REPUBLIC OF KENYA

MINISTRY OF HEALTH

Every Child Thrives (ECT) OPERATIONAL STUDY

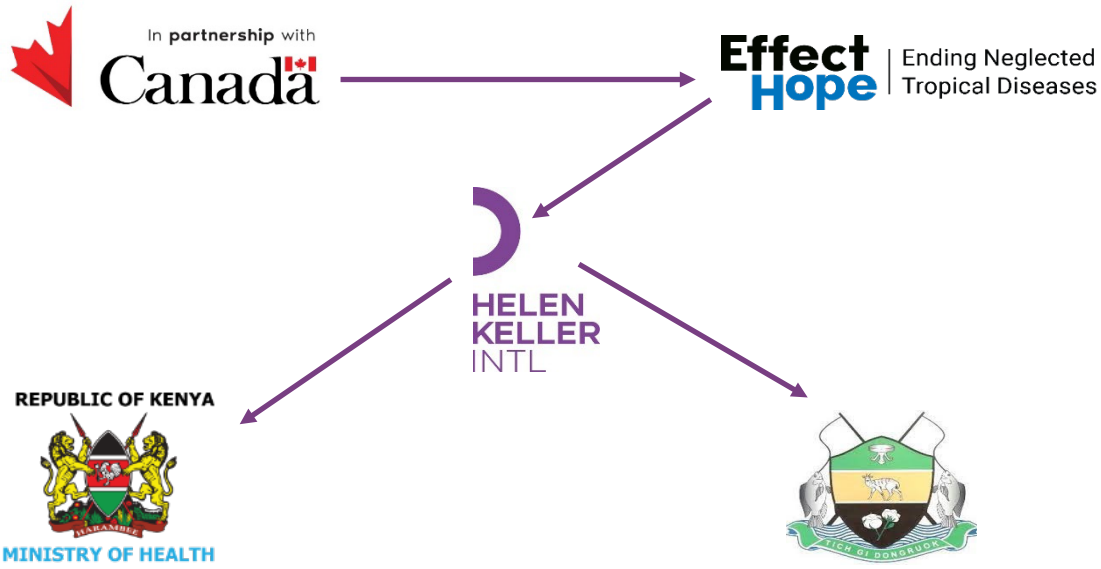
Strengthening Vitamin, A Supplementation and Deworming through Routine Community Health Services in Siaya County, Kenya

June 2022

STUDY LOCATION: Siaya County

FUNDING AGENCY: Global Affairs Canada/ effect hope

Acknowledgement



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List of Abbreviations

CHAs	Community Health Assistants
CDoH	County Department of Health
CHV	Community Health Volunteers'
CHEW	Community Health Extension Worker
CHS	Community Health Services
CHU	Community Health Unit
CHW	Community Health Worker
CHMT	County Health Management Team
CHVs	Community Health Volunteers
CNC	County Nutrition Coordinator
DND	Division of Nutrition and Dietetics
ECDs	Early Childhood Developments
EPI	Expanded Programme on Immunization
FDGs	Focus Group Discussions
HW	Health Worker
HINI	High Impact Nutrition Interventions
KIIs	Key Interview Informants
MB	*Malezi Bora*
MoH	Ministry of Health
OPS	Operational Study
SCHMT	Sub-county Health Management Team
STH	Soil-Transmitted Helminth
VAD	Vitamin A Deficiency
VAS	Vitamin A Supplementation
VASD	Vitamin A Supplementation and Deworming

Executive Summary

Introduction

Vitamin A supplementation is a lifesaving intervention essential to reducing the risk of child mortality, morbidity, and malnutrition, especially in countries with high levels of vitamin A deficiency. According to WHO, Vitamin A supplementation (VAS) can reduce child mortality rate by up to 24 percent when delivered twice a year to at least 80 percent of children aged 6 to 59 months in countries with high under-five mortality and high vitamin A deficiency rates. In Kenya, soil-transmitted helminth infections (parasitic worms) affect up to 40% of children aged 12-59 months, often affecting their health and nutritional status. The target age for both VAS and deworming are similar, and therefore combining VAS and deworming (VASD) has both logistical and health advantages as well as makes both interventions cost-effective.

In Kenya, VAS is one of the *High Impact Nutrition Interventions* (HINI) to control micronutrients deficiencies among children aged 6-59 months and is delivered through three different approaches, which include (i) routine service delivery at health facilities, (ii) integration in *Malezi Bora*, and (iii) through Community Health Units (CHUs), outreach, and early childhood development (ECD) centres. *Malezi Bora* is an approach that delivers a high-impact comprehensive package to accelerate the uptake of services targeting children aged less than five years, pregnant women, lactating mothers, and women of reproductive age. *Malezi Bora* is used to deliver VASD as part of a package of services, with some counties integrating VAS with deworming.

It is evident that VASD coverage through routine service delivery is low, especially for children > 12 months of age; hence VASD acceleration through *Malezi Bora* events helps to reach the desired coverage. *Malezi Bora* is however resource-intensive, and although counties mobilise internal funding, this is not enough for implementation; thus, they depend on donor and partner support.

Purpose and Objectives

At the national and county levels, the Government of Kenya has invested heavily in community health services to enable households to access basic healthcare and health information. Community health services (CHS) are recognised as an integral part of universal health care. However, since the rollout of the National Community Health Strategy, the use of CHS to deliver VASD has not been fully exploited. The VAS policy in Kenya allows the delivery of VAS through

Community Units. This notwithstanding, community health volunteers (CHVs) deliver VASD to the targeted children during *Malezi Bora* events only, but not through community health services at the household level.

This research was commissioned to assess the feasibility of VASD through CHS in Siaya County. The specific objectives of the study were:

a) To determine the feasibility of delivering vitamin A supplementation and deworming (VASD) through CHS.
b) To compare the costs and effectiveness of VASD delivery through CHS and Malezi Bora.
c) To determine the key steps for consideration in planning, implementing, and monitoring VASD at the CHU level.

Methodology

A mixed-method comparative cross-sectional research design with both quantitative and qualitative approaches was adopted for the study. On the qualitative dimension, in-depth insights on CHS and *Malezi Bora* approaches to VASD delivery were undertaken through Key Informant Interviews (KIIs) and Focus Group Discussions (FGDs). The quantitative dimension involved establishing the coverage of VASD through household surveys in addition to establishing the costs and cost-effectiveness of the two approaches of VASD distribution. The activity-based costing approach was used in the costing analysis as well as economic evaluation methods - cost-effectiveness and utility analysis to measure the cost per health benefit achieved.

The study was conducted in Siaya County from September 2021 to December 2021. Siaya County was selected owing to the well-established and supported community health services with 221 functional Community Health Units (CHUs) and 2128 well motivated CHVs receiving KES 3,000 monthly stipend and enrolled in National Health Insurance Fund (NHIF) Medical Scheme. Two out of six sub-counties in Siaya County were purposively selected for the study based on similarities in population characteristics, socioeconomic activities, health facilities and Community Health Units (CHUs). The sub-counties selected were Alego Usonga, the intervention site and Bondo, the control site. In Alego Usonga sub-county, two wards were randomly selected for the study: South East Alego and West Alego. In Bondo sub-county, six wards were included because of the relatively small number of CHUs (N=21) compared to the 21 CHUs in the two selected wards in Alego Usonga sub-county. The intervention of distribution of VASD through

CHS was implemented in the two wards in Alego Usonga, while VASD through *Malezi Bora* approach took place in all the wards in Bondo Sub-County.

The target population for the intervention and control arms of the study was caregivers and their children aged 6 to 59 months. The study adopted the WHO and UNICEF recommended 30 by 7 cluster sampling methodology for Knowledge, Practices and Coverage Surveys (KPC) making a sample size of 7 care givers per cluster and a total of 210. In making provision for non-response, the sample size was rounded to 10 caregivers to make a total sample of 300 households in Alego Usonga sub-county and a similar sample size for Bondo sub-county. Two-stage sampling methodology was used to select households from which to collect data. The first stage of sampling involved randomly sampling of enumeration areas (clusters) in terms of villages in the intervention and control wards. In the second stage of sampling, the households to be visited were randomly selected from a list of households of eligible target population.

The respondents for the qualitative component of the study were purposively selected, consisting of 22 key informants in Alego Usonga and 22 in Bondo. In addition, three key informants were selected for county-level interviews. Furthermore, four FGDs were considered for Alego Usonga and six FGDs for Bondo.

Primary qualitative data were collected through KIIs conducted with programme managers from the County Health Department of Siaya County, Community Health Services Coordinator, County Nutrition Coordinator, Community Health Assistants (CHAs) and Community Health Volunteers (CHVs). Focus Group Discussions (FGDs) were used to collect data from the caregivers. All costs related to the purchase of materials, services, vitamin A capsules, albendazole, training and meetings were captured. The data on the costs of the activities were obtained from Helen Keller International. In addition, data on service utilisation for *Malezi Bora* in Bondo and CHS in Alego Usonga sub-counties were obtained from the County Department of Health office.

Results

The implementation of VASD intervention through CHS started with planning meetings at the national level then cascaded to the county and sub-county levels. It mirrored the planning process used for Malezi Bora in many aspects – County Health Management Team (CHMT) inception meetings at the County to plan the implementation of the vitamin A supplementation and deworming (VASD) distribution and then planning was cascaded to the sub-county level where

the members of the Sub-County Health Management Team (SCHMT) made an implementation plan for distribution of VASD at the households. The planning process was then cascaded to the health facilities where the facility in-charges and the CHAs were involved in the process. The SCHMT members planned for the training and sensitization of those to be involved in the OPS, the management of and distribution of the vitamin A capsules and deworming drugs at the households, monitoring and supervision of the study, reporting and documentation of the number of children who received VASD and data quality assurance, Key informant interviews (KIIs) with CHMT, SCHMT, health facility in charges, CHAs and CHVs revealed that the planning process was adequate and worked well for the CHS and the *Malezi Bora.*

In rolling out the VASD through CHS, training was also cascaded, starting with the training of the facility in-charges, who trained 20 Community Health Assistants (CHAs). The CHAS then trained 220 CHVs on VASD. Although some county and sub-county members of the Health Management teams raised some concerns about the adequacy of the curriculum and duration of the training, the KIIs with the health facility in-charges, CHAs and CHVs from Alego Usonga sub-county indicated that they were well-informed of their roles.

Vitamin A capsules and albendazole deworming drugs were available in Alego Usonga throughout the study period having been provided by Ministry of Health (MoH) Division of Nutrition and Dietetics (DND) and Helen Keller International facilitating their transportation to Siaya County. The distribution of VASD in the household started with the CHVs conducting community mobilization to ensure that the caregivers and their children were available during the exercise and also sensitising the caregivers on the health benefits of VASD. The CHVs were involved in mapping the households and the number of children within the targeted age group in the community to establish the amount of vitamin A capsules and deworming drugs required. The KIIs with the various stakeholders – the health facility in-charges, members of the county and sub-county health management teams, CHVs and CHAs revealed that they were able to effectively mount the door to door distribution and to make required records of the administration of the VASD in the mother-child booklet.

The supervision followed the same procedure and protocol used for other CHS activities, only that VASD was added to the list of activities. The CHAs supervised the CHVs on a weekly basis, while the Sub-County Health Management Team (SCHMT) conducted monthly supervision which included data quality audit. In addition, external supervision was conducted by Helen

Keller International the researchers in conjunction with the planned county visits. The data flow followed the usual channel from CHVs to CHAs and from CHAs to health facilities and then to sub-county. CHVs also updated the Mother Child Booklet to avoid future duplication of supplementation. The data was entered into the Kenya Health Information System (KHIS2) at the sub-county. The supervision was reported by members of the SCHMT, the facility in-charges and the CHAS to be more rigorous and well-structured compared to that conducted during Malezi Bora resulting in improved and more comprehensive data documentation at the health facilities.

All the county and sub-county health personnel interviewed as well as the beneficiaries were in agreement that the distribution of VASD through the CHS was the preferred choice of platform with a number of reasons given, including being relatively cheaper, higher coverage, and enhanced household knowledge of VASD.

The costing analysis showed the incremental cost per child reached with VASD was KES 123.00 (US$ 1.13) during the study. If the CHS programme were implemented for the whole year (12 months) in the two wards in Alego Usonga, the estimated total incremental cost would be KES 2,393,624 (US$ 21,895) through the first year with start-up cost. However, with the implementation moving on to a regular year without start-up costs, the total cost would reduce significantly. The estimated cost of two doses with a fully running VASD through CHS was KES 33.13 (US$ 0.28) per child reached with vitamin A and albendazole.

The cost per child reached with vitamin A supplementation and deworming drugs during Malezi Bora was about KES 33.2 (US$ 0.30). The annual cost per child reached with vitamin A supplementation and deworming drugs would be twice this amount. Additionally, effectiveness analysis showed that child death averted with one dose of vitamin A was 92 and 156 children for CHS and *Malezi Bora,* respectively. With two doses, the estimated deaths averted would increase to 183 in CHS and 313 children in *Malezi Bora*. These higher numbers for *Malezi Bora* were because of many children covered in the entire Bondo Sub-County compared to only two wards in Alego Usongo Sub-County.

The cost per death averted due to VASD with one dose per year was estimated at KES 3,527 (US$ 32.26) and KES 1,988 (US$ 18.18) with two doses per year in Alego Usonga. In Bondo, the cost per death averted was at KES 5,007 (US$ 45.80) with one or two doses of VASD. These results showed that CHS was relatively more cost-effective than *Malezi Bora*. In addition, when lives

averted were converted into a simple measure of disability-adjusted live years (DALYs) using a life expectancy of 60 years, the CHS approach was still more cost-effective than *Malezi Bora*.

The approach used in the planning and implementation of the study in Alego Usonga may be adopted for the distribution of VASD by CHVs at the household. The process was efficient in achieving the main objectives of the study that is, improving the coverage of VASD using a cost-effective strategy. The planning should start at the County level for acknowledgement and support by the government and to plan the implementation process and then cascaded to the sub-county and facility level for detailed planning of the implementation of the distribution of VASD at the household level. Cascaded sensitisation and training of health workers should be adopted with some modification in terms of the duration and content covered. Additional communication channels can be considered, including local radio and churches, to improve mobilisation and sensitisation of the community about the VASD distribution and especially if this approach of distribution of VASD at the household level is adopted.

The SCHMT should be involved directly in the monitoring and supervision of the implementation of the activity and continue to play a critical role in data quality assurance. The critical role played by partners in the implementation of this activity is acknowledged. However, there is a need for advocacy for government to increase nutrition budget allocation to enable the purchase of vitamin A supplements and deworming tablets. Reliance on partners reduces the potential for sustainability of this intervention. Overall, the SCHMT should take the lead and guide the planning and implementation of the activity even as the MoH works in collaboration with partners. The study findings have shown that the distribution of VASD through community health strategy (CHS) is feasible. The findings of the coverage survey showed that in the two wards in Alego Usonga sub-county, where the intervention was undertaken, the coverage of VAS was 90 percent whereas in Bondo (the control site) where *Malezi Bora* platform was used, the coverage was 70 percent based on the findings of the coverage survey. The WHO recommended coverage of VAS of over 80 percent, which was achieved in the pilot.

Conclusions

- It is feasible to successfully distribute VASD through CHS and achieve a high coverage of children receiving the supplementation and deworming drugs. The process followed in the implementation of the activity was efficient and significantly improved the coverage of VASD in a cost-effective manner. The success of implementing VASD through CHS depends on a

couple of factors, including government support and leadership for CHS, presence of functional CHUs with well-motivated CHVs, deliberate planning cascaded from the county level to the sub-county level, training of health facility in-charges, CHAs and CHVs on VASD distribution through CHS; uninterrupted supply and availability of vitamin A capsules and albendazole; the role of played by the health facilities in the microplanning and coordination of routine VASD including VASD supplies management; close supervision of the CHVs, regular and effective supervision, continuous availability of data reporting tools, and regular implementation of review meetings at different levels.

- The implementation of VASD through CHS and Malezi Bora is cost-effective. The estimated incremental cost per DALY in CHS and Malezi Bora was less than Kenya's per capita gross domestic product, which is a benchmark for very effective intervention according to the WHO and the World Bank.

Recommendations

- The Ministry of Health should consider revision of the Community Health Policy in the country to allow the distribution of vitamin A supplements through use of CHVs.
- Scale up the VASD distribution through routine CHS especially in counties with well supported, function and optimal coverage of Community Health Units. This is because it can be easily integrated in the CHVs' daily activities without interfering with their duties. The approach has a high potential for sustainability.
- The training for VASD distribution through CHS should be improved to include: more content coverage particularly for the health facility in-charges and CHAs; post-training evaluation for the CHVs and that a curriculum should be developed, tested and validated specifically for the training of VASD distribution through CHS the approach.
- There is a need for increased community sensitization and nutrition education on the health benefits of VASD so that more caregivers avail their children of VASD. This can be attained through the use of additional channels such as the local radio and churches.
- Siaya County should prioritize the procurement of vitamin A capsules (100,000 IU and 200,000 IU) for the population of children under five years in Kenya. This procurement needs to be done on an annual basis and included in the Annual Workplan, County Budget and County Nutrition Action Plan. The vitamin A capsules and albendazole drugs are affordable, and the county should be able to purchase them. For this to happen, there will be need for advocacy and lobbying for increased funding for nutrition activities.

