:** open access CommCare software. Both Android and iOS application. works both online and offline
   - **POCT:** intergrade mRDT
   - **Impact Study:** 200,000+ consultations recorded with IeDA each month with a total of 10M+ consultation since 2014

2. **ALMANACH**
   - **Brief:** Developed as a paper-based booklet and an eCDA by Swiss TPH in 2015. It guides management of children in low-resource settings, for malaria, urinary tract infection, typhoid, and skin diseases. based on IMCI guideline
   - **Location:** Tanzania and Afghanistan (Not currently in use), Nigeria and Somalia (currently in use)
   - **Technology:** open access CommCare software Only Android. works both online and offline
   - **POCT:** Intergrade mRDT and urine dipstick
   - **Impact Study:** According to study in 2018 in Nigeria, ALMANACH has contributed to increasing the assessment of danger signs in children by 60% and decreasing antibiotic prescription by 8%. Also, in Somalia in 2020, it has helped in reducing antibiotics prescription for upper respiratory tract infections by 15%.

3. **APE App**
   - **Brief:** Developed in 2009 by Malaria Consortium as part of inSCALE project to provide mobile application for the use of healthcare workers in disease management of children under five years for assessment of diarrhea, pneumonia, malaria, and malnutrition and can integrate data with the health information system
   - **Location:** Mozambique
   - **Technology:** open access CommCare software. Android Only. works both online and offline
   - **POCT:** No
   - **Impact Study:** An evaluation study conducted in 2014 showed that 68% of CHWs were using the application, and many stated that it was useful in their daily consultations.
Brief profiles of the top three tools for patients/ caregivers

1. **Symptomate**
   - **Brief:** Developed in 2014 by Infermedica, to assist patients with preliminary diagnosis using AI and guide them to the appropriate medical services. The app has a body map as well as a symptom box option to allow the patient to select the target body part and display the associated symptoms.
   - **Location:** Can be used globally and it's free to use
   - **Triaging Mechanism:** The recommendations provided by the app are emergency ambulance (calling ambulance), emergency visit (visiting an ER), consultation within 24 hours, and self-care
   - **Technology:** A web-based and mobile application and can operate on android and iOS platform
   - **Additional Features:** It's available in 19 languages and can provide tele-medicine and COVID-19 Checkup

2. **Mediktor**
   - **Brief:** Developed by TECKEL MEDICAL SL in 2011. The app uses AI algorithm to guide the patient's interrogation in a similar way to how a doctor would do it.
   - **Location:** It can be used globally and it's free to use
   - **Triaging Mechanism:** It is based on a color-coding level of urgency- Blue: Very low urgency, Green: low urgency, Orange: medium urgency and Red: high urgency. Additionally, it indicates intensity of pain on a scale of Mild (1-2), Moderate (3-4), Intense (5-6), Very Intense (7-8) and Very Worst (9-10) as well as level of occurrence (Common, Frequent, and Infrequent).
   - **Technology:** A web-based and mobile application and can operate on android and iOS platform
   - **Additional Features:** It's available in 19 languages and can provide paid tele-medicine services

3. **Ada Check your health**
   - **Brief:** Ada uses an AI technology to support users to check their symptoms and generates a set of differential diagnosis for a given clinical case. The application consists of different modules such as: Symptom Checker, Symptom Tracker, and the Condition Library
   - **Location:** Used globally and it's free to use
   - **Triaging Mechanism:** A color-coding triage system such as red to seek emergency care immediately, orange to seek medical advice within 2-3 days or within the next few hours and green for the cases that can be managed at home.
   - **Technology:** A mobile application and can operate on android and iOS platform
   - **Additional Features:** It's available in 6 languages and can provide COVID-19 Checkup and educational information for the users through a Condition Library
Demo of Symptomate
Demo of Symptomate

Please Click the Link Below

Demo of Symptomate
Patient recommendations and triaging process in top three patient/ Care-givers tools

Symptomate

Recommendation
Call an ambulance
Their symptoms are very serious, and they may require emergency care. Do not delay. Call an ambulance right now.

