TIMCI
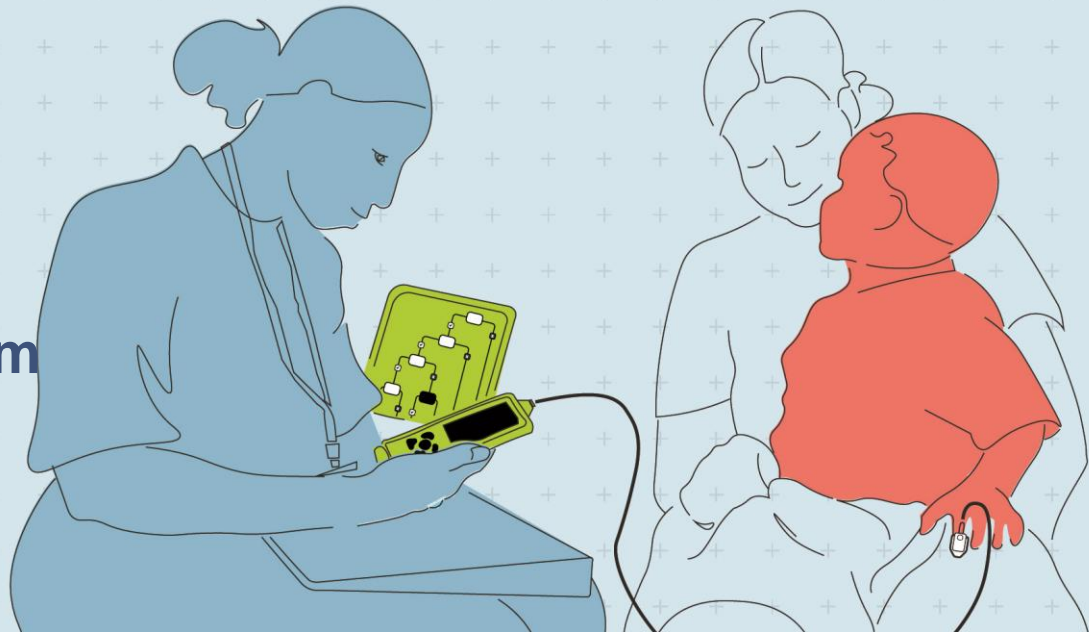**Tools for Integrated Management of Childhood Illness**

Clinical decision support algorithm

Strengthening the ability of health care workers to manage sick children

What are clinical decision support algorithms?

Clinical decision support algorithms (CDSAs) are digitized tools that combine an individual's health information with the health worker's knowledge and clinical protocols to assist in making diagnosis and treatment decisions. They analyze patient data, providing prompts and reminders that help health care workers deliver a range of services within a continuum of care. This may include alerting providers to certain symptoms, notifying health workers when patients are at risk, and providing tailored recommendations for further tests and diagnosis.

The World Health Organization recommends the use of these tools through mobile devices at the primary health care level for tasks that fall within the existing scope of the health care worker, such as use of integrated management of childhood illness guidelines to evaluate sick children.[1] In the case of early childhood illness, some CDSAs can also help guide health workers through medical consultations, create a critical link to a broad range of complementary screening tools like pulse oximetry, and integrate point-of-care laboratory tests for bacterial infections and severe diseases to determine the best course of action. In some countries, they are linked to electronic medical records, providing a more holistic picture of each patient's health.

Despite several initiatives underway around the use of these digital tools in low-resource settings, there remains a lack of awareness of their impact and cost-effectiveness at the national level, as well as a growing need to streamline how health data is collected and used for decision-making. Though more research is needed, initial evidence suggests that CDSAs can reduce barriers to quality of care and, ultimately, health disparities, leading to greater health impact.

Digital tools like CDSAs can help health workers make more accurate diagnoses and deliver more targeted care. Photo: PATH/Zachary Clemence.

What are considerations for CDSA implementation?