- The VAS and deworming through routine CHS is strongly recommended for scale up in counties with functional, supported and optimal coverage of CHS. The analysis showed that with fully running CHS programme when start-up costs are no longer incurred, the approach is more cost effective in VASD delivery than delivery through *Malezi Bora* approach.
- Generate more evidence on the feasibility of delivering VAS and deworming through routine CHS in different context with different mode of government support for CHS or limited support CHS.

1 INTRODUCTION TO THE STUDY

1.1 Background

Vitamin A supplementation (VAS) is a lifesaving intervention vital to reducing the risk of child mortality, morbidity, and malnutrition, especially in countries with high levels of vitamin A deficiency (VAD). VAS is a low-cost, effective intervention that combats the effects of childhood illnesses such as diarrhoea and measles. When delivered twice a year to at least 80% of children aged 6 to 59 months in countries with high under-five mortality and high VAD rates, VAS can reduce the under-five mortality rate by up to 24% (WHO, 2015).

In Kenya, VAS is one of the High Impact Nutrition Interventions (HINI) to control micronutrients deficiencies among children aged 6-59 months and is delivered through three different approaches, which include (i) routine contact points at health facilities, (ii) integration in campaigns and *Malezi Bora*, and (iii) community health units, outreaches, and early childhood development (ECD) centres (MOH, 2017).

Malezi Bora, also known as maternal, child and nutrition weeks, is one of the approaches that has proved to be most effective in improving coverage of VAS. *Malezi Bora* is an approach that was introduced in 2007 to provide a high-impact comprehensive package to accelerate the uptake of services targeting children aged less than five years, pregnant women, lactating mothers, and women of reproductive age (MoH, 2017). Although *Malezi Bora* is designed to deliver various maternal and child health services, most counties utilize the platform to deliver only VAS, and a few integrate VAS with deworming.

Soil-transmitted helminth (STH) infections are common in Kenya and can affect up to 40% of children aged 12-59 months. This warrants mass administration of deworming treatments. Deworming is one of the most feasible and cost-effective public health approaches to control soil-transmitted helminth infections among infants and young children. According to WHO, worm-free children have a better nutritional status, grow faster, and learn better. Worm infections are associated with a significant loss of micronutrients. In preschool children, roundworms which are the most prevalent STH infection, cause significant vitamin A malabsorption. The target age for both VAS and deworming are similar, and therefore combining VAS and deworming has both logistical and health advantages and makes both interventions cost-effective (WHO, 2004).

1.2 The Statement of the Problem

It is evident that VAS coverage through routine delivery is low, especially for children > 12 months of age; hence VAS acceleration through *Malezi Bora* events helps to reach the desired coverage. *Malezi Bora* is however resource-intensive, and although counties mobilize internal funding, this is not enough for implementation; thus, they depend on donor and partner support. This creates dependency such that there is a significant drop in coverage in the event the partner discontinues their support.

To achieve Universal health care, the Government of Kenya at the national and county levels has invested heavily in community health services to enable households to access basic healthcare and health information. However, since the rollout of the National Community Health Strategy, the use of Community Health Services to deliver VAS and deworming is not been fully exploited.

In the Community Health Strategy in Kenya, every household should be reached by a community health volunteer (CHV) for services. A community unit is made up of 5,000 people. Each unit is assigned one community health assistant (CHA) and 10 CHVs who offer promotive, preventive, and basic curative (MOH, 2019). The VAS policy in Kenya allows the delivery of VAS through community units (MoH, 2017). CHVs deliver VAS and de-wormers to the targeted children during *Malezi Bora* events only, but not through their routine house-to-house visits or during delivery of other basic services delivery.

1.3 The Rationale of the Study

The study aimed to strengthen the use of Community health services to improve the coverage and cost effectiveness of the VAS and deworming programme. The research explored opportunities within community health strategy and best approaches in integrating VAS and deworming treatment with other services delivered through community health units. It provided an understanding of the potential benefits and limitations experienced throughout the integration.

1.4 Research Questions

i. What is the feasibility of delivering VAS and Deworming using Community Health Services (CHS)?
ii. What is the difference in costs and effectiveness of VAS and deworming delivery through *Malezi Bora* versus CHS?

iii. What are the key steps that should be considered in planning, implementing, and monitoring VASD at CHU level?

1.5 Research Objectives

Specifically, this study will focus on the following:

i. To determine the feasibility of delivering VASD through Community Health Service (CHS).
ii. To compare the costs and effectiveness of VASD delivery through CHS and *Malezi Bora.*
iii. To determine the key steps for consideration in planning, implementing, and monitoring VASD at the CHU level.

2 LITERATURE REVIEW

2.1 Importance of Vitamin A for children 6-59 Months

Vitamin A (retinol) is an essential micronutrient, a fat-soluble vitamin stored in body organs, mainly the liver. The human body does not make vitamin A, so all the vitamin A we need must come from what we eat or other external sources like supplementation. However, the body can store any extra vitamin A we eat for up to 4 to 6 months so that there is a reserve for times of need. It is released, as needed, into the bloodstream, becoming available for use by cells throughout the body.

Vitamin A is essential for the functioning of the immune system and the healthy growth and development of children. However, around 190 million children globally are affected by vitamin A deficiency (VAD) (WHO, 2019). In Kenya, 9.2% of children under five years are vitamin A deficient, while 52.6% have marginal vitamin A deficiency. 34.3% are under six months old compared to 27.7 % of those between 37 and 48 months old (Family-Health, 2017). Children that suffer from VAD are at risk of suffering illnesses and death from childhood infections such as measles and diarrhoea and visual impairment (WHO, 2015). Vitamin A deficiency can be prevented through three main strategies, which include consumption of vitamin A-rich foods, food fortification, and vitamin A supplementation.

WHO recommends universal vitamin A supplementation for children 6-59 months in populations at risk of VAD. Vitamin A supplementation is a lifesaving intervention that is vital to reducing the risk of child mortality, morbidity, and malnutrition, especially in countries with high levels of VAD. When delivered twice a year to at least 80% of children aged 6 to 59 months in countries with high under-five mortality and high rates of vitamin A deficiency, Vitamin A supplementation (VAS) can contribute to a reduction of under-five mortality rate by up to 24% (Imdad A, 2017). VAS is a low-cost, effective intervention that combats the effects of childhood illnesses such as diarrhoea and measles.

2.2 Importance of Deworming for Preschool Children

Soil-transmitted helminths (STH), more commonly known as intestinal worms, represent a serious public health problem wherever the climate is warm and humid, and inadequate sanitation and unhygienic conditions are common. STH, which includes three types of worms (hookworms, whipworms, and roundworms) impair the health of preschool-aged children (12-59 months)

(Vitamin Angels 2015). STH infections can impair nutrition status by causing internal bleeding, leading to loss of iron and anaemia, intestinal inflammation, diarrhoea, and impairment of nutrients intake, digestion, and absorption (WHO, 2015).

Deworming for preschool children is robustly associated with reduced stunting and anaemia in sub-Saharan Africa (Lo et al., 2018). STH infections are common in Kenya and can affect up to 40% of children aged 12-59 months. Deworming is one of the most feasible and cost-effective public health approaches to control soil-transmitted helminth infections among infants and young children to reduce the burden of STH infections. According to WHO, worm-free children have a better nutritional status, grow faster, and learn better. WHO recommends preventive chemotherapy using annual or biannual single-dose albendazole (400mg) as a public health intervention for young children 12-23 months of age, preschool children 1-4 years of age and school-age children 5-12 or up to 14 years of age (MOH, 2017).

2.3 History of VAS and Deworming in Kenya

Kenya has been supplementing children 6-59 months old with vitamin A since the 1980s. Delivery of VAS was initially through polio and measles National Immunization Days (NIDs), which achieved very high coverage of up to 80%. In 2007, the delivery of VAS changed to be in line with the government's health policy of delivery of a package of child survival services at the health facility level. However, systems and structures within the government were not put in place to adequately implement the VAS programme through the health facility on a routine basis. This resulted in a sharp drop in VAS coverage to 15% from previous high campaign coverage.

To recover, Kenya adopted other complementary strategies like delivery through Early Childhood Development Education (ECDE) centres integrating VAS during scheduled measles and polio campaigns. These multiple strategies increased VAS coverage gradually to reaching 66% in 2012. The attainment of the government target of 80% two-dose VAS coverage through routine delivery systems has remained a challenge (MOH, 2017). The Program was relaunched in 2012 and now targets more than 5 million children in 11,000 schools in 144 Sub-Counties within 29 Counties in Kenya (deworm the world initiative).

2.4 Combining Vitamin A Supplementation and Deworming

VAS is one of the High Impact and cost-effective Nutrition Interventions (HINI) to control micronutrients deficiencies among children aged 6-59 months and is delivered through three

different approaches, which include (i) routine contact points at health facilities, (ii) integration in campaigns and Malezi Bora, and (iii) community health units, outreaches, and early childhood development centres (MOH, 2017). Combining Vitamin A Supplementation and deworming has both health and logistical benefits; vitamin A-deficient children are at risk for worms infections, similarly and worm infections are associated with significant loss of micronutrients. In preschool children, roundworms which are the most prevalent STH infection cause significant vitamin A malabsorption. The target age for both VAS and deworming are similar, and deworming training sessions can easily be added to and therefore combining VAS and deworming has both logistical and health advantages and makes both interventions cost-effective.

2.5 VAS and Deworming Policies and Legal Framework

Vitamin A supplementation is backed by various national policy documents, strategies, guidelines, and action plans. Kenya has a VAS policy that defines the target group, the dosage, frequency type of supplement, administration, and delivery approaches. The Kenya Nutrition Action Plan 2018-2022 recognizes VAS under the fourth key result areas as one of the major approaches to reducing vitamin A deficiency among children 6-59 months. Other key strategies guiding VAS supplementation nationally include the National VAS multi-year plan 2017-2022, the National Policy Guidelines on Immunization (2013), VAS Operational Guidelines for Health Workers and the VAS harmonized curriculum training guide for both participants and the health workers.

Through the Breaking Transmission Strategy (BTS 2019-2023), the government of Kenya reflects its commitment to controlling and eliminating the Soil-Transmitted Helminths, among other NTDs (MOH, 2019). The National School Health Policy 2018 also recognizes the need to deworm preschool and school-aged children within endemic areas. The national *Malezi Bora* strategy 2017 provides a high-impact comprehensive package for service provision for children under five years, of which deworming of children is one of the recommended services (MOH, 2017).

2.6 VAS and Deworming Delivery Approaches in Kenya

Vitamin A supplementation in Kenya is conducted using various approaches which are complementary to achieve the desired coverage. The Kenya VAS Policy defines three strategies that should be used to deliver VAS. These include:

a) Routine contact points at Health Facility
b) Integration in Campaigns and *Malezi Bora*
c) Community Health Unit, Outreaches and Early Childhood Development Centres (MOH, 2017)

Kenya adopted routine VAS supplementation from campaigns in 2007 to make the program more sustainable and less costly. The coverage, however dropped from over 80% through campaigns to 22%. Since then, coverage through routine supplementation has been low; especially for children above one year. According to a study conducted in Mbagathi Hospital, mothers do not take their children for VAS at the health facilities after completing the first-year immunization schedule. Most of them cited lack of time, stock-outs of Vitamin A capsules, lack of transport, a child is not sick, and child has completed immunization as the reasons they do not take their children for Vitamin A supplementation. Others reported a lack of knowledge on the importance of VAS or/and the date when the child is scheduled for the next dose (Kamau & Mugoya, 2012) At the service provision level, stock-outs, weakness in data monitoring and record-keeping (Guintang et al., 2020) inadequate supervision, inadequate health workforce, workers attitude, and lack of commitment, contribute to low coverage. Further, access to health facilities has been shown as a limitation to seeking services including VAS and deworming services (Oiye et al., 2019).

In an attempt to improve the coverage, routine delivery was complemented with *Malezi Bora* events twice yearly to accelerate the coverage to the recommended 80% or more. Various studies conducted have shown that *Malezi Bora* approach helps to improve VAS coverage especially for children above one year. The evaluation report of the Every Child Thrives Project that was implemented in Siaya, Kilifi and Kwale (2020) showed that supplementation through routine accounted for about 28% of the county coverage whereas *Malezi Bora* accounted for 72%. Similarly, the Post Event Coverage Survey (PECS) conducted by Helen Keller International in November 2020 showed majority of children (77%) were supplemented during *Malezi Bora*. Delivery of VAS and Deworming during *Malezi Bora* is however accelerated through various approaches including house to house distribution, at the health facilities, and outreaches.

Early Child Development Centres and outreaches have been widely used during *Malezi Bora* to accelerate the uptake of both VAS and Deworming among children aged 3-5 years. Kenya conducted a pilot study for VAS through ECD between 1997- 2002 which informed the revision of ECD VAS guidelines and the development of the tools. National ECD VAS supplementation

was conducted in 2010 and 2011. Since then, supplementation at the ECD centres as an outreach strategy has been conducted routinely twice yearly to accelerate VAS coverage (MOH, 2017). Although this is a useful approach, the attendance of ECD is low. A study in 2012 conducted in Arid and Semi-Arid Areas (ASAL) and non-ASAL areas in Kenya showed that 45% of eligible children (3-5 years) did not attend ECD centres (Paloma C et al., 2014) and therefore the use of another outreach system will help to optimize access for this age cohort.

2.7 Use of *Malezi Bora* to Deliver VAS and Deworming

Malezi Bora in Kenya was started in 2007 to accelerate access to maternal and child health services. Conducted twice yearly, for 2 weeks in May and November, the strategy is focused on increasing social mobilization for mother-child health and nutrition services, improving the quality of services at the health facilities, increasing participation of service providers, improving knowledge on maternal and child health services, and improving the delivery of integrated services to children and mothers. The strategy has shown more community involvement in health care provision, intensified supportive supervision, and outreach services to the hard-to-reach populations, including the Early Childhood Development Centres (ECDCs) (Family-Health, 2017).

The Division of Family Health provides an official communication describing the dates and the theme of *Malezi Bora* every semester and shares with the counties the delivery approach to be applied to deliver the services; these include health facility delivery platform, outreach programs, ECDEs, and the community strategy. Vitamin A Supplementation and deworming are two major activities among other child health interventions that are implemented during *Malezi Bora*. Other services may be included, depending on the availability of funding. The Micronutrients Technical Working Group (MNTWG) at the national level ensures all counties are supported and supplies (including Vitamin A) are delivered to the Counties.

At the Counties, the planning is conducted at the County and Sub-county levels, the County Health Directors, Directors of ECDEs/Education, Nutrition Coordinators (CNCs), the Community Strategy Focal Persons, and the Records Officers are involved in planning and coordination. Mapping of ECDEs centres, identification of CHVs to be engaged is also done during the planning meetings. Resource mobilization and mapping are conducted to determine the available funding streams. In some counties, *Malezi Bora* is heavily funded by partners.

Sensitization of the key actors including the health care workers, the Community Health Assistants (CHAs), and the CHVs is conducted. Community mobilization is conducted through various channels, although this varies with the availability of resources and county preferences. The most common channels used include the use of mass media, public addresses, whistle blowers, churches, and community dialogues. Launches for *Malezi Bora* are planned and implemented for mobilization, communication, awareness, and advocacy purposes.

For VAS and deworming distribution, CHVs are provided with bags, tally sheets, and vitamin A and albendazole capsules, PPEs (during Covid-19) and are facilitated logistically depending on the available budget. Monitoring and Supervision are conducted by the CHAs, sub-county, and county health management teams, and the national level team.

The CHVs fill in the tally sheets during distribution, these are then verified by the CHAS and are used to fill in the CHAS summary sheet. The summary sheets are submitted to the link health facilities for compiling together with routine supplementation data, then submitted to the sub-county health records and information (HRIO) for updating in the routine health facility data in the Kenya Health Information System (KHIS).

2.8 Use of Community Health Services to Deliver VAS and Deworming

In Kenya, CHVs provide basic prevention and care services, make home visits, deliver health promotion messages, treat common child ailments, illnesses, and minor injuries, maintain household registers, and keep records of community health-related events, organize, and mobilize communities for health events, and participate in dialogues and action days (MOH, 2019).Community health volunteers are supervised by community health assistants and operate within community health units encompassing 50 CHVs and about 5000 households (MOH, 2019). In VAS and deworming, Community Health Strategy in Kenya has been useful to reach children especially between the age of 12-35 months who are neither in ECDEs nor accessing health facilities after completing the immunization schedule (MOH, 2017). The strategy is also useful to reach children who are eligible for ECDEs (36-59 months) but not attending. Safety and capacity concerns have however been raised about CHVs administering VAS to children. CHS policy 2020 recommends selection criteria for a CHV-that he or she should have a secondary school education, receive basic CHS training modules, and other technical service delivery modules (MOH, 2020). Vitamin A supplementation can be delivered by the CHVs safely if support supervision is strengthened (Hategeka, Tuyisenge, Bayingana, & Tuyisenge, 2019). The

Kenya VAS policy allows administration of VACs through community units, under the supervision of the health workers. In the year 2020 in Kenya due to COVID 19 pandemic, the use of CHVs to deliver VAS from house to house was shown to the preferred approach and this enabled Kenya to maintain coverage nationally above 80% (KHIS, 2020). Deworming in Kenya is delivered through schools, ECDEs, and communities. Community platforms include house-to-house distribution and fixed points distribution for people who may not be at home during the mass drug administration (MOH, 2018).

