SURE Rapid Response

Is a vertical compared to an integrated approach effective in implementing the Expanded Programme of Immunization in Uganda?

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This rapid response was prepared by Ekwaro A OBUKU

Key messages

Despite efforts to provide universal access to immunisation in Uganda, there have been challenges in the availability of vaccines in the field in the recent past. This follows a transition of vaccines management from a vertical Expanded Programme of Immunisation under the Ministry of Health to an integrated procurement, supply and distribution of essential drugs under the National Medical Stores. This paper reviews research evidence comparing the effectiveness of either approach: vertical versus integrated.

- ➔ There is no research evidence directly comparing vertical vs. an integrated management of EPI.
- ➔ The research evidence proposes conditions in which a vertical approach to EPI may be preferred.
- ➔ Research evidence suggests that maintenance of the cold chain is the most crucial component of EPI vaccine management.

UNHRO

SURE Supporting the Use of Research Evidence

REACH Regional East African Community Health Policy Initiative

Makerere University College of Health Sciences

EVIPNet Evidence-Informed Policy Network

Who requested this rapid response?

This document was prepared in response to a specific question from a decision maker in the Ministry of Health, Uganda.

! This rapid response includes:

- **Key findings** from research
- **Considerations about the relevance** of this research for health system decisions about effective strategies for implementing EPI in Uganda.

X Not included:

- Recommendations
- Detailed descriptions

What is SURE Rapid Response?

SURE Rapid Responses address the needs of policymakers and managers for research evidence that has been appraised and contextualised in a matter of hours or days, if it is going to be of value to them. The Responses address questions about arrangements for organising, financing and governing health systems, and strategies for implementing changes.

What is SURE?

SURE – Supporting the Use of Research Evidence (SURE) for policy in African health systems – is a collaborative project that builds on and supports the Evidence-Informed Policy Network **(EVIPNet) in** Africa and the Regional East African Community Health **(REACH)** Policy Initiative (see back page). SURE is funded by the European Commission's 7th Framework Programme.
www.evipnet.org/sure

Glossary

of terms used in this report:
www.evipnet.org/sure/rr/glossary

Background

The Expanded Programme on Immunisation (EPI) is a World Health Organisation (WHO) goal to ensure universal access to vaccines to all children, particularly in Low and Middle Income Countries (LMICs). WHO member nations are obliged to implement country programmes, hence the Uganda National Expanded Programme on Immunisation.

Despite the registered success in Uganda, there have been serious challenges with at least two polio outbreaks reported in Uganda in 2009 and 2010 [1, 2]. In addition, Uganda reported the lowest vaccine coverage in East African in 2010 (Table 1).

Table 1: EPI coverage in East Africa for selected vaccines

Vaccine	Country	Year & Coverage (%)				
		2010	2009	2008	2007	2006
BCG	Uganda	**86**	90	86	89	85
	Rwanda	99	99	93	89	98
	Kenya	99	75	95	92	92
	Tanzania	99	93	89	89	99
DPT3	Uganda	**80**	83	79	85	80
	Rwanda	97	97	97	97	99
	Kenya	83	75	85	81	80
	Tanzania	91	85	86	83	90
Polio 3	Uganda	**79**	83	79	84	81
	Rwanda	93	93	97	98	99
	Kenya	83	71	85	76	77
	Tanzania	94	88	89	88	91
Measles	Uganda	**73**	81	77	86	89
	Rwanda	95	95	92	99	95
	Kenya	86	74	90	80	77
	Tanzania	92	91	88	90	93

The possible reasons for this decline in performance include: (a) a weak procurement, storage (cold chain) and distribution system during the transition from UNEPI (vertical) to National Medical Stores (integrated); (b) a funding gap following mismanagement of the Global Alliance for Vaccination Initiative; with recent persistent complaints of vaccines and vaccine supplies shortages from field staff in the affected districts.