Alarming symptoms:
- Breathing problems after an injury
- Sudden breathing problems after an injury
- Vomiting
- Diarrhea

Ada

Assessment report

Summary
People with similar symptoms may require emergency care. If you think this is an emergency the safest thing to do is call an ambulance.

Possible causes

1. Broken rib
   Seek emergency care
   4 out of 10 people with these symptoms had this condition.

2. High blood pressure
   Seek emergency care
   3 out of 10 people with these symptoms had this condition.

Reason for consultation: Headache
Main symptom: Headache
Risk factors: Current tobacco use, High blood pressure, High cholesterol / triglycerides and Diabetes.

Vital signs
Temperature: 39.00 °C

Urgency
Medium urgency

Diseases
1. Coronavirus infection - COVID-19
   Emergency Medicine, Family Medicine
2. Common cold - Viral respiratory infection
   Emergency Medicine, Family Medicine
3. Sinusitis
   Emergency Medicine, Family Medicine
Desired Features of Digital AFI tool

Healthcare Facility Tool
- Easy to use
- Cost effective
- Clinical algorithm
- Support Referral
- Online & offline
- Record Vital signs

Self-Monitoring patients’ tools
- User-Friendly Interface
- Color-based triage system
- No self-treatment
- Local Language
- Online & offline
- Free of cost

The Need of (e-CDA) Tools/Mobile Application
Study participants confirmed there is a need for digital AFI tools to support fever case management at primary healthcare level.
Tool should also educate and guide the community on when to seek timely medical consultation and how to manage fevers at home, especially after COVID-19.

Willingness of MOH to implement AFI Tools
Study participants confirmed that the government is willing and open to introduce e-CDA/mobile applications-based AFI tools for managing fever cases.
### Mapping desired feature of patient tools with the existing features of the top 3 patient tools

<table>
<thead>
<tr>
<th>Tool Name/ Desired features</th>
<th>User friendly interface</th>
<th>Color-based triage system</th>
<th>No self-treatment</th>
<th>Local Language</th>
<th>Online &amp; offline</th>
<th>Free of cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptomate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>19 languages</td>
<td>Online only</td>
<td>Yes</td>
</tr>
<tr>
<td>Mediktor</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>10 languages</td>
<td>Online only</td>
<td>Yes</td>
</tr>
<tr>
<td>Ada Check your health</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>6 languages</td>
<td>Online only</td>
<td>Yes, and has paid Tele-medicine services</td>
</tr>
</tbody>
</table>
Mapping desired feature of patient tools with the existing features of the top 3 Healthcare workers tools

<table>
<thead>
<tr>
<th>Tool Name</th>
<th>Easy to use</th>
<th>Cost effective*</th>
<th>Clinical algorithm</th>
<th>Support Referral</th>
<th>Online &amp; offline</th>
<th>Record Vital signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>IeDA</td>
<td>Yes</td>
<td>N. A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>ALMANACH</td>
<td>Yes</td>
<td>N. A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>APE App</td>
<td>Yes</td>
<td>N. A</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*The information about the total cost of the tools was not available
Critical Bottlenecks for Implementation & Scale-up of AFI Tools in LMICs

**Poor Regulation and Planning**
- Lack of regulatory framework for long term implementation
- No partnership with the relevant stakeholders to support scaling-up and funding

**Data Privacy Issues**
- Concerns about patients’ data privacy when using digital tools

**Limited Access to Healthcare Services**
- Limited access to secondary and tertiary care
- Shortage of well-trained HCWs on emergency care

**Limited Awareness and Trainings around AFI and digital tools**
- Lack of awareness about the tool’s usage
- Lack of regular and refresher trainings
- Limited transfer of technical knowledge between the developers and the local IT teams for maintenance of the tool

**Lack of workforce and Resources**
- Shortage of workforce in remote areas
- Limited availability of smartphones & internet
- Lack of basic services at healthcare facilities (such as: RDT, Point of Care tests)

**Conventional Community Behaviors**
- Patients prefer traditional medicine for immediate care and often present to a clinic when symptoms are severe.
- Unwillingness of the community to use digital tools due to lack of awareness around its actual benefits
Existing Digital Initiatives in the selected LMICs