2.9 VAS and Deworming Delivering Costs and Finances

Vitamin A supplementation is a low-cost high-impact nutrition intervention. However, delivery through the campaign was found to be more resource-intensive than through routine contact. The shift from campaign mode to routine in 2007 was therefore to reduce implementation costs due to heavy logistics to make it more sustainable. More delivery platforms such as *Malezi Bora* which are resource-intensive have however been necessitated to improve the coverage. Delivery of VAS and deworming treatments through *Malezi Bora* requires heavy logistics as CHVs are facilitated to mobilize the caregivers and distribute VAS at the household level. The analysis of government funding for health shows that county health budgets are low and fall below recommended of 35%. The budget is dominated by recurrent expenditure raising concerns about efficiency in service delivery. Most counties do not allocate resources for nutrition service delivery, as such, there is heavy reliance on the donor for *Malezi Bora* as well as other nutrition services delivery. The average logistics cost of *Malezi Bora* per county is estimated at US $10,000-12,000 (HKI, 2020)

3 METHODOLOGY

3.1 Research Approach

A participatory approach was adopted in conducting the Operation Study. The study began with consultative meetings between the external consultants, technical and coordination staff from Helen Keller International, and the County Health Management Team, consisting of the County Nutrition Coordinator, Community Strategy Focal Person, County Public Health Nurse, Ciunty Health Records Officer and Research Coordinator. The purpose of the consultation was to agree on the scope of the assignment. During these consultative meeting, a mapping of the stakeholders to be involved in the assessment process both at the county and sub-county levels was conducted.

3.2 Study Design

This study adopted a cross-sectional design using mixed methods of data collection, quantitative and qualitative. According to Sacred Heart University (2021), cross-sectional research designs have three distinctive features: no time dimension, reliance on existing differences rather than change following the intervention, and groups selected based on existing differences rather than random allocation. The cross-sectional design can only measure differences between or from among a variety of people, subjects, or phenomena rather than change.

The study obtained quantitative data on health service provision in terms of costs and utilization of VASD through CHS and *Malezi Bora* and were compared for the quantitative dimension. Additionally, the quantitative approach included data collection on the delivery of VASD through a household survey. In this study, the outcome *coverage* referred to: the number of children aged 6-59 months who received VAS and those 12-59 months who were dewormed out of the total number of children in the same age groups who were included in the household survey. On the qualitative dimension, in-depth insights into the two approaches to VASD delivery (CHS and *Malezi Bora*) were undertaken through Key Informant Interviews (KIIs), and Focus Group Discussions (FGDs).

The research had two main components; investigation of the feasibility of delivering VASD throughout September-December 2021 using community health services (CHS) and the planning, implementation, and monitoring of the use of this platform. Secondly, was to determine the difference in cost-effectiveness of the CHS and *Malezi Bora* delivery platforms. Cost-effectiveness in this study meant comparing the total costs of each mode of VASD delivery with

actual number of children reached. The study adopted the two approaches that are used in costing studies, consisting of activity-based costing, where all the inputs to provide VASD such as capsules, supplies, transportation, training, mobilization, and personnel were included. Additionally, the health benefits of VAS, in terms of deaths averted, were estimated.

3.3 Study Location and sampling

The study was conducted in Siaya County. The evidence informed the choice of the county of already existing and functional community health units and CHVs supported by the county government. Siaya County has six sub-counties: Alego Usonga, Bondo, Ugenya, Ugunja, Gem, and Rarieda. Alego Usonga and Bondo sub-counties were purposively chosen as the study sites because they had similarities in population characteristics, socioeconomic activities, health facilities and community units through which VASD was to be administered. In Alego Usonga, VASD was distributed through the CHS platform and in Bondo through the *Malezi Bora* platform.

In Alego Usonga Sub-County, two wards were randomly selected; South East Alego and West Alego from all the wards in the Sub-County. In Bondo Sub-County, all the six wards were included because of the relatively small number of Community Health Units (CHUs); 21 in total compared to the 21 CHUs in the two selected wards in Alego Usonga sub-county. Furthermore, Bondo was the control where *Malezi Bora* took place in all the wards.

3.4 Period of the Study

The study was conducted over one year, starting July 2021 to April 2022.

3.5 Study Population and Sample Size

3.5.1 Sample size for qualitative data

The study targeted the county and sub-county health management teams, community health assistants, health care workers at facilities, community health volunteers, and caregivers of children aged 6-59 months (Table 3.1).

Table 3.1: Sample for qualitative data collection

Data collection methods	County level	Sub-County level	
	Siaya County	Alego Usonga	Bondo
Key Informed Interviews (KIIs)	CNC, County CHS Coordinator; **total n=2** **Grand total n=2**	• SCNC, CHS coordinator: **total n=2** • **5** health facility workers@ 1 per facility: **total n=5** • **5** CHAs @ 1 per health facility: **total n=5** • **10** CHVs @ one per Community Health Unit= **total n=10** **Grand total n=22**	• SCNC, CHS coordinator: **total n=2** • **5** health facility workers@ 1 per facility: **total n=5** • **5** CHAs @ 1 per health facility: **total n=5** • **10** CHVs @ one per Community Health Unit= **total n=10** **Grand total n=22**
Total KIIs n= 46			
Focus Group Discussions (FGDs)		• 2 groups of caregivers with children 6-59 old months in South East Alego (n= 6-8 participants per group) • 2 groups of caregivers with children 6-59 months old in West Alego ward (n= 6-8 participants per group) **Total FGDs n=4**	• One group of caregivers with children 6-59 old months in of the **six** wards n= 6-8 participants per group) **Total FGDs n=5**
Total FGDs n= 10			
Quantitative data collection: Household Survey for VASD		• Survey in 300 households	• Survey in 300 households
Total sample for survey N=600			

3.5.2 Inclusion and exclusion criteria for respondents of KII and FGD

County and sub-county health management

The health management teams both at the county and sub-county levels were eligible to participate in the study so long as they were directly involved in the Community Health Strategy and VASD programming. The participants selected to participate in this study included the nutrition coordinators, community health strategy focal persons, facility nurses both at the county and sub-

county levels (Table 3.1). They were purposively selected to participate as key informants for the study because by of their job descriptions, they were involved in issues of VASD. Only those willing to participate in the study were recruited.

Health facility personnel

The study purposively included health workers who were actively involved in the Expanded Programme on Immunization (EPI) and specifically supplementation of VASD at the health facility level because they were the ones with the knowledge on VASD. In addition they were selected because of their supervisory and mentorship role over CHVs and their involvement in promotion services at the community level. They also play a critical role in the training of CHVs and creating linkage between the CHUs and the health facilities (Table 3.1). This typically was the nurse in charge of other nurses active in the EPI program. Only health personnel who participated in the VASD activities during the 6-month study period were selected.

Community Health Assistants

One CHA in each of the selected health facilities was interviewed, and it could be either the one attached at the health facility or at the community. The CHAs that were selected were those actively involved in Expanded Programme on Immunization and specifically VASD at the health facility level (Table 3.1).

Community Health Volunteers

Two CHVs were purposively selected by the CHAs from the list of those who participated in VASD activities during the year of study (Table 3.1)

Caregivers

This study population included mothers or primary caregivers of children aged 6-59 months (Table 3.1) willing to participant in the study. A recommended standard of 8-12 caregivers was considered for the focus group discussions. The caregivers were selected from the households in the catchment area of the health facility selected and included in the study. Four FGDs were conducted in Alego Usonga, two in each of the wards in the study intervention and 6 in each of the 6 wards in Bondo sub-county.

3.5.3 Sample size determination and sampling procedure for the household coverage survey

Sample size determination

WHO and UNICEF have recommended a 30 by 7 cluster sampling methodology for knowledge, practices and coverage (KPC) surveys (https://www.spring-nutrition.org/publications/tool-summaries/knowledge-practice-and-coverage-survey-kpc-2000-field-guide, (accessed on 26-07-2021). This study adopted this cluster sampling methodology to estimate the VASD coverage in control and intervention sites. This yielded a sample size of 210 mothers/caregivers and their children 6-59 months of age per Sub-County (Bondo and Alego-Usonga). This sample size was inflated to 10 per cluster to take care or non-response resulting in 300 per sub- County and a total sample of 600 mothers/child pairs for the two sub-counties. This sample size gives ±10% level of precision. This is considered reasonable to provide valid information for programming. The sampling unit/cluster was the Kenya National Bureau of Statistics (KNBS) Enumeration Areas (EAs).

Sampling procedure

Multi-stage sampling methodology was used to select the target population; mothers/caregivers with children 6-59 months old as follows:

Sampling Stage 1

The first stage of sampling involved randomly sampling enumeration areas (clusters). A village as an enumeration area was the smallest geographical unit for which population statistics were available. All the villages in West Alego and South East Alego wards (n =223), and the six wards in Bondo sub-county constituted the sampling frame. Each village was listed together with the total population of children aged 6-59 months per village. The cumulative population of all children 6-59 months old from all villages was calculated and used in the computation of a population proportional to size (PPS) sampling design to identify the specific villages for the survey. After computing the cumulative population, the sampling interval was determined by dividing the total cumulative population by 30, the number of clusters required. A random number was then selected from a Table of Random Numbers, and the village where the random number fell was the first cluster to be selected for the survey. Subsequent villages were sampled, adding the sampling interval to the number first selected. Through this process, the locations of the sampled villages/clusters were identified. This process was conducted using the ENA for SMART software (http://www.nutrisurvey.de/ena/ena.html accessed on 27-07-2021.

Sampling Stage 2

The second stage involved the selection of 10 households per cluster/village. A list of all households with children 6-59 months old per village was obtained from the Community Health Volunteers (CHVs), and 10 households were selected through simple random sampling by the enumerators during the field survey, using the Table of Random Numbers. The CHVs then identified the sampled households. The survey team visited the sampled households and asked about their willingness to participate in the survey. During actual data collection, unwillingness and unavailable households were replaced through resampling from the households in the village which did not make it to the previously selected households. In a household that had more than one child 6-59 months old, all such children were included in the coverage survey.

3.6 Data Collection Methods

Data collection consisted of the collection of both primary and secondary, qualitative and quantitative data.

Primary qualitative data were collected through:

Key Informant Interviews (KIIs) were conducted with programme managers from the Ministry of Health County and sub-county teams (CHS coordinator, CNC) and community health assistants (CHAs) and community health volunteers (CHVs). Overall, the interview guides were structured around the following points:

- Existence of national policies and strategies;
- Assessment of the VASD program according to the different health system components (governance, financing, service offer, human resources, procurement, and information system);
- Successes and best practices in delivering VASD via CHS;
- Constraints and difficulties related to the implementation of VASD via CHS;
- Recommendations and perspectives for the VASD via CHS.

Focus group discussions (FGDs) were used to collect data from the caregivers. Eligible mothers for the survey were those residing in the community and who agreed to participate in the focus group through informed consent. The targets of the focus groups were mothers or caregivers of children aged 6 to 59 months. To respect the criterion of homogeneity relating to the organization

of focus groups, the FGD groups were exclusively for mothers or caregivers of children aged under five years of age. Each focus group constituted 8 to 10 mothers of young children aged 6-59 months. The FDGs were conducted in *Dholuo*, the local language.

The content of the focus group guide revolved around the following points:

- Knowledge of vitamin A and deworming (presentation, administration, etc.);
- Knowledge of the importance of VASD for the health of the child;
- Knowledge of the consequences induced by deficiency of vitamin A;
- Source of vitamin A and deworming knowledge;
- Knowledge of foods rich in vitamin A;
- Knowledge of the number of doses and appointments for vitamin A and deworming;
- Vitamin A supplementation and deworming services for local and surrounding children
- The problems encountered by mothers or guardians of children in vitamin A supplementation and deworming at the level of the health structure and/or community level;
- Attitudes and beliefs of mothers and caregivers about the involvement of community health workers in vitamin A supplementation and deworming; and
- Recommendations to improve vitamin A supplementation and deworming services.

Collection of secondary quantitative data for cost-effective analysis

The incremental costs of VASD in CHS and *Malezi Bora* were collected, consisting of the direct costs. The activity-based costing used considered costs incurred for the following activities:

- Planning;
- Development of tools;
- Training;
- Follow-up;
- Distribution;
- Supervision; and

All costs related to the purchase of materials, services, vitamin A capsules, and albendazole drug were captured. The data on the costs of the activities were obtained from Helen Keller International. In addition, data on service utilisation for *Malezi Bora* in Bondo and CHS in Alego Usonga sub-counties were obtained from the CDoH office in the KHIS. The data on service utilisation covered one year, from March 2021 to February 2022.

3.7 Data Analysis

3.7.1 Qualitative data analysis

For qualitative data, interviews from FDGs and KIIs were audio-recorded and later transcribed into English. After the data collection, the transcription was done, and FGD and KII teams transferred the audio recording to an external drive for safekeeping with appropriate labelling. In addition, the FGD and KII team took field notes during the interviews. The thematic analysis technique was used to analyse the data. The data from interviews was first transcribed and content analysis conducted. Content analysis involves the detailed exploration for common themes and assigning of labels to variable categories. The categories or themes were predetermined in advance in line with the objectives and scope of the assessment. The coding consisted of searching for the common themes which were established as categories into which later information was inserted. The themes were clustered in a patterned order so as to identify variables that predict general concepts and isolate repetitions. Care was taken to ensure that the end result of the categorization agreed with the context it was taken from (re-contextualization). Inferences were made from particular data under each theme. Conclusions were drawn from the findings and used to triangulate quantitative data.

3.7.2 Quantitative data analysis

Both descriptive and inferential analyses were applied to the collected data for coverage. Specifically, frequency distribution tables were produced to explore frequency and proportion (%) of the responses of the households to the questions in the data collection tools. The calculation of the coverage for VASD, defined as the number of children 6-59 months old who received VASD out of the total number of children sampled for the household survey, was done for both control and intervention sites. In addition, test of equality of coverage proportion in the two sites was conducted.

The cost-effective analysis was carried out in the following steps for both CHS and *Malezi Bora*.

- Calculation of all direct inputs used in CHS consisting of training, Vitamin A capsules, albendazole tablets, personnel costs, planning and review meetings.
- Calculation of all direct inputs used in *Malezi Bora*: Vitamin A capsules, albendazole tablets, personnel costs, supervision, and other costs.
- One year trend analysis of total VASD service utilization for CHS and *Malezi Bora*

- Estimation of deaths averted and disability-adjusted life years (DALYs) averted from VAS uptake by the children.
- The effectiveness was considered for only vitamin A supplementation since literature was available to estimate the benefits rapidly. The study period was too short to enable data collection for estimating mortality and morbidity reduction benefits from VAS. The study adopted the approach used by Ching, Birmingham, Goodman, Sutter, and Loevinsohn (2000) to estimate the benefits of VAS. In this approach, Ching et al. (2000) provide international estimates of multi-country studies which gave point estimates of mortality reduction at 11.5 per cent and 23 per cent for one dose per year and two doses of vitamin A, respectively.
- The formula for estimating the number of deaths averted (Z) due to the provision of vitamin A supplements, as given in the study: Z = deaths in the absence of vitamin A x coverage rate x expected mortality reduction.
- DALY was calculated as deaths averted multiplied by expected life expectancy for children under five years. Computation of cost per death averted, incremental cost-effectiveness ratio, and cost per DALY averted with one period of reference.

3.8 Data Quality Control

The study coordinators from Helen Keller International, County and Sub-county health management teams and the researchers monitored study processes to ensure quality and adherence to the protocol. The researchers participated directly in data collection and supervised enumerators to ensure the quality of the data collected. The quantitative data on coverage were collected using phones and the ODK format to ensure data quality. In addition, rigorous training was conducted for the research team (research assistants) to strengthen data quality. Quality of data checks were done daily and at the analysis stage.

3.9 Ethical Considerations

3.9.1 Potential risks and benefits for participants

Potential risks*:* Subjects participating in this study were not exposed to any risks.

Benefits*:* At a broader level, this evaluation has the potential to benefit the Siaya County communities by providing information that can be used to optimize the roll-out of this intervention

to improve Vitamin A and Deworming coverage in the country, to reduce child morbidity and mortality. However, no benefit was available to the respondents directly.

3.9.2 Confidentiality

Under the Inquiries Act, the confidentiality of information provided by participants was kept. No identifiable information (e.g. name, telephone number, address) from any of the participants was collected except for the audio recording of the voices of FGD participants and key informant interviews. All information obtained from questionnaires or interviews was kept confidential under lock and key cabinets with Helen Keller Offices. This study report avoided any information that could facilitate the identification of study participants.

3.9.3 Informed consent

Informed consent was sought from all study participants. The data collection teams respected any refusal to participate in the study. The data collectors explained to the participants the purpose of the study and guaranteed results confidentiality. The data collectors explained to the participants that they were free to refuse to be interviewed, withdraw from the interview or focus group, or refuse to answer a particular question or set of questions. The consent was verbal, but a standard consent form was prepared and read to all potential participants.

The study protocol was reviewed and approved by Maseno University Ethics Review Committee.

3.9.4 Covid-19 measures

Due to the current Covid-19 pandemic, all the safety precautions as provided by the Ministry of Health for social distancing, sanitizing, and wearing protective gear were be observed. They included:

During the training of CHVs, the following Covid-19 measures were taken:

- All the study team members received training on how to implement this operational study as well as additional safety procedures for covid-19;
- The training venues were arranged to observe the physical distancing procedure;
- Both the enumerators' and trainers' temperatures were monitored daily.
- The participants were issued with masks and hand sanitisers during the entire duration of the training and reminded how to use them properly.