This paper synthesises research evidence on the effectiveness of a vertical compared to an integrated approach in implementing the EPI in LMICs with contextual focus on Uganda.

How this Response was prepared

After clarifying the question being asked, we searched for systematic reviews, local or national evidence, and other relevant research. The methods used by the SURE Rapid Response Service to find, select and assess research evidence are described here:

www.evipnet.org/sure/rr/methods

What the quality of evidence (GRADE) means

The quality of the evidence is a judgement about the extent to which we can be confident that the findings of the research are correct. These judgements are made using the GRADE framework, and are provided for each outcome. The judgements are based on the type of study design (randomised trials versus observational studies), the risk of bias, the consistency of the results across studies, and the precision of the overall findings across studies. For each outcome, the quality of the evidence is rated as high, moderate, low or very low using the definitions below.

⊕⊕⊕⊕
High: We are confident that the true effect lies close to what was found in the research.

⊕⊕⊕◯
Moderate: The true effect is likely to be close to what was found, but there is a possibility that it is substantially different.

⊕⊕◯◯
Low: The true effect may be substantially different from what was found.

⊕◯◯◯
Very low: We are very uncertain about the effect.

For more information about GRADE:

www.evipnet.org/sure

What we found from the research evidence

1. There is no evidence on a vertical vs. integrated implementation of EPI

- We examined several systematic reviews but did not find a single study directly comparing a vertical approach to an integrated mode of implementing EPI in terms of procurement, supply and distribution of vaccines and vaccine dry supplies. We therefore appraised indirect evidence from systematic reviews about vertical versus integrated approaches for other health interventions and not necessarily for EPI.

- One systematic review on integration of targeted health interventions into health systems found no instances where interventions were purely vertical (wholly not integrated) or horizontal (fully integrated into the health system functions) [3].

- Another systematic review concluded that full integration of health programmes probably decreases the knowledge and utilisation of specific services and may not result in any improvements in health status [4]. The review concluded that there is some evidence that 'adding on' services (or linkages) may improve the utilisation and outputs of healthcare delivery. However, there is no evidence to date that a fuller form of integration improves healthcare delivery or health status.

2. Evidence suggests conditions necessary for a vertical approach to EPI [5]

We found low quality evidence from field surveys suggesting that the following conditions are necessary for a vertical approach to EPI (refer to policy brief attached):

➔ If the health system is weak: poor drug procurement, supply (cold-chain) and distribution system can significantly reduce the potency of a vaccine. Extremes of temperatures and light damage vaccines, and this can only be detected by a laboratory test since the physical appearance generally remains the same.

- Inappropriate transportation and improper storage of vaccines causes decreased vaccine effectiveness. For example, OPV, DPT, HepB and TT are seriously damaged at temperatures less than 0°C. HepB vaccine freezes at temperatures less than -0.5°C [6].
- Despite WHO guidelines of the optimum temperature range for vaccine storage being 2°C to 8°C [7] vaccine freezing is common. A systematic review found that 14% to 35% of refrigerators or transport shipments exposed vaccines to freezing temperatures; and 75% and 100% in all segments of distribution [8].
- 75% of HepB vaccine shipments in Indonesia were being frozen [9]. The highest rates of freezing occurred during transportation from central provincial to district ware-housees.
- A study in Nigeria found that the potency of polio, measles and yellow fever vaccines decreased below international standards when transported from the national central store to the peripheral health units [10]. This loss of potency was caused by repeated cycles of vaccine freezing and thawing due to deficiencies in cold-chain; electricity shortages; and improper vaccine storage.
- Two villages in Thailand which reported an outbreak of 180 Measles cases had the highest morbidity rates (9.57% and 6.99%); low vaccine coverage rates of 71.7% and 50.9%; as well as very low vaccine efficacy rates of 35.2% and 39.9%, respectively [11].

➔ When a rapid response is needed: For example a vaccine-preventable disease outbreak. Vertical programmes are likely to lead to more rapid results than strategies that attempt to strengthen broader systems as a platform for service delivery.

