



Evaluating the implementation and effectiveness of a hub and spoke model to deliver antimicrobial stewardship interventions in Africa

Ayesha Iqbal, Gizem Gülpınar, Helena Rosado, Maxencia Nabiryo, Frances Garraghan, Claire Brandish, Victoria Rutter

Commonwealth Pharmacists Association

Corresponding author:

gizem.gulpinar@commonwealthpharmacy.org

Background

As part of the Commonwealth Partnerships for Antimicrobial Stewardship (CwPAMS) programme, a novel application of hub and spoke model (HSM) (Fig. 1) operates across 8 health partnerships (HPs) to build antimicrobial stewardship (AMS) capacity and capability in 6 African nations (Ghana, Kenya, Malawi, Sierra Leone, Tanzania, and Uganda). The programme is overseen by the Commonwealth Pharmacists Association and the Tropical Health and Education Trust, facilitating effective coordination and collaboration.

The HSM stands as an effective framework for healthcare delivery, notably optimizing resource utilization, enhancing coordination, and improving access to specialized services. This model ensures efficient allocation of resources, preventing redundancy and reducing costs. Centralizing specific resources and expertise within the CwPAMS program at the hub streamlines implementation at respective spoke sites.

Despite literature highlighting HSM benefits, implementation research shows contextual factors can hinder adoption.

Aim

This study is an integral component of a broader evaluation of AMS implementation, focusing specifically on assessing the HSM mid-term progress.