Data collection:

- All research assistants and study participants will be provided with face masks and sanitisers during data collection.
- During KIIs and FDG sessions, participants wore face masks,
- The arrangement of FDGs always took place outside.

3.10 Study Limitations

The study did not encounter major limitations. However, a few limitations are worth mentioning:

(a) The study period was too short of having actual data on the health outcome of VASD. Therefore, the effectiveness of the intervention was based on literature and not on actual observation of deaths averted. However, the literature data used were derived from comprehensive studies done in many countries and the WHO recognises the impact on mortality of VAS based on these studies.

(b) The child mortality data used for effectiveness analysis came from the Kenya Demographic and Health Survey 2014 for the entire Nyanza region and not specifically for Siaya County.

4 RESULTS

4.1 Feasibility of Delivering VASD through Community Health Service (CHS)

This study was conducted to investigate the feasibility of delivering VASD through the CHS to improve coverage. Feasibility in this study was assessed based on the following parameters:

1. Appropriateness of the study design in achieving the objectives of the operational research.
2. The operation process/Implementation of the study which included the following aspects:
    - Planning process;
    - Sensitization and training of the personnel to be involved in the implementation of the study;
    - Mobilization of the community for the study;
    - Competence of CHVs to administer VASD at the households;
    - Availability of and management of vitamin A supplements and deworming drugs;
    - Monitoring and supervision of study activities including the appropriateness of Reporting tools for VASD;
    - The level of appreciation of the VASD distribution through the CHS platform by the beneficiaries;
    - Limitations and challenges in the implementation of the study activities; and
    - Strengths of the implementation process and the potential for sustainability.
3. Coverage of VAS supplementation for children 6 -59 months of age and for deworming for children 12-59 months of age based on the survey conducted during the study.
4. The difference in costs and effectiveness of VAS and deworming delivery through *Malezi Bora* versus CHS.

4.1.1 Appropriateness of the study design

The cross-sectional comparative design using mixed methods of data collection (qualitative and quantitative approaches) adopted for this operation study was appropriate in attaining the objectives of the study. This design allowed for measuring the difference in coverage between the intervention sites Alego Usonga sub-county where the CHS approach was used in the distribution of VASD, and in Bondo where the distribution of VASD was conducted through *Malezi Bora.* The qualitative dimension provided in-depth insights on the various aspects of the feasibility of the two methods of VASD distribution.

4.1.2 Planning for VASD through the Community Health Strategy

Planning for the delivery of VASD through CHS started at the national level with the presentation of the study and validation of the study protocol at the Ministry of Health Division of Nutrition and Dietetics (MOH-DND) Nutrition Research Technical Working Group. The planning process was then cascaded to the county level where an inception meeting of a technical committee was conducted. The meeting comprised of the following members: Director of Health; Director of Research; Community Health Strategy Focal person; Nursing Officer; Public Health Officer; Public Health Promotion Officer; County Nutrition Coordinator; County Health Records Information Officer; representation from Helen Keller International and the research team. Representation from Alego Usonga sub-county (where the study was conducted) by the Sub-County Nutrition Coordinator was also part of the technical committee meeting. The agenda of the meeting was to brief the management team on the purpose, objectives and methodology of the Operational Study and to establish the Road Map for the study in terms of *What, Where* and *How* it was to be conducted. During this meeting, the research activities as well as the time plan were agreed on. It was agreed that there was a need to hold inception meetings with the stakeholders at the study site that is Alego Usonga sub-County. After the inception meeting at the County level, the sub-county team briefed the management in Alego Usonga on the planned Operational Study on VASD delivery through the CHS.

At the sub-county level in Alego Usonga an inception meeting was conducted to provide information on the research objectives and methodology and also to discuss the training content for those to be involved in the study. Discussion on the meetings/sensitization with health facility in-charges, training for the CHAs and CHVs and allocation of roles to the members to be involved in the study also took place. During this meeting the roles of members of the SCHMT were agreed on. The meeting was attended by SCNC, SCMOH, sub-county Community Health Focal Person and Sub-county Nursing Officer.

The SCNC was to be in-charge of the planning for Sub-country entry and for the study, budgeting for the CHVs allowances and monitoring and supervision of the study. The Sub-county Health Information/ Human Resource Officer, was to provide population census for the study site (Alego Usonga sub-county) to be used in the determination of the number of children to be targeted in the study. The health facility in-charges were to be in-charge of commodity and VASD data management. They were to receive the commodities from the SCNC on a monthly basis and distribute them to CHAs and also receive the tally sheets from the CHAs on how the supplied

commodities have been used on a monthly basis. The health facility in-charges were to consolidate the data received from the CHAs into the health facility routine data on a monthly basis. The CHAs were to be in-charge of data management of the CHVs – receiving and compiling data tally sheets and submitting to the health facility in-charges. The CHAs also monitored and supervised the CHVs in their distribution of the commodities at the household.

Overall, it was reported by the CHMT, SCHMT, health facility in-charges, and CHAs that the planning process was adequate. The planning and implementation process is shown in Figure 4.1.

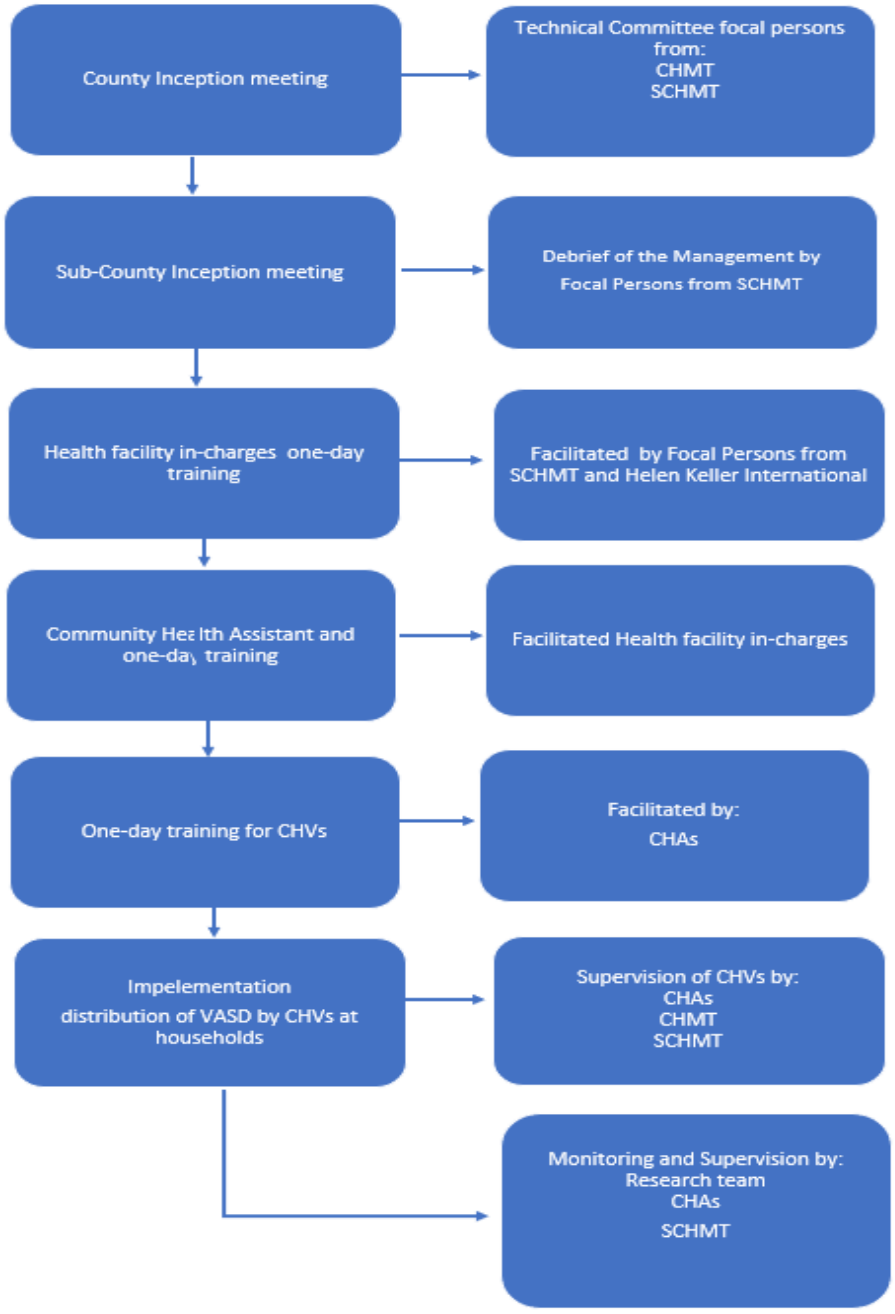


Figure 4.1: Planning and implementation of the VASD distribution through CHS

4.1.3 Training of personnel for the implementation of CHS

After the inception meeting at the at Alego Sub-county, the SCHMT, together will Helen Keller International, conducted a one-day training for the health facility in-charges. The health facility in-charges in turn, conducted a one-day training for 20 CHAs attached to their health facilities. The training content for the health facility in-charges and CHAs included: the objectives and methodology for the study without revealing the design; the health benefits of vitamin A supplementation; the dosage and frequency of dispensation; who should receive vitamin A and deworming tablets; the dispensing, distribution and documentation of Vitamin A and Deworming tablets using the Bin Cards and S11 tools used for entering the received commodities and tracking stocks of vitamin A and deworming tablets at hand and for placing orders respectively. The training content also included supervision, reporting and documentation of the number of children receiving the two commodities. The training was conducted using the MoH Health Worker curriculum adapted to for the purpose of this study. The training process and the facilitators of the training sessions are shown in Figure 4.1.

A total of 220 CHVs underwent a one-day training conducted by CHAs in preparation to undertake their role in the household distribution of VASD. Each CHA conducted a one-day training for the CHVs in their Community Units. The one-day training for the CHVs was to provide basic knowledge on vitamin A supplementation and deworming of children aged 6-59 months of age. The content in the curriculum for VASD for CHVs developed for use in the context of Covid-19 was used for the training. The training content was prepared by the SCHMT and endorsed by the Implementing Partner Helen Keller. The detailed content covered during the training included:

- Functions of Vitamin A in the body at its health benefits;
- Health benefits of deworming;
- Vitamin A and deworming schedules;
- The importance of hygiene measures by CHVs in the distribution of VASD;
- Documentation/reporting of the number of children who receive vitamin A supplements and those who receive deworming tablets. The Ministry of Health Registers and Tools were to be used for data collection. The CHVs were to submit the data on a monthly basis to the CHAs, who would summarize the data and subsequently submit it to the health facility in-charge. The data was to be integrated into the health facility information system;
- The duration and the steps involved in the implementation study;

- The role of CHVs in the distribution of VAS and deworming tablets; and
- Adherence to Covid-19 guidelines.

All the training sessions for all cadres of health personnel were supervised by the SCHMT members together with Helen Keller International.

Some of the CHMT and SCHMT members felt that the training was not adequate. A member of the CHMT reported that one of the inadequacies was to do with the curriculum which was used for the training content. He reported that; *"We used a patched-up curriculum. There is need to have a tested and validated curriculum in future".* Another member of the CHMT stated that, *"The training did not include a capacity test for the CHVs".*

A member of the SCHMT indicated that the duration of the training was not adequate to cover the necessary content, especially for the health facility in-charges and the CHAs. This opinion was based on the fact that the current VAS curriculum is supposed to be taught over a three-day training session. The member indicated that; *"The science behind deworming and VAS was not adequately addressed in the training".*

Nonetheless, the findings of the KIIs with the health facility in-charges from Alego Usonga sub-County indicated that they were well-informed of their role in the Operation Study. Some of the roles they mentioned were:

- Establishing the population of children aged 6 to 59 months in their catchment area so as to determine the demand for VAS and deworming;
- Liaising with the Sub-County Nutrition Coordinator to get the required number of VAS capsules and deworming tablets;
- Establishing through the CHAs the total number of CHVs to be involved in the study; and
- Planning for regular and monthly review meetings.

The CHAs also demonstrated a high level of knowledge of their roles in the Operational Study. According to interviews conducted, the CHAs reported that they received training on the planning process and in turn, trained CHVs to ensure the activity was successful.

The majority of the CHVs reported that the training received was adequate. They stated that they were taught not only about the frequency of administration and which type of VASD to be

administered to a child under 1 year and the dosage for children 12-59 months old. They were also taught about the diseases caused by lack of Vitamin A and worm infestation; that is, night blindness and anaemia, respectively.

One of the CHVS stated that, "*Anaemia can be caused by lack blood if a child is not dewormed. Deworming prevents them from lacking blood in their bodies. We were also taught how to observe cleanliness during the administration of VASD and how to talk to caregivers before and during administration".*

Another CHV reported that; *"We were also taught the proper way to store the drugs before administration. In addition, we were also provided with reporting tools so that we could report on the usage. The training also involved how to report using tally sheets and how to use the stickers, the stickers are used to show that the child had already received the vitamin A and deworming'.*

Whereas the majority of the personnel felt and stated that the training was adequate, the CHVs indicated it should be done frequently since they tend to forget easily because they are old and therefore, there is a need for refresher courses after every six months. One of the CHVs stated that, *"I understood everything but it should be redone, as a human being, there are times when after some time, the information slips the mind, so even if the training was adequate, there should be a refresher to remind us."* Some of the topics they noted that need to be revisited include, the frequency and duration of administration of VASD, the age of administration and the importance of the intervention.

The expected roles for the health personnel involved in the implementation of the study were by, and large similar to that of the *Malezi Bora* and therefore, the personnel were, on the whole, familiar with the expectations about their roles.

4.1.4 Community mobilization for VASD through CHS

Based on the key informant interviews with the health care workers, the process of distribution of VASD at the household started with the CHVs conducting community sensitization to ensure that the caregivers and their children were available during the exercise. In addition, the CHVs were involved in mapping the households and the number of children within the targeted age group in the community to establish the amount of vitamin A and deworming tablets required. The CHVs are recognized and acknowledged as credible health service providers by the community members. The CHVs updated the under-five population list in their villages (if necessary) and

provided this information to the CHAs to assess the coverage. The CHVs know their targets since these are the households in which they work. So all the households aged 6-59 months were targeted.

According to a health care worker in one of the health facilities, *"At the community level, the CHVs are considered as the major eye to the health sector because they are the ones who have the reach to the community before any other person. The CHVs are very important in the distribution process of VASD since they offer their community sensitization skills to ensure that eligible children receive the service".*

This view was confirmed by CHAs, who added that; "*The CHVs are part of the health system community mobilization process that without their engagement, the VASD exercise would not have succeeded".*

The CHVs, statements confirmed that they were involved in the process of household sensitization and mobilization. This process involved moving from household to household within a village to identify the households with the children of the target age group. A male CHV stated that, *"When doing door to door visits, I am able to identify target groups and keep the records so as to know how many children in that area need VASD and how many have already received the supplementation".*

This opinion was corroborated by a female CHV who said that, *"We distribute or administer VASD when going door-to-door; we identify children who have not received their dose and add the details in our notebook to keep track. We have our own notebooks where we write the records, and we also add notes on the mother's clinic books."* This ensures that the mother gets the next dose on time, whether it's through the CHV or if she visits a health facility.

4.1.5 Distribution of VASD at the households by CHVs

The study lasted four months (September to December 2021), during which the CHVs distributed VASD at the households. The CHVs updated the Mother-Child Booklets and the Household Register after delivering VASD to the children to prevent double supplementation with Vitamin A. One of the CHVs had this to say about the distribution of VASD, *"After picking the drugs from the facility, we do door to door visits to administer vitamin A and mebendazole tablets. For vitamin A we, have the blue capsule, which is called 100,000 IU and the 200,000 IU, which is red. The drugs are administered to children under five years of age".*

This view is corroborated by the following statement from a female CHV; *"We distribute or administer VASD when going door-to-door; we identify children who have not received their dose and add the details in our notebook to keep track. We have our own notebook where we write the records, and we also add notes on the mother- child clinic book. This ensures that the mother gets the next dose on time whether it is through the CHV or if she visits a health facility'*.

The mothers'/caretakers' views also corroborated these findings. A mother reported during an FGD that: *"In order to avoid over-deworming, a CHV will give the deworming tablets to the child and put a sticker in the booklet to show deworming has been done. I always see when the CHV comes to the household, she will ask for the mother-child booklet, after supplementation or deworming, she put a gum to show the child has been supplemented to avoid double supplementation"*.

It was reported that during the process of door to door distribution of VASD, the CHVs also gave health and nutrition messages to the caregivers on the benefits of vitamin A supplementation and deworming to the children. The CHVs met their targets of children aged 6-59 months.

4.1.6 Forecasting, availability and Management of VASD commodities

For the forecasting of the amount of VASD commodities required for the study, a census of the children aged 6-59 months was conducted by the CHVs. The information was collected from villages which have well-known boundaries and census population. Each CHV is allocated a village in which they conduct they work. They have information on all the households in the villages since they are also residents of the same villages. A number of villages are attached to a CU of which the CHAs are in-charge. Each CHV conducted a census of the households and the number of children aged 6-59 months who were eligible for VASD and communicated this information in a report to the CHA. The CHAs compiled the data from all the villages under their CHU and submitted the report to the health facility to which the CHU is attached. The health facilities compiled the data from all the CHUs under their jurisdiction and submitted the report to the sub-county nutritionist who then compiled the data for the two wards in Alego sub-county where the study was conducted.

