Implementing WHO SMART guidelines - Digital Adaptation Kits(DAKs): Early lessons from Pathfinder countries in Africa

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Abstract

Background: The adoption of digital systems requires processes for quality assurance and uptake of standards to achieve universal health coverage. The World Health Organization (WHO) developed the Digital Adaptation Kits (DAKs) within the SMART Guidelines framework to reinforce standards and recommendations through digital systems, however, a systematic process is needed for implementing and ensuring impact of DAKs in country contexts.

Objective: The paper details the structured process and stepwise approach used to customize the DAKs to the national program and digital context in five countries in Africa with diverse program guideline uptake and significant digital health investments: Ethiopia, Ghana, Malawi, Zambia, and Zimbabwe All these countries have existing digital systems, which have potential to be updated with the DAKs.

Methods: A DAK assessment tool was developed and employed to assess guideline digitization readiness and opportunities for system uptake in each country. Multi-stakeholder teams were established to conduct the content review and alignment of the generic DAK to national guidelines and protocols through a series of stakeholder consultations, including stakeholder orientation, content review and alignment, content validation, and software update meetings.

Results: Country adaptation processes identified requirements for national level contextualization and highlighted opportunities for refinement of DAKs. Quality assurance of the content during the content review and validation processes ensured alignment with national protocols. Adaptation processes also facilitated the adoption of the DAKs approach into sexual and reproductive health (SRH) national guidelines and strategic documents.

Conclusions: Country experiences offered early insights into the opportunities and benefits of a structured approach to digitalizing primary health care services, and ultimately how this process can continuously be refined and sustained for country impact. Clinical Trial: N/A

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Abstract

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Country experiences offered early insights into the opportunities and benefits of a structured approach to digitalizing primary health care services, and ultimately how this process can continuously be refined and sustained for country impact.

Introduction:

Globally, the digital transformation of the health sector has seen many countries seek to transition from paper to digital systems in a broader effort to achieve universal health coverage (UHC).[1]

However, this process has not been without challenges. Digital ecosystems, in low- and middle-income countries, continue to be flooded with a multiplicity of digital tools. It is also often difficult to ascertain the design process of these tools and whether the underlying content is developed in accordance with the evolving clinical evidence base, protocols, and guidelines. This is largely due to the existing process of translating narrative guidelines into digital systems, which is often laborious, prone to error, and lacks accompanying technical documentation appropriate for digital use.[2] This results in disjointed digital health ecosystems with inadequate standards that hinder the quality of care, exchange of data and reporting, and hamper continuity of care. [3] To deliver sustainable digital health solutions for country impact, digital system development needs to be based on principles of transparency, accessibility, scalability, interoperability;[4] and be adherent to clinical guidelines and data use and sharing standards, and be guided by national digital strategies.

To ensure accurate reflection of guidance within digital systems, WHO developed the SMART (Standards-based, Machine-readable, Adaptive, Requirements-based, and Testable) guideline approach, which includes Digital Adaptation Kits (DAKs).[4] DAKs area transparent, inclusive and software-agnostic mechanism for translating narrative guidelines into a format that informs the design of digital systems. They have been developed for health service areas such as, ANC[5], HIV,[6] and family planning[7], with more health domains in the pipeline. DAKs are packaged as an operational guidance document (PDF) with four (4) web annexes (Excel files: A) core data elements/ data dictionary, B) decision support tables, C) programme indicator definitions, D) functional and non-functional requirements. They are structured into components, such as personas, workflows, data dictionaries, decision-support logic,[3,] that are intended to be customized and adapted across diverse country digital and program landscapes and contexts. These include settings that already have established digital systems, as well as those that are preparing to transition from paper to digital systems.