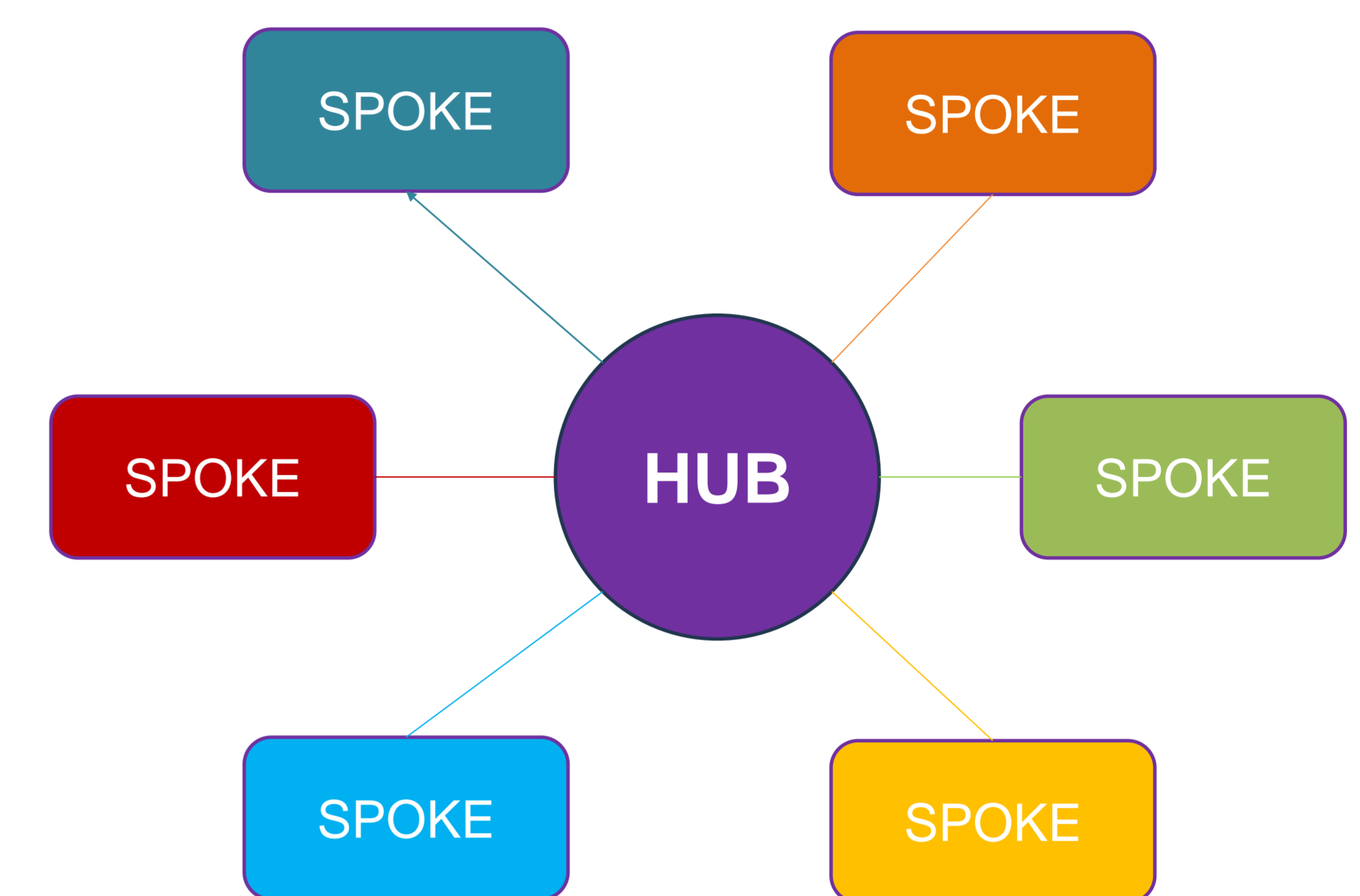


Figure 1: Hub and Spoke model

Method

A hybrid Type 2 implementation study was designed to evaluate HSM effectiveness in delivering AMS interventions and achieve CwPAMS planned initiatives and outcomes (Fig. 2). A mixed methods approach was adopted for data collection (December 2022 - March 2025) in three phases:

- ❖ pre-implementation
- ❖ mid-implementation
- ❖ post-implementation.

Data collection tools (surveys, study forms, monitoring and evaluation forms and interview topic guides) were designed for each phase based on implementation science frameworks, and administered to relevant stakeholders through virtual and in-person methods. Mid-term data was collected from January to April 2024. Progress and outcomes in CwPAMS hub and spokes were tracked using four mandatory indicators:

- 1) Completing a pre-AMS assessment tool
- 2) Developing AMS action plans
- 3) Establishing an operational AMS committee
- 4) Conducting an AMS Global Point Prevalence Survey (GPPS)

Quantitative data were analyzed using descriptive statistics using Microsoft Excel and SPSS software (V 22.0) and a thematic analysis was performed to analyze qualitative data using NVivo14®.