There was adequate supply of vitamin A capsules (VACs) and deworming drugs with VACs supplied from National Programme for Immunization and Vaccines stores in Kitengela while deworming drugs were supplied by Helen Keller International during the study period. Helen

Keller International also provided PPEs which were distributed to CHVs for use at the households. The amount of PPEs required by each CHV was determined through the households register and the request made by health facility in-charges through the SCNC. The CHAs collected the capsules, the dewormers and PPEs from the link health facility and distributed to the CHVs.

Wastage of the commodities

There was not enough of vitamin A 100,000 IUs so that 200,000 IUs were used. In this case half the content was used to supplement children aged 6 to 12 months. Sometimes the left over was not used and this resulted in some wastage although this was minimal. There was no wastage reported by CHVs – they were provided with plastic containers for each commodity and the bags to carry them in each. The CHVs were provided with the commodities by the CHAs on demand.

4.1.7 Monitoring and supervision of the activities during the study period

The supervision followed the same procedure and protocol used for other CHS activities, only that VASD was added to the list of activities. During the study the CHAs supervised the CHVs almost on a basis either physically or by telephone. The CHVs submitted the tally sheets indicating the number of children who received VASD to the CHAs in charge of the Community Units under which they worked. The CHAs compiled the data from all the CHVs under their jurisdiction and sent this information on a monthly basis to the health facilities using the MOH 710 summary sheets Tool. The CHAs roles in monitoring and distribution of VASD also involved ensuring the commodities are well distributed and reached all CHVs for successful implementation of the study. The CHAs were also required to submit at the end of every month a report that summarized the activities of the month and receive feedback during the monthly review meetings. According to the CHAs, *"During these monthly meetings, we have a time of sitting together with the CHVs and the in-charge of health facilities. We discuss the challenges and assess whether whatever we are doing in the community is working out for us"*.

The health workers at the health facilities reported that they monitor the activities of the CHAs and the CHVs (indirectly through the CHAs). The health workers collate and document the number of children reached, particularly in the health facilities where there are no Health Information System officers to undertake this role.

Monitoring of the implementation of the OPS was conducted monthly by the SCHMT, the research team and Helen Keller International. The monitoring included visits to the health facilities, to the households, and the Community Units to observe and check on the

implementation process, any challenges faced, and aspects that could be improved. The monitoring team held discussions with the SCHMT, the health facility in-charges, CHAs and the CHVs.

The SCHMT was involved in the supervision of the implementation of the OPS on a monthly basis. The supervision included visits/meetings with health facility workers, CHAs and CHVs to discuss the progress, meeting of targets, successes and challenges experienced in the implementation. During the monthly review meetings, Data Quality Assurance (DQA) was also conducted to in terms of meeting the targets and documentation. The DQA was conducted by the SCNC and the Sub-County Health Information Officer at health facilities. In addition, there were also the monthly meetings of the steering committee to keep track and check on the implementation process and provide the needed support and advice.

On the whole, it was reported by the CHMT and the SCHMT teams that the structured and rigorous supervision conducted involving SCHMT more directly in the exercise does not usually happen during the *Malezi Bora* campaign or during the usual delivery of health services.

4.1.8 Reporting protocols and tools for the VASD

The Ministry of Health (MoH) reporting registers (MoH 702 and MoH 515) were used for reporting VASD by the CHVs and submitted these to the CHAs, who summarized them and subsequently submitted them to the health facility in-charge monthly. As a whole, the documentation of the VASD commodities was done satisfactorily. The CHVs submitted monthly reports indicating the number of children who received VASD in a timely manner and also kept accurate records of the number of VASD commodities received and used. The CHAs also compiled data from the CHVs and submitted the records to the link health facility in a timely manner. The health facility in charges kept accurate records of the commodities usage and submitted this information to the SCNC. However, during the first month of the study, a few health facilities, 2-3 in number, did not integrate the data into the Health Information System, but the SCHMT took timely intervention, and this was rectified. The reasons given for this was that the health facility in-charges were on leave or had forgotten to do so as reported by a member of the SCHMT.

4.1.9 Challenges in the uptake of VASD

Some of the challenges reported by the respondents to interfere with the uptake of VASD (not only during the study) include:

- Laxity on the part of some of the caregivers to take their children to the health facility for services. When such respondents are not found at home during the CHV visits, they end up not going for the services. Some of the caregivers do not see the need to go to the health facility if the child is older than 2 years and is not sick. This view was expressed by the respondents. For example, one of the respondents stated that: "*After my children get the last vaccination, I do not see the need of taking the child to the hospital so that they may receive other services up to 5 years. If I go and all I receive is vitamin A and growth monitoring I do not see the need of going again";*
- Inadequate mobilization about the VASD distribution in the household. It was reported that some children were not covered because the caregivers were not aware of the VASD distribution and therefore missed the exercise;
- Inadequate knowledge on the health benefits of VASD and thus the laxity to take the child to the health facility or wait at home for this service;
- In Bondo, it was reported that there was no documentation or evidence that a child had been dewormed and therefore could be dewormed twice. In Alego Usonga it was reported that the CHVs used stickers which they placed on the Mother and Child booklet to show the child had been dewormed; and
- Lack of money for transport costs also hindered some parents from taking their children to the health facility to get VASD services.

4.1.10 Comparison between Malezi Bora and CHS strategy used during the Operation Study for distribution of VASD

The main difference between the CHS and the *Malezi Bora* platforms in the distribution of VASD, is that *Malezi Bora* is a national campaign conducted in all the counties in Kenya to accelerate the coverage of VAS. *Malezi Bora* is conducted over a period of two weeks during the first semester (in May every year) and another two weeks during the second semester in November every year. In *Malezi Bora*, the services, including VASD, are distributed through outreaches, the static health facilities and distribution by CHVs in households and ECDs. *Malezi Bora* is an integrated approach targeting many Maternal and Child Nutrition (MCN) indicators such as immunization, ANC, growth monitoring indicators etc. The CHS approach was an Operational Study whose main aim was to increase the coverage of VASD in a continuous and sustainable manner, unlike *Malezi Bora* which increases the coverage to a high peak that is not sustainable. In the CHS approach, therefore, VASD was delivered continuously through the routine Community Health Service by the CHVs at households for a period of 4 months. The differences between the two approaches are summarized in Table 4.1.

Both the *Malezi Bora* and CHS approaches are supported by the government (Ministry of Health) through the existing government infrastructure as well as partner support in terms of logistics, capacity building, monitoring and supervision. For the CHS, Helen Keller International provided financial support and also facilitated supply of vitamin A capsules from the National Program for Immunization and Vaccines Stores and provision of deworming tablets. The CHS study focused on VASD distribution and promotion of nutrition messages, unlike the *Malezi Bora*, which is composed of an integration of many activities inclusive of ANC, growth monitoring and promotion, child immunization etc., as shown in Table 4.1.

Table 4.1: Comparison of VASD through CHS and *Malezi Bora* platforms

Aspects	**Distribution of VASD through Community Health Strategy during the Operational Study**	**Distribution of VASD through *Malezi Bora***
Nature or intervention	Operational Research Study targeting Siaya County County and Partner driven A research implemented for four months (September to December 2021) A well-knit fabric –with SCHMT driving the VASD distribution through CHS	National level strategy targeting all Counties National, County and partner driven. Follows a national schedule conducted twice a year for 2 weeks in May and another 2 weeks in November. Most recent conducted in November 2021 A national campaign: This is an accelerated programme targeting improvement of about 30 MCN nutrition indicators. Implemented spontaneously
Time of intervention	Supposed to be continuous – routine using the CHVs to distribute VASD during the normal household routine visits to conduct other duties	Two-week duration twice a year, in May and November. In *Siaya Malezi Bora* is implemented for a period of one month because: • Implementation for one month is a little bit cheaper than the 5 to 6 Ksh million required for two weeks. This is achieved by riding on the ongoing activities • The CHVs have a monthly target of households to visit in their catchment area and therefore can use the opportunity to distribute VASD. Inclusion of VASD in *Malezi Bora* activities is dependent on the interest of partners providing the support. Helen Keller International has been providing the support in recent times

Aspects	**Distribution of VASD through Community Health Strategy during the Operational Study**	**Distribution of VASD through *Malezi Bora***
Source of support	Government through the existing infrastructure and personnel Partner support for logistics, capacity building, monitoring and supervision and the provision of vitamin A capsules and deworming drugs- Helen Keller International provided the financial support	Government through the existing infrastructure and personnel Partner support for logistics, sensitization and mobilization, supply of commodities. Been supported by various partners – most recently Helen Keller International
Approach	Focused on VASD and promotion of nutrition messages at household through integrated household visits	Integrated allowing for other activities such as immunization, ANC etc. through outreaches to be covered. Distribution of VASD at household and ECDs and health facilities
Objectives	To provide VASD and nutrition promotion messages	To reach all members of the target groups usually all mothers with children less than 5 years old and provide MCN services
Planning	Initiated at County level and then cascaded to the Alego Usonga sub-county where the study was conducted At county and sub-county levels, planning very similar in nature and content to that for *Malezi Bora*	Initiated at national level then trickles to the County and Sub-County levels For *Malezi Bora* no formal sensitization/training for health workers but informed of the planned activity from the SC office
Inception and training	Inception meetings were conducted at County level CHMT technical meeting and then cascaded to the SCHMT. The SCHMT and Helen Keller International trained the health facility in-charges who in turn trained the CHAs. The CHAs trained the CHVs on VASD distribution	Initiated at national level then trickles to the County and Sub-County levels The SCHMT informed the health facility in-charges who in turn informed the CHAs of the activity so as to mobilize the CHVs to map the number of children of the targeted age. The health facility in-charges compiled the total number of children require the VASD commodities There is no formal training sessions for the HCWs, the CHAs and the CHVs. But a meeting held to discuss the *Malezi Bora* activities before implementation mainly the dosage and children targeted for VASD distribution
Distribution channels	Mapping of the amount of Vitamin A capsules required conducted by the CHVs, collated by CHAs and submitted to health facilities. The SCNC supplied the health facilities per requirement. The CHVs picked their requirements from the health facilities. Distribution of VASD by CHVs at household	Mapping of the amount of Vitamin A capsules required conducted by the CHVs, collated by CHAs and submitted to health facilities. The SCNC supplied the health facilities per requirement. The CHVs picked their requirements from the health facilities Distribution of VASD at ECDs, outreaches and households

Aspects	Distribution of VASD through Community Health Strategy during the Operational Study	Distribution of VASD through *Malezi Bora*
	Standard distribution of VASD at health facilities	Standard distribution of VASD at health facilities
Availability of vitamin A capsules and deworming tablets	These two commodities were available throughout the study period having been provided by Helen Keller International No stock out and break in supply chain.	Stock outs experienced during the distribution session especially for the Vitamin A 100,000IU capsules for the younger children Commodities planned and supplied is only for the duration of the campaign which is all consumed and then ceases
Monitoring and supervision	**Monitoring** At the health facility, the VASD commodities are recorded into registers at the health facilities upon arrival from the Sub-County. Monthly reporting on what has been used and what is left and send reports to the Sub-County. CHAs issue the commodities to CHVs who fill a tally sheet on the number of children who have received the commodity and submit the report monthly to the CHAs The health facility in-charges organize monthly meeting to discuss and get feedback about the exercise. Research team and Helen Keller International involved in monitoring **Supervision:** The CHVs were supervised directly by the CHAs The CHAs supervised the Health facility In-charges SCHMT together with Helen Keller International and the Research team supervised the CHAs and the CHVs through field visits. SCHMT conducted review meetings on DQA at the health facility with the officers including the Health Information System	Not as rigorous as for the CHS approach CHMT not directly involved in the supervision. CHVs supervised mainly by the CHAs. Not all CHAs and CHVs were involved in the exercise unlike in the CHS approach No review meetings to discuss progress or for DQA

Aspects	Distribution of VASD through Community Health Strategy during the Operational Study	Distribution of VASD through *Malezi Bora*
	officer where these officers were available	
Reporting protocols and tools	Used the same reporting tally sheets and Summary Sheets as for *Malezi Bora*. The CHAs also used the HKI community service tool for reporting progress. The CHVs also indicated if a child had received VASD on the Mother-Child-Booklet by putting a sticker on the booklet	Same as for the CHS platform Not indicated in the Mother-Child Booklet

4.1.11 Stakeholders' preferences of the distribution of VASD between Malezi Bora and the CHS platforms

County and sub-county level health personnel preference

All the county and sub-county (Alego Usonga) health personnel interviewed were in agreement that the distribution of VASD through the CHS was the preferred choice of platform. The reasons given included the following:

- VASD distribution through CHS is better in terms of higher coverage because of the decentralization and the continuous provision of the commodities compared to the twice yearly distribution *Malezi Bora* campaign;
- Improved knowledge on nutrition particularly knowledge on the health benefits of VASD among the mothers/caregivers but also among the health facility in charges, the CHAs and the CHVs;
- Better option for sustainability because it is less resource intensive as it used the existing routine service provision health infrastructure;
- Increased referrals be made by the CHVs, for example, cases of child malnutrition. This is a trickle down positive effect of the strategy; and
- Greater impact on coverage as the distribution is conducted on a continuous and not on spontaneous basis.

More or less the same sentiments were expressed by the health facility in charges, the CHAs and the CHVs from Alego Usonga Sub-County.

Mothers'/caregivers preference of the mode of distribution of VASD through CHS and *Malezi Bora*

In comparing CHS with *Malezi Bora* the majority of the caregivers in Alego Usonga preferred CHS because they reported that during *Malezi Bora* not every child received VASD unlike in the case of CHS. One of the mothers in an FGD in Alego Usonga, stated that: "*During Malezi Bora, the time frame is short unlike during the CHS if a child misses the dose, the CHV can still do follow up to ensure they get it. Through CHS the CHVs visits the households regularly unlike Malezi Bora which is once and not all households are reached*".

Another added that: "*There is also inadequate supply of VASD during Malezi Bora while on the other hand through the CHS, since the CHVs visit households regularly they are able to go back and provide the supplement another time if they run out of stock".* Most of the respondents said that they prefer the one done at the community because the one for *Malezi Bora* means that if a child misses out a caregiver has to wait for the next time.

The respondents in Bondo district were also of the opinion that the CHVs should be given VASD commodities to distribute at the households. One of the participants in a FGD stated that; *"We appreciate that the Malezi Bora programme and feel that the Ministry of Health cares about the health of children, but we feel that CHVs should distribute VASD door to door because the time allocated for Malezi Bora is too short for them to reach all households".*

The respondents also reported that with the CHVs visiting the households for VASD distribution, they would also identify other health issues the children have such as malnutrition and other ailments and refer them for treatment. They also educate the mothers on how to take care of their children to remain healthy. Additionally, the respondents stated that the distribution of VASD at the household was a good and welcome idea because of the convenience especially for people who stay far from hospitals to get the services at home through the CHVs. The respondents from both sub-counties felt that door to door distribution of VASD is less costly for them because they do not have to incur expenses on transport to go to health facilities.

Nonetheless, a few caregivers indicated that they prefer distribution of VASD at the health facilities. One participant stated that; *"The health worker answers some of her questions before the child is given VASD. The doctor is more qualified than the CHV*".

4.1.12 Successes/strengths of distributing VASD through the CHS

- An impactful strategy – tremendous improvement in coverage of VASD to over 90% in Alego Usonga compared to 70% in Bondo as demonstrated by the findings of the household survey conducted in the Operational Study and corroborated by the coverage from the health facility Health Information System. The higher coverage in Alego Usonga is attributed to the utilization of the routine health system, that is, the CHVs distributed VASD as they conducted their usual duties during household visits. This was continuously conducted for a period of 4 months unlike the *Malezi Bora* implemented only for one month. Additionally, through the CHS platform, the CHVs were able to identify children in the community who had not yet received VASD. This ensured that the children got the next dose of VASD on time whether through the CHV or through visits to a health facility.
- The strategy enhanced key messages on nutrition, especially knowledge on VAS and deworming which was significantly higher in Alego Usonga compared to the knowledge in Bondo. This is attributed to the emphasis by the CHS approach to nutrition messaging for the caregivers at the households by the CHVs. During Malezi Bora, the focus is on many maternal and child health issues. It was reported by a member of the SCHMT that knowledge on VASD also improved among the health workers at the health facilities and also among the CHAs.
- The distribution of VASD through the CHS is integrated into the existing health system. The use of the CHVs contributes to strengthening of the health system because the strategy used is not new nor parallel to the health system – but used the existing health infrastructure. One member of CHMT stated that; *"It is crystal clear that with adequate training, the CHVs can be effectively used to distribute VASD at the household".*
- Presence of the functional, supported, and good coverage CHUs with well-motivated and incentivized CHVs. This ensured provision of quality VAS and deworming services at household and community level on routine basis. The existence of updated household registers facilitated household visits for delivery of VAS and deworming services as per the target groups.
- There was good partnership and coordination between stakeholders but with the government on the driving wheel and therefore increasing the potential for sustainability of the activity.
- Vitamin A and deworming tablets were continuously available throughout the study period unlike in the *Malezi Bora* which consumes all commodities then ceases. There is usually stock outs of these commodities during normal times but Helen Keller International provided adequate supplies during the study; and

- The study strengthened the data quality and data reporting system – there used to be gaps in data at the health facility because of incomplete documentation; for example, VAS was sometimes given but not documented. Because of the sensitization of health workers, CHVs, and CHAs there was more focus on documentation than before and strengthened by the monthly data review meetings. There was constant data flow from the CHVs through the CHAs to the health facilities unlike in *Malezi Bora* where the data comes in peaks and then drops. One member of the CHMT stated that; "*The data management in the CHS approach was a system flow unlike in the Malezi Bora".*

4.1.13 Lessons learnt from the distribution of VASD through the CHS

- With adequate capacity building, CHVs can satisfactorily administer and follow the correct procedure to administer VASD at the household. The following statement from a CHV illustrates this point: "*I use a pair of scissors to cut the capsule nipple and give it to the mother who will administer it to her child. I don't administer it myself, and I want the mother to administer it for herself to see what she's giving to her child."*

- The CHS approach provides a significantly higher coverage for children who received VASD as demonstrated by the quantitative findings and corroborated by the qualitative findings. In addition, the approach had trickle-down positive effects beyond VASD distribution. A worker from a health facility in Alego Usonga stated that: "*One of the main successes of the distribution of VASD through the CHS is that it has been able to help in identifying children with malnutrition in addition to increasing supplementation and enabling children to receive deworming on time".*

- The use of the CHVs contributes to health system strengthening because the strategy used is not new or parallel to the health system – but uses the existing health infrastructure with the government on the driving wheel.