In order to budget for, fund, and sustain CDSAs, it is critical that countries, implementing partners, and donors understand the upfront and recurrent costs and criteria associated with implementing these digital tools. These considerations may include:

+ **Market readiness:** Countries must understand the ongoing costs, acceptability, and operational barriers for CDSAs. Suppliers of these tools must consider demand and affordability, as well as any barriers to distribution, uptake, and ongoing maintenance to ensure the business model is feasible and their products remain operational.

+ **Interoperability:** Interoperability refers to the ability of different information systems and digital technologies to access, exchange, and use data cohesively, as well as be

integrated within existing systems. Interoperability is critical to a strong health ecosystem so that providers have a more holistic picture of patient health.

+ **Political readiness and national policy:** Government leadership is important for the success of digital technologies and systems. Countries must consider alignment with technological, legal, and regulatory policies that build on privacy and security commitments for patient health data, address data-sharing standards and collaboration, and anticipate future trends and demands of the health sector.

+ **Change management:** Although CDSAs are a critical intervention to improve data availability, quality of care, and decision-making, they are only one piece of the equation. Change management processes ensure that digital health technologies are adopted and integrated within existing systems and contribute to a culture of data use in health facilities. Change management strategies may range from trainings on the new digital tools to targeted supportive supervision for underperforming health facilities.

What are scale-up and sustainability considerations for CDSAs?

When determining which solutions will help countries strengthen their data collection, quality of care, and decision-making, it is critical to plan for sustainability from the start. There are four critical elements that need to be considered when planning for sustainability that countries, implementing partners, and donors should keep in mind:

+ **Policy and governance:** Governments must understand the current policy context for data management, data privacy, data use, and data security. Because there are often gaps in these policy areas, a plan based on international standards should be established to ensure complete data privacy and security, and an advocacy plan should be built to help the government begin to address these policy issues.

+ **Technical:** Governments must understand their human and infrastructure capacity to manage solutions in a sustainable way. This requires mapping capacity and then developing and executing a plan to ensure the required skills and infrastructure are in place.

+ **Institutional:** Governments must determine the level of engagement across the health system in the design and adaptation of CDSAs to meet user needs. It is important to understand early on the flow of data across the health system and how these tools interface with other digital systems. This includes the reporting structure for health data, as well as the decision-making and authority structure

to establish new processes and practices, such as the decision to switch from paper-based registries to digital systems.

+ **Financial:** Governments must work to ensure that the cost of maintaining and replacing solutions over time is both feasible for the government and built into the appropriate funding mechanism. This includes understanding the initial investments and roll-out costs, as well as ongoing maintenance and sustainability costs, to inform funding requirements going forward.

Tools for Integrated Management of Childhood Illness

PATH, with support from Unitaid, and in partnership with the Swiss Tropical and Public Health Institute, is implementing an initiative to improve accurate screening and diagnosis of illness in children under five in India, Kenya, Myanmar, Senegal, and Tanzania.

Goal: The Tools for Integrated Management of Childhood Illness (TIMCI) project will improve access to affordable and appropriate tools—such as pulse oximeters—at the primary health care level, as well as evaluate the impact of their use together with CDSAs.

In partnership with Unisanté, the developer of the CDSA software providing technical solutions for adaptation of these algorithms, TIMCI is working with ministries of health to adapt CDSAs for their country context and incorporate them into health systems to enable better and more targeted patient care. This step will help to ensure that decision-making algorithms informing these critical decision support tools align with local guidelines and evidence-based practices. The expected results are stronger health systems, increased adherence to guidelines or protocol-based care, and better patient outcomes.

TIMCI carried out an assessment to evaluate the scale-up considerations in all five focus countries. The results from this assessment provided many insights about the readiness to implement a digitized health tool in the countries. These will now inform country implementation, the scale-up strategy, and the plan for sustainability of CDSAs in each of the focus countries.

To learn more about TIMCI, please contact TIMCI@path.org.

References

1. World Health Organization (WHO). *WHO Guideline: Recommendations on Digital Interventions for Health System Strengthening.* Geneva: WHO; 2019. https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf?ua=1.

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