Each country uses some digital surveillance or data management system as listed below. It would be advisable to develop a tool that can be integrated with the existing system for better acceptance of the tools among the healthcare workers

**Nigeria**

- Surveillance Outbreak Response Management and Analysis System (SORMAS platform) which is used for the management of infectious diseases in Nigeria to monitor infection outbreaks, follow-up cases and keep a check on the overall numbers and statistics of outbreak responses.
- The SORMAS app was developed at Germany’s Helmholtz Centre for Infection Research in collaboration with international and national partners in response to the Ebola outbreak in West Africa in 2014. The app was also recognized by United Nations in November 2020 and considered to be relevant in efforts to achieve SDG by 2030.

**India**

- Integrated Disease Surveillance Program (IDSP) is being used to strengthen the disease surveillance in the country. Under IDSP, a web-based near-real-time electronic information system "Integrated Health Information Platform (IHIP)" is used for data monitoring and managing disease outbreaks. It used by the ASHA and the ANM workers for the report of Malaria and Kala Azar cases.
- It was launched by Ministry of Health & Family Welfare in 2004 with the World Bank assistance, currently is being funded by the government.

**Kenya**

- An e-Health strategy supported by e-health Africa has been in place to implement a digital health system DHIS (District Health Information Software) to collect and analyse health data.
- A Community Health information system to support community health workers in collecting and managing of health data.
- TIMNCI tool which is a digital version of IMNCI guidelines that is developed by the government.
Product Introduction Pathway suggested by the global and country level stakeholders

Engaging key Stakeholders

Buy-in from MOH (national, sub-national levels), Professional associations & community-level organizations to get insights about the feasibility of implementing the tool.

Partnership with multilateral agencies

Engage agencies actively working in fever management in that country or region. They can provide technical support and funding to improve sustainability.

Customization of tools as per country needs

Assess the current situation to understand the local needs and challenges. Study existing tools and digital initiatives to understand the existing limitations and real needs of the country. The tool should be customized accordingly.

Pilot Study

Test the tool in a mix of urban and rural areas selected based on the epidemiological statistics data to assess and understand the effectiveness of the tool.

Engage community and private sector

Its important to engage and train traditional healers, pharmacists and private practitioners to increase community reach.

Scale up and sustainability planning

Develop an action plan to scale up the implementation across the country. Action plan should consider the sustainability of the tool implementation, and funding options.

Building capacity of the local health workforce to use and manage minor technical issues.
Additional factors stated to ensure success of AFI tool implementation

<table>
<thead>
<tr>
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<th>Implementation Plan and Location</th>
<th>Manpower &amp; Work Resources</th>
</tr>
</thead>
<tbody>
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Stakeholder Engagement

- Engaging with the private sector to improve the overall quality of care as private sector caters to large populations
- Engaging with healthcare stakeholders such as WHO Afro, and African CDC to support implementation
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Implementation Plan and Location

- Approaching progressive states or regions to model and pilot AFI tools
- Designing open-source tool for the countries to customize as per their needs.

Manpower & Work Resources

- Increasing supportive supervision & training of healthcare workers.
- Integration of tools in the country’s healthcare system
- Include the tool/guideline algorithm as a curriculum/courses for undergraduate students
**Recommendations**

**Product Development**
- Donors can develop an open-source application that the countries can customize and use as per the requirement.
- Select and identify relevant audience for whom the implemented tool will be useful.
- Designing simple tools with less dependency on internet connection.
- Get the govt buy-in engage health providers while developing home based tool for better acceptance.

**Implementation**
- Engaging health care provider associations/clinical associations working in AFI to endorse the tool.
- Approaching fever clinics set up during the COVID-19 to implement digital tools for fever management.
- Sensitizing the front-line workers with real life situations of fever case management using the digital tool and spreading awareness in the community regarding use of home-based tools.

**Sustainability**
- Provide on job trainings and mentorship support to ensure comfort level in using the AFI tool.
- Use train-the-trainer model to ensure the sustainability of trainings at the local level.
- Include the tool/guideline algorithm as a curriculum/course for undergraduate medical students.
- Healthcare providers should be engaged to promote the use of home-based tools.
THANK YOU