Considering that SMART Guidelines and DAKs are new concepts, it is important to establish defined processes to introduce, adapt and integrate DAK content within countries' existing digital ecosystems and programmatic landscape. This article details the processes and lessons learned towards the development of a framework for the systematic implementation of DAKs within country contexts being undertaken by WHO through technical assistance and implementation research. Using this experience, we aim to develop and refine a replicable process for the country adaptation and implementation of DAKs as a mechanism for a consistent approach to digitalizing primary health care services.

Methods:

Aim and Objectives

The paper highlights the processes and lessons learned towards the development of a framework for the systematic implementation of DAKs within country.

Implementation Approach:

The selected countries were part of a broader UN interagency initiative[8] to strengthen sexual reproductive health and rights outcomes (Zambia, Malawi and Zimbabwe), while Ethiopia and Ghana were positioned for implementation research[9]. All countries have national digital health systems that would be updated and enhanced with country adapted DAK packages.

A stepwise approach was developed to introduce DAKs within existing digital systems across five (5) countries: Ethiopia, Ghana, Malawi, Zambia, and Zimbabwe. Multi-stakeholder DAK adaptation teams consisting of programme and digital health, and providers were assembled and engaged through-out the adaptation processes. The ANC and FP DAKs were used as the initial set of content areas to inform a standard methodology and process for DAK country customization and integration into the health system. This method builds on processes for customizing the ANC digital module[10] using the ANC DAK in Zambia and Rwanda[11] and defines a methodology for applying the DAKs into the existing digital systems available in country. The approach included the following steps:(1) country assessment and stakeholder orientation; (2) content adaptation: review and alignment to national package; 3) content validation of draft DAK package; 4) digital system and content updates (Figure 1: DAK adaptation processes steps). Subsequent steps, such as the design of the system prototype (Step 4) will be expanded on through standard software development processes, including quality assurance assessments and user acceptance tests to facilitate further iterations and enhance the readiness for deployment. Related deployment activities, including system monitoring, training, and continuous support and feedback, are acknowledged as part of the overall process. However, these are not specific to implementation of the DAK. To guide and document this process for future replication, we developed operational tools (Table 1).