- The use of CHVs for routine distribution of VASD does not interfere with the schedule of their day to day activities, unlike during *Malezi Bora* which interferes because they are engaged in many activities outside their normal duties.

- The community appreciated the CHS approach greatly. The mothers were very appreciative of the role of the CHVs in distributing VASD at the household, sometimes referring to them as doctors. A CHV from Alego Usonga made this comment: *"The community has really*

appreciated the exercise, at times they refer to us as doctors and are also very comfortable with getting VASD and that the number of children with ringworms has reduced in the community".

- The key pillars for successful distribution of VASD include; ensuring availability of the commodities (vitamin A capsules and deworming tablets), adequate sensitization through appropriate communication flow and creation of demand for the services.
- The use of the CHS provides a good platform for partnership and coordination between the county government, the partners and the community.
- Regular (monthly) review of data quality and close supervision by SCHMT and CHAs provided good results.
- Need for accountability to the community –feedback on the findings of the study should be disseminated to the community.

4.1.14 The distribution of VASD through CHS is an impactful strategy that is worth scaling up. Existence of functional and supported CHUs is a prerequisite for attainment of quality and good coverage of VASD servicesLimitations and challenges of the distribution of VASD through the CHS

- Limited package of activities/interventions as the focus of the study CHS was VASD. It was planned not have too many activities to distract the CHVs from performing their usual activities like it was reported that the *Malezi Bora* does.
- Distribution of VASD through CHS lacks political support from the government. The Community Health Strategy 2018, indicates that these commodities could be distributed through the CUs without specific mention of the CHVs role in this activity. If the distribution of VASD through the CHS and the CHVs could be regularized at the national and county levels, then the procurement of VASD would be included in the KEMSA essential list of drugs and this would address the challenge of frequent stock outs. However, in this study there was no stock outs of VASD.
- Vastness of some of the areas made CHVs not reach all the households within the specified time. The challenge of the vastness of the area to be covered was compounded by the rough roads and poor transport system which constrained movement of the CHVs especially during the rainy seasons. All the same, all the households targeted were covered during the 4 months than those covered during the *Malezi Bora*.
- The beneficiaries reported inadequate mobilization by the CHVs in terms of reaching every household within their villages, a challenge that was reported to be worse under the *Malezi Bora* programme because not all CHVs are used as was the case of the CHS.

4.1.15 Opportunities not fully exploited in the distribution of VASD through the CHS

- Integration of activities to provide a comprehensive package – this was a missed opportunity in the CHS approach, which provided only VASD and nutrition education. Some of the CHVs indicated that fathers should also be involved in the sensitization and health promotion messages to increase the uptake of VASD.
- The VASD distribution through the CHS platform should be planned for and included in the County Annual Work Plan so that it becomes a regular County Activity. This would mean that the distribution can take place continuously especially given the positive findings of this study. There may be need to develop Operational Guidelines for the distribution of VASD through the CHS platform.

4.1.16 Sustainability of the distribution of VASD through the CHS

- High potential for sustainability because of using existing government structure in terms of government-provided personnel and technical services such as training and support supervision. The approach, therefore, strengthens the health system at a minimal additional cost since it does not involve a parallel system. It can be integrated into the current health and nutrition activities being conducted by the CHVs - by using the same CHVs already implementing activities at the households. Nonetheless, it was reported that this would largely depend on the continuous availability of VASD commodities. Relying on partners for the supply of these commodities reduces the likelihood of sustainability of the programme.

- The County Ministry of Health was at the driving wheel in terms of the health agenda and, therefore, the potential for sustainability because of the support provided by the ministry.

4.1.17 Suggestions for improvement on the distribution of VASD through the CHS

- Overall, the planning, implementation process, training, and monitoring of VASD through the CHS were adequate and resulted in higher coverage and knowledge of VASD by the health workers and the beneficiaries. A few suggestions are, however, made for improvement;
    - Capacity building for all cadres of health workers on VASD programming (the entire process; forecasting for commodities, how VAS and deworming should be given, possible adverse effects etc.) based on the study operation.

- Improve capacity training for the health facility in-charges and CHAs. The health in-charges and the CHAs should receive more training on the science behind the deworming and Vitamin A supplementation for them to fully appreciate the health benefits of the two. This would require a longer training duration and the use of a tested, standardized and validated curriculum, unlike the one the *adopted* that was used.
- For the CHVs, it was recommended that the capacity test be included as part of the training. The CHVs also recommended refresher courses to be conducted from time to time to remind them of the critical information about VASD. The CHVs felt that they needed more information on the health benefits of VASD.

- There is a need for increased community sensitization and nutrition education on the health benefits of VASD so that more caregivers avail their children of VASD.
- There should be high-level advocacy and mobilization to create demand for services through the local media (radio), interfaith organizations and local leaders to increase the uptake of VASD.
- The provision of Vitamin A capsules and deworming tablets is a government responsibility. In this respect, the government should commit to increasing the budget for nutrition services and the provision of VASD commodities through KEMSA. This will require high-level advocacy to lobby for increased budget allocation for nutrition activities both at the national and county levels.
- The use of CHS for VASD distribution is worth scaling up but in a more carefully thought-out and integrated manner to make it even more cost-effective.

4.1.18 Coverage of VASD in the five months before the study

Characteristics of the respondents and the index children

A total of 625 respondents participated in the study, out of which 318 were from Bondo Sub-County and 307 from Alego Usonga Sub-County. The majority of the participants were female, 94.3% and 99% in Bondo and Alego-Usonga sub-counties, respectively. As expected, most of the children were of age 12-59 months. Sources of age verification varied in the two study areas with the most common the Mother Child Booklet for and about 76. 6 percent in Bondo and 71.3 percent in Bondo and Alego Usonga respectively. The distribution of the index children by sex was more or less similar in Bondo (49.7% males and 50.3% female) and Alego Usonga (50.2% male and 49.8% female).

Coverage of VAS and deworming in Bondo and Alego Usonga

The results show that coverage in the intervention Alego Usonga during the CHS study period was higher than in the control site (Bondo), even when the Malezi Bora period was considered. About 90.6 percent [95% CI: 87.3-03.9], received Vitamin A capsules compared to 70.4 percent [95% CI: 65.4-75.4] in Bondo Sub-County while deworming coverage was 73.9 percent95% CI: 69.0-78.7] in Alego Usonga and 54.7 percent [95% CI: 49.2-60.2] in Bondo Sub-County (Figure 4.2).

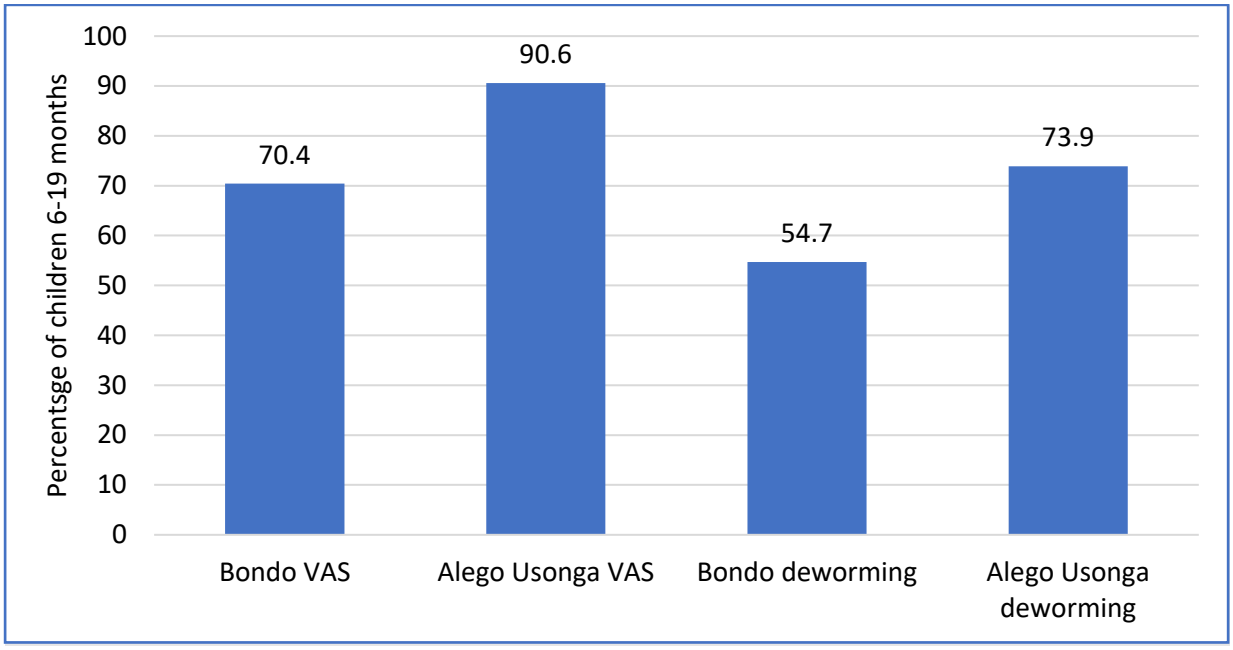


Figure 4.2: VASD coverage in Alego Usonga and Bondo sub-counties

In both interventions, VAS and deworming, the test of equality of the proportions was rejected at the five percent level, implying a significant difference in the percentages of coverage in the intervention and control sites (Table 4.3).

Table 4.3: Vitamin A supplementation and deworming coverage

Variable	Percent	95% CI		Z-value	P-value
Vitamin A capsules coverage		Lower	Upper		
Bondo sub-county (control site)	224 (70.4)	65.4	75.4	-6.35	<0.01
West Alego and South East Usonga (intervention sites)	278 (90.6)	87.3	93.9		
Deworming coverage among children					
Bondo sub-county (control site)	174 (54.7)	49.2	60.2	-5	<0.01
West Alego and South East Usonga (intervention sites)	227 (73.9)	69	78.8		

Knowledge on VAS

Table 4.2 presents the results of the analysis on the household responses to the questions on knowledge about vitamin A.

Table 4.2: Knowledge of vitamin A

Knowledge of vitamin A	Bondo Sub-County		Alego Usonga Sub-County	
	Number of respondents	Percent	Number of respondents	Percent
Health benefits of Vitamin A in the body				
To make them grow healthily	179	56.3	201	65.5
To prevent infections	164	51.6	155	50.5
To ensure good eyesight	134	42.1	109	35.5
To build strong bones	113	35.5	112	36.5
Other	103	32.4	109	35.5
Number of times in a year children should receive VAS				
Once	9	2.8	7	2.3
Twice	154	48.4	190	61.9
Thrice	50	15.7	59	19.2
Other	14	4.4	10	3.3
I don't know	91	28.6	41	13.4
Children's' frequency of receiving VAS				
Every six months	158	49.7	187	60.9
Every three months	47	14.8	60	19.5
Every two months	4	1.3	7	2.3
Other	27	8.5	12	3.9
I don't know	82	25.8	41	13.4
Do you know age when a child should receive VAS?				
Knowledge of minimum age in months	158	49.7	199	64.8
Knowledge of Maximum age in months	155	48.7	174	56.57
Your source of information on VAS				
Health facility	266	83.6	276	89.9
Friends	18	5.7	0	0
Relatives	24	7.5	3	1.3
Outreaches	35	11	4	1.3
CHVs	201	63.2	265	86.3
Others	28	8.8	12	3.9
Is the information received on VAS sufficient?				
Yes	181	56.9	195	63.5
No	137	43.1	112	36.5

Table 4.6 shows that over half of the respondents (56% in Bondo and 66% in Alego Usonga) indicated that vitamin A helps in healthy growth followed by the prevention of infections. More respondents in Alego Usonga (62%) than in Bondo (48%) correctly identified that a child should receive VAS twice a year. Furthermore, those who correctly indicated that the child should get vitamin A every six months were Alego Usonga (61%) and Bondo (50%). An overwhelming majority reported having received information on VAS from health facilities (83.6%) from Bondo and 89.9% from Alego Usonga. A significantly larger proportion (86.3%) from Alego Usonga compared to 63.2 percent from Bondo also reported having received information from the CHVs. About two-fifths of the respondents indicated that the information received was not adequate; 43.1% from Bondo and 36.5% from Alego Usonga. They requested additional information on the advantages and disadvantages of VAS, differences between VAS and multivitamins, age of taking and stopping vitamin A and consequences of not taking vitamin A. These findings concur with those from the FGDs in which some of the respondents indicated they did not have adequate knowledge on the health benefits of VAS to the child.

Knowledge on deworming

The respondents in Alego Usonga had higher knowledge on the benefits of deworming compared to those in Bondo; 69.9% and 56.7% knew that deworming prevents malnutrition, respectively. In Alego Usonga 68.1% of the respondents stated that deworming improves growth in children, and 54.4% in Bondo reported the same (Table 4.4).

Table 4.3: Knowledge of deworming

Variable	Bondo Sub-County		Alego Usonga Sub-County	
	n	%	n	%
Benefits of deworming in children				
To prevent malnutrition	177	55.7	214	69.7
To improve the growth of children	173	54.4	209	68.1
Other (eliminate worms in the body, improve immunity)	128	40.3	102	33.2
Children's frequency of receiving deworming tablets				
Once a year	30	9.4	15	4.9
Twice a year	39	12.3	116	37.8
Every three months	148	46.5	130	42.3
I don't know	64	20.1	37	12.1
Others	37	11.6	9	2.9
Knowledge of minimum age for deworming children	160	50	160	50
Sources of information on deworming of children				
Health facility	253	79.6	278	90.6
Friends	28	8.8	1	0.3
Relatives	43	13.5	2	0.7
Outreaches	42	13.2	2	0.7
CHVs	199	62.6	268	87.3
Others (Chemist, ECDs and common knowledge)	29	9.1	9	2.9

Further analysis of the knowledge responses on VAS was done by weighting with one point a correctly answered question and summing them up across the questions. For instance, the response to the questions on importance of vitamin A were awarded as follows: to prevent infections – correct score 1; to ensure good eyesight – correct = 1 otherwise 0; to prevent night blindness – correct = 1 otherwise 0; helps in promoting growth – correct = 1 otherwise 0; to build strong bones – incorrect = 1 otherwise 0; How many times in a year should children VAS? Twice correct = 1 otherwise 0; Children's' frequency of receiving VAS, six months correct = 1 otherwise 0, correct minimum and maximum age of VAS each correct score =1 otherwise 0. The total possible knowledge score was 8.

In the case of deworming, the scoring was done as follows: to improve growth of children correct = 1 otherwise 0; to prevent malnutrition – correct = 1 otherwise 0, increases nutritional uptake - correct = 1 otherwise 0; prevents anaemia - correct = 1 otherwise 0; improves immunity - correct = 1 otherwise 0. The total knowledge score was 3.

In both sites as shown in Table 4.5, the test of equality of the mean score was rejected. The mean score was significantly higher in Alego Usonga than in Bondo (Table 4.5). This may have been attributed to the focus on nutrition and health promotion at the household level by the CHVs. The findings from the KIIs and FGDs corroborate this finding on the high knowledge of the respondents in Alego Usonga.