➔ To gain economies of scale: In the event the disease condition is rare concentrating the provision of services in dedicated provider units to increase demand.

➔ To address the needs of hard-to-reach target groups: For example in Uganda persons living in mountainous terrain or slums, in underserved areas, with limited access to health facilities will require a specialised disease control programme to reach them.

➔ To deliver complex services when a highly skilled workforce is needed: For example, the maintenance of the cold-chain for vaccine delivery requires highly skilled field officers and thus recurrent training becomes necessary.

3. Research evidence to improve shortcomings of the cold chain in EPI

- The vaccine vial monitor (VVM): A small sticker put on a vaccine vial and changes colour as the vaccine is exposed to heat. This colour change can alert the responsible officer in the supply chain or a frontline health worker when the vaccine potency has been compromised. An evaluation study in India demonstrated relatively high correlation between VVM and vaccine potency; with a low probable risk (2.15%) that a sub-potent vaccine could have been administered [12]. However, another study in India showed low awareness of VVM among frontline health workers [13].

- Cool water packs: a study in four Low and Middle Income Countries (Zimbabwe, Myanmar, Turkey and Nepal) found that water packs refrigerated at 2 °C to 8 °C can safely replace frozen icepacks [14]. There was 0.4% to 4.6% life loss when the boxes were exposed to 11.7 °C to 39.8 °C temperatures over the 98 h 15 min test period. This suggests that largely vaccine potency remains intact, with the use of cool water packs.

Relevance of the research to the question being asked

➔ Findings	▷ Interpretation*
APPLICABILITY	
➔ **Studies were from LMICs.**	▷ *The studies were mainly from LMICs and results are likely to be applicable in Uganda today.*
EQUITY	
➔ **The evidence proposing a vertical approach addresses inequity in health services distribution with low levels in hard to reach communities.**	▷ *Hard to reach populations may benefit from a targetd approach of EPI.*
COST CONSIDERATIONS	
➔ **No studies reported costs comparing a vertical vs. an integrated approach to EPI.**	▷ *The rationale for integrating is to save costs due to economies of scale. However, this may not be cost-effective if vaccine potency is compromised due to weakness of the cold chain or covergae is interupted by erratic supplies of vaccines, syringes and sundries.*
MONITORING & EVALUATION	
➔ **Evidence evaluating effectiveness of EPI interventions from the supply side is lacking. Specifically, comparing integrated vs. a vertical approach to EPI is scarce**	▷ *The MoH should evaluate the current EPI startegy rigorously and prospectively for effectiveness (vaccine covergae, potency and cold chain bottlenecks) and using appropriate comparisons.*

*Judgements made by the authors of this response based on the findings of the research and consultation with others (see acknowledgements). For additional details about how these judgements were made see: www.evipnet.org/sure

About the research underlying this Response

Types of	What we searched for	What we found
Interventions	EPI: integrated vs. vertical	Incentives, Motivation, Extrinsic, Intrinsic
Participants	Supply chain staff and health Workers	Supply chain staff and health workers
Settings	LMICs	LMICs
Outcomes	Vaccine coverage Vaccine potency	Vaccine coverage Vaccine potency
Research	Systematic reviews of RCTs	Single studies; policy brief & systematic reviews on integration vs. vertical health interventions

Date of most recent search: April 2013 in PubMed, PDQ evidence, Cochrane and Google Scholar data bases.

Limitations: The evidence is from observational studies (surveys and programme reports) hence low to very low quality.

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SURE collaborators:

The **Evidence-Informed Policy Network (EVIPNet)** promotes the use of health research in policymaking. Focusing on low and middle-income countries, EVIPNet promotes partnerships at the country level between policymakers, researchers and civil society in order to facilitate policy development and implementation through the use of the best scientific evidence available.
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Conflicts of interest

None known.

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