Figure 1: DAK adaptation process steps and phases

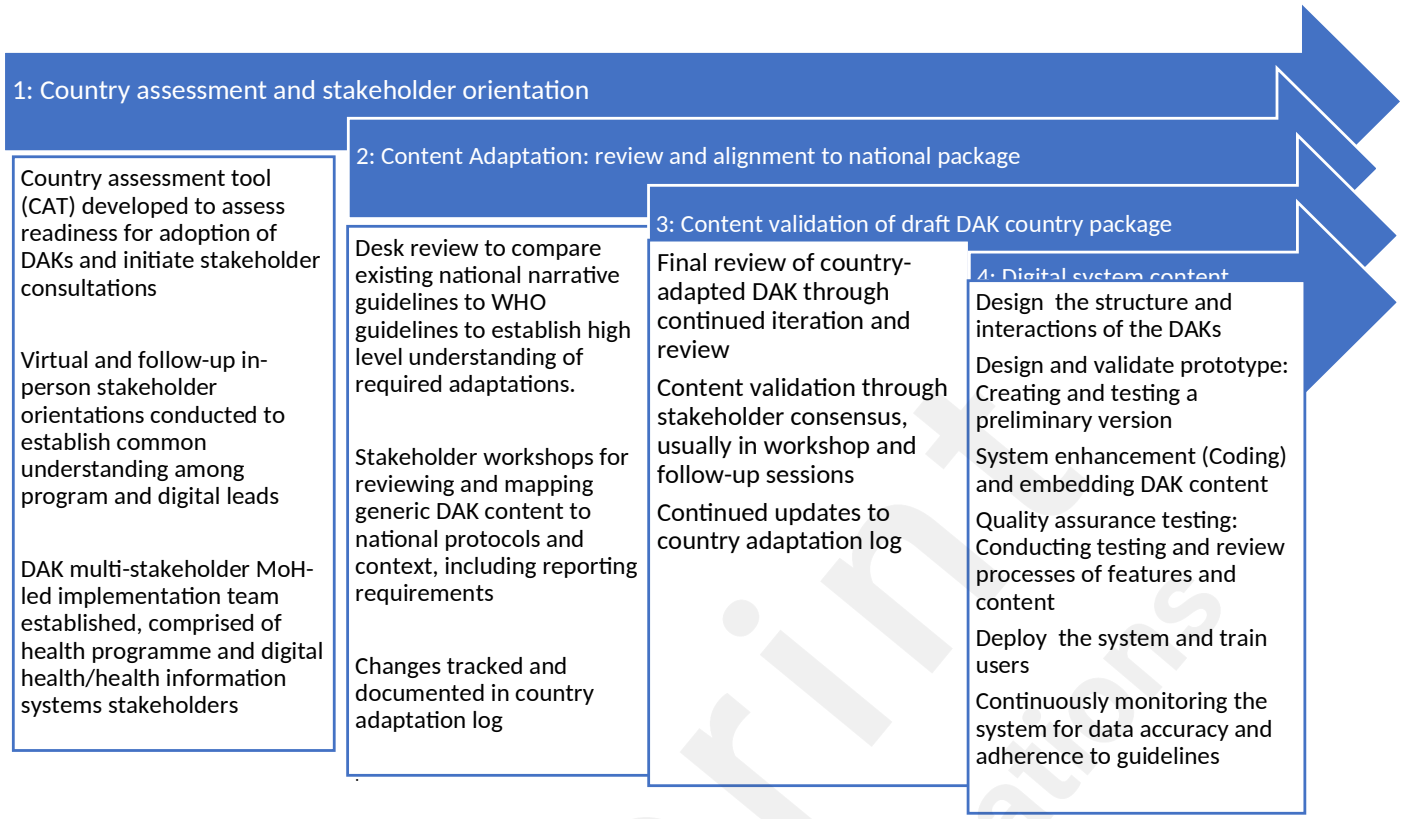

Table 1: Tools used in DAK country adaptation

S/N	Tool	Purpose and description	DAK Adaptation Steps	Point of use/ when used	DAK component reviewed
1	Guideline extraction	Provides a high-level comparison between	Country assessment and stakeholder	Pre-stakeholder	Health Interventions and

		country and WHO narrative guidelines	orientation	orientation workshop Pre-content review and alignment workshop	recommendations
2	Country assessment	The assessment tool evaluates a country's digital health landscape, governance, and workforce capacity.[12] It examines existing systems, guidelines, leadership structures, strategic priorities, and services. It seeks to identify relevant governance frameworks, and investment plans to guide the selection and sustainability of the digital system to be used for DAK content updates.	Country assessment and stakeholder orientation	Pre/ during stakeholder orientation workshop	Health Interventions and recommendations Personas
3	Pre mapping tool	This is adapted from the generic DAK data dictionary for specific health domain area and includes questions to determine if the DAK data element already exists in the country's protocols/ guidelines/registers, whether it should be added to the country adapted DAK, and if any modifications are required. It also considers data elements that exist in the country protocols but not in the DAKs, with space to provide a description of the new data element and indicate any removals, notes, or justifications.	Content adaptation: review and alignment with national protocols/guidelines	Content review and alignment with national protocols/ guidelines workshop	Health interventions and recommendations Personas Business Processes and workflows Core data elements Decision Support logic Indicators and performance metrics
4.	Monitoring, evaluation and reporting alignment	The tool is used to systematically review and align DAK elements added to the country adapted DAK to existing reporting tools (e.g., paper registers).	Content adaptation: review and alignment with national protocols/guidelines	Content review and national protocols/guidelines workshop	Core data elements Decision Support logic Indicators and performance metrics
5	Country adaptation log	The log provides a comprehensive overview of changes (additions, removals and modifications) made to the data dictionary and decision support logic for	Content validation of draft country package	Post content review and alignment workshop	

		the adaptation of the DAK in an existing system			

Results and Lessons learned:

Iterative content review for country adaptation

The above mentioned processes resulted in the development of country adapted DAKs and provided an opportunity for countries to review their business requirements processes for standardizing content within their digital system. Four main scenarios for adaptation were identified: a) direct adaptations/additions from the generic DAKs b)modifications of DAK elements c)additions from country digital system/protocols, and d) removals of DAK elements. The majority of generic content was directly adopted from both generic data dictionaries and decision support logic. Modifications were made to largely align to terminologies used in national contexts, e.g "Higher education" modified to "Tertiary education"; "HIV positive" modified to "Known HIV positive". Removals consisted of elements that were not in line with current clinical practice and guidelines in respective countries. Countries also identified information from the existing digital system, national protocols and reporting tools to be added to the country adapted DAKs. The content adaptation process is not linear; multiple iterations and layers might be required for alignment with other components of the digital ecosystem, including the health management information systems (HMIS) for reporting.

Initially, the DAKs and related spreadsheets were perceived as abstract materials, and stakeholders often requested understanding what the "end-product" would look like. A reference application with ANC and FP DAK content was often demonstrated as part of the workshops to provide clarity on how the DAKs would eventually appear in a digital interface.

The content adaptation process is not linear; multiple iterations and layers might be required for alignment with other components of the digital ecosystem, including the health management information systems (HMIS) for reporting.

The process of adapting DAKs for different countries revealed the need for national level contextualization and opportunities for refinement. However, the adaptation process is not linear; multiple iterations and layers might be required for alignment with other components of the digital ecosystem, including the health management information systems (HMIS) for reporting . Moreover it was time-consuming and required extensive stakeholder consultations due to the inadequate nature and unavailability of requirements documentation for country digital systems. This process involved reviewing over 1500 data elements and aligning the draft DAK content to the health management information system (HMIS) reporting tools. This was iterated and eventually included updating existing paper tools based on the DAK adaptation process in Zambia.

Opportunities for improved system uptake

DAKs were found to be clearly structured, with some ministries of health proposing to adopt the DAK approach to document business processes for other health domains and include it as part of their broader strategy to digitalizing SRH services at the primary health care level. Examples include Malawi and Zambia. Decision support functionalities were found to be a valuable addition due to their potential to guide or/remind clinicians of key clinical recommendations during provision of care. Additionally, the content review process provided an opportunity for both digital and health literacy capacity building as clinicians reviewed both the content as well as tools used to inform the design of a digital module they themselves would be utilizing—a critical component for system adoption.

Accelerating guideline adaptation through digital

In settings where the narrative guidelines are not up-to-date, DAKs can be used to catalyze guideline adaptation within the health system. The adaptation process can be useful for informing the updates for narrative guidelines in aligning to the latest WHO guidelines. However, the DAK itself cannot be a substitute for undergoing the formal process of updating national health programme guidelines.[13]

offers a sustainable pathway for institutionalizing WHO SMART Guidelines–DAKs. Strong digital health leadership and governance, along with a coordination and strategic direction for digital investments will be critical [14] particularly in countries where systems are still disease specific. Moreover, the collaboration between program leads, policy makers and digital teams will also be vital, including engaging program managers and policy makers in system update trainings and continuous system monitoring at facility level, and identification of ‘system champions’ at facility level. Further, plans for interoperability and data use standards will also need to be incorporated and considered as part of the DAK country implementation processes.

Conclusion

These initial set of country experiences offer insights into the requirements and opportunities to optimize the use of WHO SMART Guidelines DAKs as a tool for strengthening countries' digital investments in a structured manner. This approach sets the foundation for a systematic approach to implementing DAKs and will be further refined through rigorous research.[9]

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Competing Interests: KB is a clinic informatics specialist who works for IHM – a tech company that supports the implementation of the digital system in Zambia.

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