Table 4.4: Test of equality of VASD mean knowledge scores

Variable	Mean score	Standard deviation	t-value	p-value
Vitamin A				
Bondo	4.4717	0.1379		
Alego-Usonga	4.9511	0.1127	2.6821	0.0075
Deworming				
Bondo	1.19497	0.05039		
Alego-Usonga	1.42671	0.03957	3.6011	0.0003

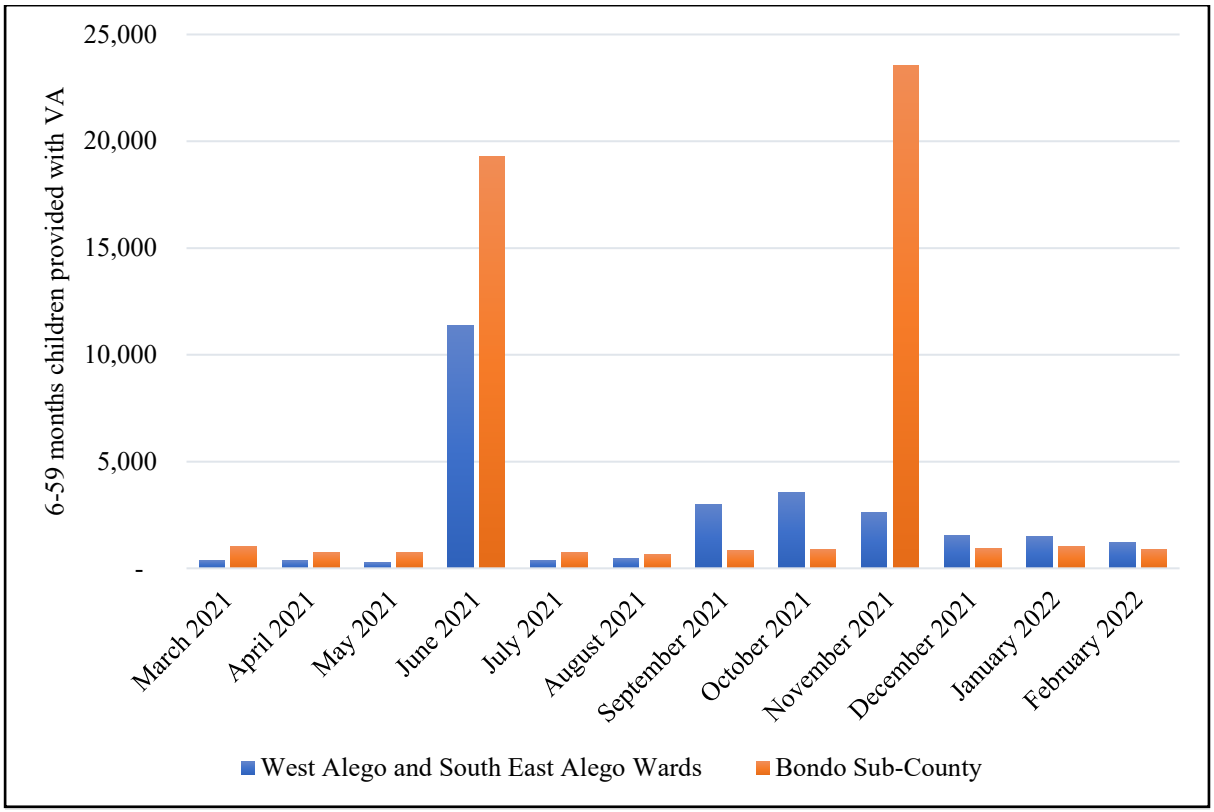
4.2 Costs and Effectiveness of VASD Delivery through CHS and *Malezi Bora*

4.2.1 Introduction to costing and benefit analysis

Two types of analyses were carried out to compare the cost-effectiveness of VASD delivery through the community health strategy and *Malezi Bora*. The first was costing analysis, in which the cost of service delivery under each delivery model. The second type of analysis entailed estimating the benefits of Vitamin A in terms of mortality expected to be averted. The results from the types of analyses were then used to compute the cost-effectiveness ratio. The results are presented in the sections that follow.

4.2.2 Costing analysis

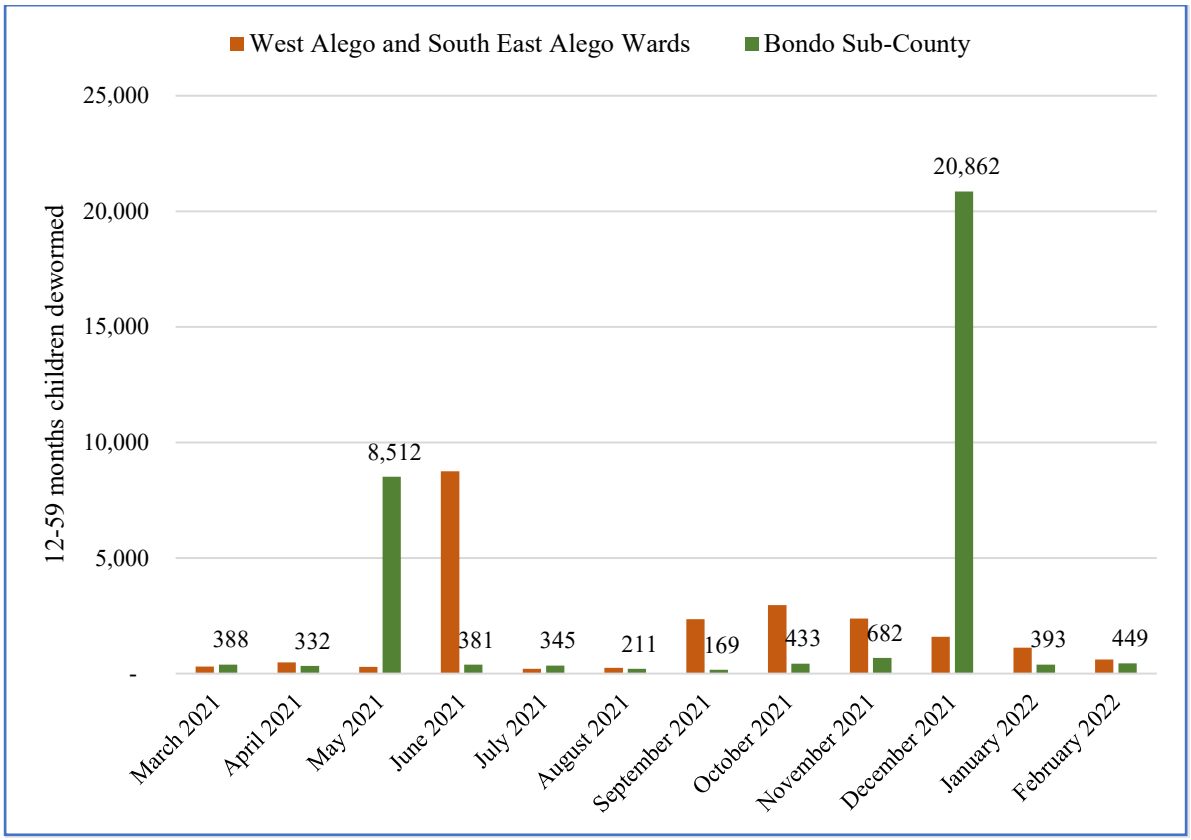
The delivery of VASD through CHS was piloted for approximately four months, from September to December 2021, in two wards -West Alego Ward and South East Alego Wards, in Alego Usonga Sub-County. In June 2021, the first annual *Malezi Bora* campaign was carried out in the entire Siaya County, including the two wards for CHS pilot and Bondo Sub-County. However, in November 2021, the *Malezi Bora* covered the entire control site of Bondo Sub-County, with the exclusion of CHS pilot wards. The data on VAS service uptake in one year period in the two sites is shown in Figure 4.3.



Source: Constructed using data from Kenya DHIS

Figure 4.3: VAS service utilisation

Figure 4.3 shows that service utilisation increased significantly in Bondo Sub-County during the two phases of the *Malazi Bora*. There was also a substantial increase in uptake of VAS in West Alego and South East Alego wards in the phase 1 *Malazi Bora* in June 2021. It is also apparent that the CHS pilot phase from September to December 2021 increased the uptake of vitamin A in the two pilot wards, with a total of 9288 children reached this this period. Figure 4.4 shows a similar utilisation pattern of deworming services in the pilot and control sites.



Source: Constructed using data from Kenya DHIS

Figure 4.4: Service utilisation for deworming of children

The analysis of the incremental cost incurred is presented in Table 4.5

Table 4.5: Incremental cost of CHS in West Alego and South East Alego wards

Cost component	Total cost (KES)	Total cost US$[1]
Commodity cost		
Vitamin A 100,000 IU	3,854.79	35.26
Vitamin A 200,000 IU	20,631.01	188.72
Albendazole	18,576.00	169.92
Sub-total	43,061.80	393.89
Supplies		
Containers for storing VACs and Deworming drugs	23,100.00	211.30
Carrier bag	253,000.00	2,314.24
Procurement of sticky notes	1,820.00	16.65
Sub-total	277,920.00	2,542.19
Inception meeting		
Transport reimbursement	14,000.00	128.06

[1] Exchange rate of US$ for KES 109.32, used throughout.

Cost component	Total cost (KES)	Total cost US$[1]
Conference package	37,500.00	343.02
Sub-total	51,500.00	471.08
Training of CHAs		
CHA lunch allowance	27,000.00	246.97
Facilitator's allowance	9,000.00	82.32
Sub-total	36,000.00	329.30
Training of CHVs		
CHV allowance	220,000.00	2,012.38
Facilitators' allowance	80,000.00	731.78
Hall hire during CHVs training	18,000.00	164.65
Sub-total	318,000.00	2,908.81
Sensitization of Health Facility In-charges		
Meeting allowance	23,000.00	210.39
Review meetings		
CHV general review meeting allowance	109,500.00	1,001.62
CHV data review meeting allowance	111,000	1,015.34
CHAs and SS review meeting allowance	82,000	750.07
Data review meeting - HCWs and CHAs allowance	80,000	731.78
Sub-total	382,500	3,498.80
Other costs		
PPEs for CHS actors	184,000	1,683.08
Airtime	2,000	18.29
Sub-total	186,000	1,701.38
Grand Total	**1,317,982**	**12,055.84**
Cost per child reached (Vit A and Dewormed)	**123.00**	**1.13**

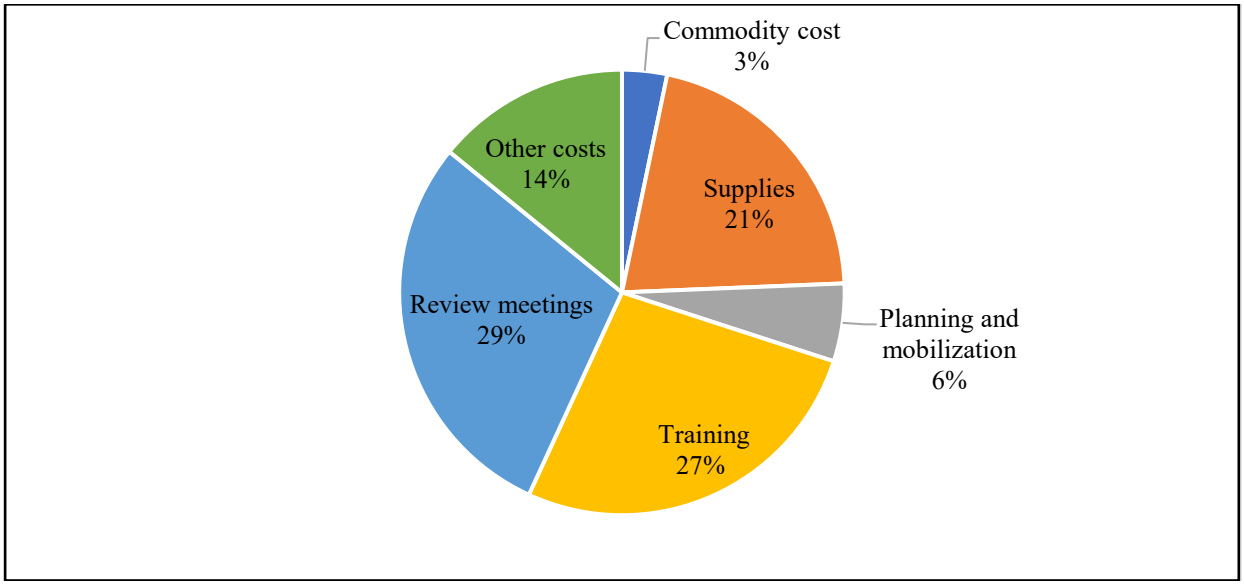


Figure 4.5: Percentage of cost components - West Alego and South East Alego

The costs captured in Table 4.5 were only incremental. The CHS VASD entailed an integrating vitamin A and deworming into existing services done by the CHVs and hence no significant opportunity cost incurred. Figure 4.5 depicts that planning and review meetings accounted for the largest share of the incremental cost at 29 percent, followed by training (27%). Commodity costs consisted of vitamin A supplements, and medicine for deworming took the least share at 3 percent. The financial costs, as shown in Table 4.2, were funded by Helen Keller Foundation (HKI) and Nutrition International (NI). NI donated vitamin A supplements used during the pilot phase, and HKI funded all the other components, including medicine for deworming and distribution of all vitamin A supplements and albendazole.

Table 4.5 shows that the estimated total cost during the pilot phase between September and December 2021 was KES 1,317,982 (US$ 12,056). This total cost translated to a cost per child reached with vitamin A and albendazole estimated at KES 123.00 (US$ 1.13) during the start-up period. However, with the implementation moving on to a regular year without start-up costs, the total cost would reduce significantly. The estimated cost of two doses with a fully running VASD through CHS was KES 33.13 (US$ 0.28) per child reached with vitamin A and albendazole.

The estimated costs for *Malezi Bora* in Bondo Sub-County during the second phase in November 2021 are shown in Table 4.6.

Table 4.6: Cost of *Malezi Bora* in Bondo Sub-County

Description	Total cost (KES)	Total cost (US$)
Commodity cost		
Vitamin A 100,000 IU	5,124.68	46.88
Vitamin A 200,000 IU	49,814.59	455.66
Albendazole	41,724.00	381.66
Sub-total	96,663.28	884.20
Supplies		
Surveitte	4,225	38.65
Inception meeting /Planning		-
Planning Meeting - transport reimbursement	5,000	45.74

Description	Total cost (KES)	Total cost (US$)
Conference package - Planning Meeting	15,000	137.21
Chief Officer-opportunity cost	3,383	30.95
County Nutrition Officer-opportunity cost	1,150	10.52
County Health Records and Information Officer-opportunity cost	837	7.65
County Community Strategy Focal Point (PHO)-opportunity cost	1,201	10.98
County PHO-opportunity cost	1,357	12.41
County Public Health Nurse-opportunity cost	1,180	10.80
Sub-total	29,108	266.26
Review meeting		
Malezi bora planning meeting- Senior HCW transport reimbursement	11,000	100.62
Malezi bora planning meeting -other HCW transport reimbursement	5,000	45.74
Sub-County Nutrition Officer -opportunity cost	5,297	48.45
Sub-County Health Records and Information Officer-opportunity cost	4,631	42.36
Sub-County Community Strategy Focal Point (PHO)-opportunity cost	6,034	55.19
Sub-County PHO-opportunity cost	7,205	65.91
Sub-County Public Health Nurse-opportunity cost	5,292	48.41
County Nutrition Officer-opportunity cost	6,902	63.13
County Health Records and Information Officer-opportunity cost	5,020	45.92
County Community Strategy Focal Point (PHO)-opportunity cost	7,205	65.91
County PHO-opportunity cost	8,141	74.47
County Public Health Nurse-opportunity cost	7,082	64.78
Sub-total	78,808	720.87
Personnel		
HCW allowance for dosing	93,044	851.09

Description	Total cost (KES)	Total cost (US$)
CHV allowance for dosing	61,196	559.77
HCW opportunity cost	399,664	3,655.80
CHV opportunity cost	4,590	41.98
Sub-total	558,494	5,108.65
Supervision	11,700	107.02
Other costs		
Printing	3,958	36.21
PPE		-
Sub-total	3,958	36.21
Grand total	782,957.05	7,161.86
Cost per child (Vit A and Dewormed) - one dose	**33.2**	**0.30**
Cost per child (Vit A and Dewormed) - two doses	66.48	0.61

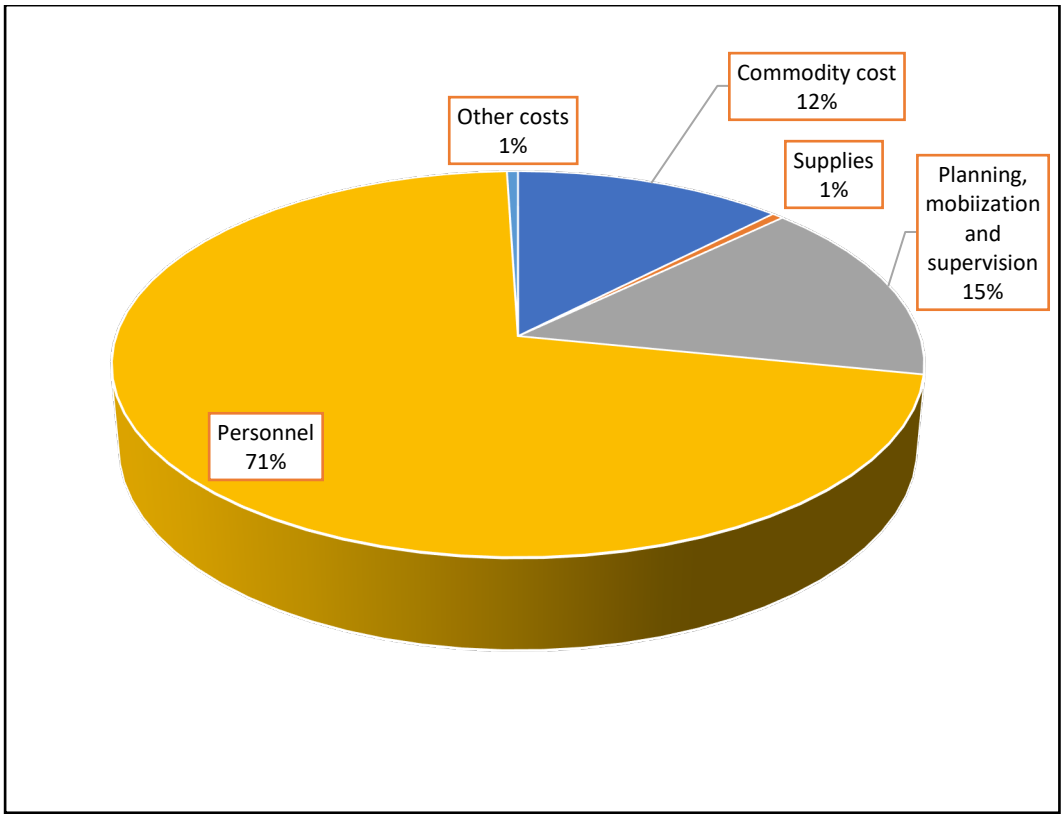


Figure 4.6: Cost percentage distribution in Bondo Sub-County

The Bondo Sub-County consisted of four wards, and the costs shown in Table 4.6 pertain to the entire sub-county. During the *Malezi Bora* phase 2 in November 2021, the total cost was estimated at KES 782,957 (US$ 7,162), resulting in the cost per child reached with vitamin A and albendazole of about KES 33.2 (US$ 0.30). The annual cost per child reached with vitamin A and albendazole of about KES 66.48 (US$ 0.61). The annual incremental cost of *Malezi Bora* entailed doubling the above amounts, with the assumption that coverage remains at the same level as in November 2021.