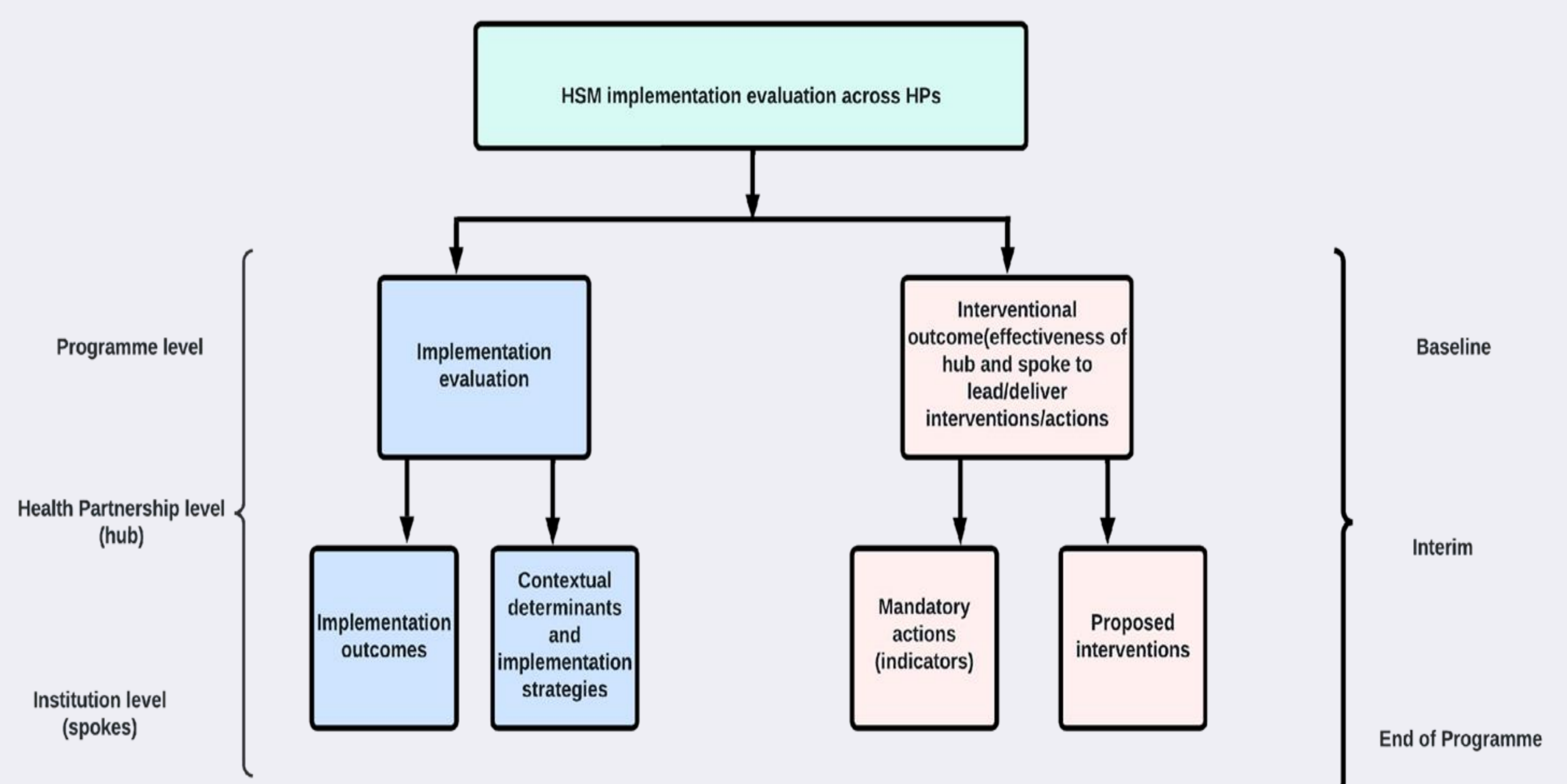


Figure 2: Model of implementation evaluation for the CwPAMS programme.

Results



Achievements

In the mid-implementation phase, the hub and spoke model facilitated progress on mandatory and non-mandatory indicators. Amongst the indicators outlined:

- 1) Pre-AMS assessment tools completed for all 8 hubs and 34 spokes
- 2) AMS Action plans prepared for 8 hubs, and still being developed by spokes
- 3) AMS committees established in 8 hubs and 9 spokes (3 newly formed; 6 in existence but rejuvenated as part of CwPAMS2).
- 4) GPPS on antimicrobial prescribing/use conducted in 2 hubs and 1 spoke, and yet to be conducted in 34 institutions.



Challenges

- ❖ Major barriers reported to delivering CwPAMS2 activities using the HSM:
- ❖ Difficulty in identifying leaders and site champions
- ❖ Inadequate staff training and lack of knowledge to reach mandatory indicators
- ❖ Resistance to change (both organisational and individual level)
- ❖ Lack of time and resources (procurement, laboratory diagnostics, chemicals, etc.) and diversion to execute other parallel quality improvement and daily patient care initiatives and priorities.

Conclusion

The three-phased CwPAMS implementation evaluation framework continues providing programmatic support and helps identify progress as well as barriers and facilitators to delivering AMS interventions and reaching mandatory indicators via the HSM. Insights gained guide tailoring interventions and optimizing strategies to overcome contextual challenges, enhancing the delivery, uptake, integration, and sustainment of AMS interventions in real-world healthcare systems.

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