Figure 4.6 shows that personnel cost was the main driver, taking 71 percent of the total cost. The personnel cost covered opportunity cost and allowance to health care workers and community health volunteers during the *Malezi Bora* implementation period in November 2021.Figure 4.6 also shows that the cost of vitamin A supplements and albendazole accounted for 12 percent.

4.2.3 Effectiveness of vitamin A supplementation

Child mortality data for Nyanza was obtained from KDHS 2014, 82 per 1,000 live births. The coverage component of this study showed that 70.4 percent of children under five years in Bondo Sub-County were reached with VAS during *Malezi Bora* phase 2. The coverage results also indicated that the CHVs reached 90.6 percent of the under-fives in Alego West Ward and South

East Alego Ward during the pilot period of four months of VASD. The computations of deaths averted are shown in Table 4.7.

Table 4.7: Estimated number of deaths averted in CHS and control sites

Site	Dosage of Vitamin A	Child mortality rate	Coverage rate	Expected mortality reduction	Children reached with VAS	Estimated deaths averted
West Alego and South East Alego	One	82	90.6%	11.5%	10715	92
	Two	82	90.6%	23.0%	10715	183
Bondo Sub-County	One	82	70.4%	11.5%	23553	156
	Two	82	70.4%	23.0%	23553	313

The table shows that with one dose of vitamin A given in each site, the number of death averted will be lower than with two doses per year for the same population of children.

4.2.4 Cost-effectiveness analysis of VAS

The cost-effectiveness ratios were computed by using both the costing results and the estimated deaths that would be averted. Table 4.12 shows the results of cost effectiveness analysis.

Table 4.8: Cost-effectiveness of Vitamin A

	Dosage of Vitamin A	Cost per child reached with vitamin A and albendazole		Cost per death averted	
		KES	US$	KES	US$
West Alego and South East Alego	One	30.13	0.28	3,527.05	32.26
	Two	33.96	0.31	1,987.61	18.18
Bondo Sub-County	One	33.24	0.30	5,007.34	45.80
	Two	66.48	0.61	5,007.34	45.80

In the CHS pilot sites of the two wards, the cost per death averted due to vitamin A supplements with one dose per year was estimated at KES 14,397 (US$ 132). However, with two doses per year, the cost per death averted reduces to KES 13,073 (US$ 120). In Bondo Sub-County, with one dose or two dosages, the cost per death averted was at KES 13,018 (US$ 119). The implementation of the CHS approach throughout the year would reduce the cost per death averted to almost the same as that of *Malezi Bora*.

Additionally, the incremental cost-effectiveness ratio (ICER) was calculated for CHS vs *Malezi Bora* aand the results are as follows. The CHS VAS was considered as the new intervention and Malezi Bora being a comparator.
One dose: ICER = 7,098
Two doses: ICER = 9272

These results showed that CHS was relatively more cost-effective than *Malezi Bora*. Additionally, the lives averted were converted into a simple measure of disability-adjusted live years (DALYs) using a life expectancy of 67 years for children under five years (WHO, 2019b). Again, the CHS approach was more cost-effective than the *Malezi Bora*. The results are shown in Table 4.9.

Table 4.9: Cost per DALY averted in control and intervention sites

	Dosage of Vitamin A	DALYs averted	Cost per DALY averted (KES)	Cost per DALY averted (US$)
West Alego and South-East Alego	One	6,133.48	52.64	0.48
	Two	12,266.96	29.67	0.27
Bondo Sub-County	One	10,476.24	74.74	0.68
	Two	20,952.48	74.74	0.68

The cost per DALY averted in case is less than Kenya's GDP per capita, and hence both interventions, CHS and *Malezi Bora*, are very cost-effective.

4.3 Key Steps for Planning, Implementation, and Monitoring VASD at CHU level

Overall, the planning the process used in the planning, implementation and monitoring of VASD distribution at the CHU level adopted in the OPS was efficient in achieving the intended objectives.

4.3.1 Planning process

The planning process should start at the County level involving the CHMT and therefore soliciting their approval and support for the activity was appropriate. The planning process should then be appropriately cascaded to the Sub-County, where the distribution is to be conducted. At the sub-county, inception meetings with members of the SCHMT should be conducted to sensitize them on the impending activity so as to solicit their approval and support in the implementation of the activity. These meetings are critical to discuss the *What, Why* and *How* of the intended activity as well as to solicit support from the sub-county government. Detailed implementation plans should then be conceptualized, indicating a detailed plan of activities, who is responsible for the implementation of the various activities and the time plan. The implementation plan should include all aspects involved in the distribution of VASD CHU, which include the following: sensitization and mobilization of the community; sensitization and training of the health facility workers, CHAs and CHVs; mapping of the number of children who require VASD; VASD commodity movement from Sub-County to the health facility to the CHVs; documentation of and reporting of the number children who receive VAS; monitoring and supervision of the VASD activities. This process should be executed under the guidance of the SCHMT with the SBCNC and the sub-county CHS focal persons in the forefront.

The SCHMT provided the appropriate leadership and guidance in the implementation of the activities for the distribution of VASD at the CHU level. For example, all the stakeholders - the health facility in-charges, the CHAs and the CHVs reported that as a whole, they were adequately sensitized and trained for their responsibilities for the distribution of VASD at the CHU. This view was confirmed by the researchers, who, through the findings of the KIIs and the FGDs observed that the stakeholders were conversant with their roles in the distribution of VASD at the CHU. The planning process adopted was successful and therefore should be adopted for future distribution of VASD at the CHU.

4.3.2 Community sensitization and mobilization for the distribution of VASD through the CHS

The door to door sensitization and mobilization of the community for VASD distribution by CHVs should continue. The CHVs did a good job, but not all the targeted households were reached because of the vastness of the area and poor roads. It is recommended that to increase sensitization and mobilization of the community, additional channels such as the use of local radio media, local leaders and churches should be used.

4.3.3 Sensitization and training of personnel to be involved in the distribution of VASD at CHU

It is recommended that the process and procedure used during the distribution of VASD in the OPS be adopted but with some modifications. The training/sensitization of the health facility in-charges was conducted by members of the SCHMT who in turn conducted a one-day training/sensitization for CHAs who also conducted a one-day training for CHVs. Despite the fact that the process was on the whole successful, the following modifications are recommended:

- Increase the duration of the training period for all the health cadres to address more information of VASD. For the health facility in-charges and the CHAs the training content should include information such as the science behind the importance of vitamin A supplementation and deworming. For the CHVs, the training should also include post-training evaluation to establish their capacity to distribute VASD using the CHS approach. In addition, there need for refresher courses for CHVs to remind them of the critical information on VASD. It is recommended that a three-day training be adopted in tandem with the recommended duration for the MoH curriculum on VAS distribution at community.

- A curriculum or an amended one, specifically for VASD distribution at CHU level should be developed, standardized and validated instead of using a modified curriculum. Such a curriculum would meet the specific needs of the activity.

4.3.4 Distribution of VASD at the CHU by the CHVs

It is recommended that the CHVs continue to distribute VASD at the household level because the study has demonstrated that with adequate and appropriate capacity development, they can efficiently perform the task. In this study, there were no report of any adverse effects and the possibility of overdosing the children. Precautions had been taken to put a sticker on the mother-child booklets for the children who had received VASD and this is commended and should continue to be the standard practice.

Nonetheless, additional funding should be availed by the government or partners to ensure that all CVHs involved in the exercise get allowances so as to increase the coverage of VASD distribution.

4.3.5 Availability and Management of VASD commodities

It is recommended that the government should play its role in supplying the VASD commodities and that this should not be the sole responsibility of an implementing partner. VASD distribution should be regularized and included in the County Nutrition Action Plan for the government to solicit for/provide funds for the purchase of these commodities. Depending on partners to provide these commodities reduces the potential for sustainability of the activity.

4.3.6 Monitoring and supervision of VASD distribution activities

The SCHMT should take leadership in the monitoring and supervision of the VASD distribution activities involving the health facility in-charges, CHAs and CHVs while conducting the monthly review meetings. The SCNC should conduct the monthly DQA review meetings at the health facilities. This exercise greatly improved the documentation and reporting of the VASD distribution in the MoH health facility routine Health Information System.

5 DISCUSSION

This study investigated the feasibility of delivering VASD through the CHS to improve coverage. The findings indicate that delivering VASD through the CHS is feasible using the existing government health system and structures. The study revealed having a functional and well supported CHS by the county government was a key driver to successful delivery of VAS and deworming on routinely through CHS. The planning at the county level, sub-county level and implementation of the CHS in the community was a success. The SCHMT was the main driver of the VASD in the CHS approach with the active participation of the CHAs. The CHMT took a keen interest and provided leadership and oversight, with Sub-County Nutrition Officer supervising the implementation directly. Due to cascaded planning and sensitisation, all stakeholders understood their roles in implementing VASD distribution through the CHS. The planning process was similar to that of *Malezi Bora,* and therefore the process was the health workers were largely familiar with the process.

A very critical component of the implementation of CHS was the cascaded training of the sub-county team and CHVs in Alego Usonga. Although the CHVs were trained to provide community health services, the VASD training improved their skills in the administration of doses, making reports of VAS and albendazole use and service utilisation. Overall, the training was considered adequate by most of the stakeholders interviewed, and few suggested a need for increased duration of the training and expanded topics covered during the training. The adequacy of the training was corroborated by the findings from the KIIs with the Alego Usonga health facility-in charges, CHAs, and CHVs, which demonstrated a high level of knowledge of their roles in the CHS implementation. Additionally, some key informants suggested that the CHVs should undergo a post-training evaluation to establish their capacity to implement VASD distribution using the CHS

The process of community mobilization for the operation study was, on the whole, adequately conducted by the CHVs through door to door. According to interviews with CHVs, all the households targeted were reached by the CHV during VASD distribution.

During the study period, there was no break in the supply chain of vitamin A capsules and the albendazole deworming tablets. Helen Keller International provided adequate quantities of these commodities. There was an adequate supply of these two commodities during the study period. Stock-outs of these commodities are usually common during routine health facility distribution when no additional interventions are needed to accelerate or improve VASD distribution.

There was a great improvement in the coverage of both VAS and deworming using the CHS strategy. The CHVs successfully distributed VASD at the household level, indicating that they effectively performed this task with appropriate capacity building. The quantitative findings of this study demonstrated Vitamin A coverage for Alego Usonga sites reached a significantly higher (90.6%) than 70.4% in Bondo Sub-County, where the VASD distribution was conducted through *Malezi Bora*. The coverage for deworming was also significantly higher (70.4%) in Alego Usonga compared to Bondo at 54.7%. The qualitative findings from the CHMT, SCHMT, health facility-in-charges, CHAs and CHVs, were also in agreement with the quantitative findings that the coverage of VASD had increased significantly.

The SCHMT was in charge of the monitoring and supervision of the implementation of the OPS. Monitoring of the implementation of the OPS was conducted monthly by the SCHMT, the research team and HKI in Alego Usonga Sub-County. Overall, the OPS supervision was structured and more rigorous compared to that conducted during the *Malezi Bora* campaigns and the routine delivery of VASD through the health facilities. The structured monitoring and supervision resulted in improved quality of data. Even though the same reporting tools were used for the documentation of VASD distribution, the monthly DQA at the health facilities improved the data quality in that there were minimal gaps in the Health Information System as previously experienced where some children would receive vitamin A supplementation, but the information would not be included in the health information system.

Both the *Malezi Bora* and CHS approaches are supported by the government (Ministry of Health) through the existing government infrastructure and partner support in terms of logistics, capacity building, monitoring and supervision. For the CHS, Siaya County Department of Health provided CHVs with monthly stipend and enrolment to medical scheme whereas Helen Keller International provided financial support and logistical support in the transportation of vitamin A and deworming tablets. The CHS study focused on VASD distribution and promotion of nutrition messages, unlike the *Malezi Bora*, comprised of an integration of many activities. The planning and implementation strategies were more or less similar for both approaches. However, the CHS had more involvement of the CHMT and SCHMT, particularly in the training, monitoring and supervision of the implementation of the activities. In the CHS approach, a one-day training was conducted for CHVs, unlike in the *Malezi Bora* where only sensitization was conducted. The monitoring and supervision of the activities in the CHS approach were also more structured and

included monthly review meetings and DQA audits, unlike *Malezi Bora*. The main focus of the CHS approach was VASD distribution and health and nutrition promotion at the household level.

All stakeholders, the CHMT, SCHMT, the health facility-in-charges, the CHAs, CHVs and the beneficiaries (mothers and caretakers) from Alego Usonga Sub-County all preferred VASD distribution at the household. This platform was reported to have resulted in higher coverage of VASD and higher knowledge of VASD among the beneficiaries. It was also reported to have trickle-down benefits such as identifying and referring children with health problems to the health facilities who would, in a majority of cases, not be taken to the health facilities for medical attention. Even the stakeholders from Bondo Sub-County, where the distribution of VASD was conducted through *Malezi Bora* platform, preferred the distribution of VASD at the household for more or less the same reasons as those from Alego Usonga Sub-County.

Based on the Kenya Health Information System data (the health facility routine data), the uptake of VASD continuously declined as the period when the child received them moved from the "last five months" to the "last two weeks" in Bondo Sub-County. However, in the intervention sites in Alego Usonga Sub-County, the uptake was more or less the same over the "last five months" to the last "last two weeks" before the data collection for this study. This observation lent further evidence of improved VASD and sustained coverage under the CHS approach.

The respondents demonstrated higher knowledge about VASD in Alego Usonga than in Bondo Sub-County. The reasons for this difference were not determined, but the sensitization by CHV during CHS may have contributed to this, given that the focus on CHS on the promotion of health and nutrition messages at the household level. The respondents in Alego Usonga confirmed they received nutrition messages about VASD from the CHVs.

The most preferred source of obtaining VASD was CHV for most of the respondents in Alego Usonga, while the most preferred source was health facilities for respondents in Bodo Sub-County. The fact that CHV is the preferred source of VASD in the intervention sites suggests that the CHS study has increased the acceptability of CHS for VASD. Even in Bondo Sub-County, where the CHS was not tested, CHV was the most preferred source of VASD.

The cost analysis has shown that there was a slight variation in the cost components incurred in CHS and *Malezi Bora*. The personnel allowances during the *Malezi Bora* campaign took most of

the costs, while training and review meetings were the main cost drivers in the CHS. With the scale-up of VASD through CHS, these two components will continue to dominate the costs. However, as the scale-up matures, the training will not be incurred annually. Similarly review meetings will be integrated into routine review meeting done every month and hence no additional cost will be incurred.

Relatively, CHS VAS was more cost-effective than through Malezi Bora, based on cost per death averted ans also cost DALY averted This notwithstanding, both approaches were most cost-effective based on the thresholds given by the World Bank and World Health Organization. According to the thresholds, a cost per DALY averted of less than per capita gross domestic product indicates that an intervention is 'very cost-effective'. If the cost per DALY averted is between one and three times per capita GDP, an intervention is 'cost-effective'. Any intervention whose cost per DALY averted is more than three times the per capita GDP is not cost-effective.

The approach used in the planning and implementation of the study in Alego Usonga may be adopted for the distribution of VASD by CHVs in the household. The process was efficient in achieving the main objectives of the OPS that is, improving the coverage of VASD using a cost-effective strategy. The planning should start at the County level for approval and support by the government and then cascade to the sub-county level for detailed planning of the implementation of the distribution of VASD at the household level. Cascaded sensitization and training of health workers should be adopted with some modification in terms of the duration and content covered. Additional communication channels e.g local radio and churches be used to improve mobilization and sensitization of the community about the VASD distribution. The SCHMT should be involved directly in the monitoring and supervision of the implementation of the activity and continue to play a critical role in data quality assurance. The critical role played by partners in the implementation of this activity is acknowledged. However, there is a need for advocacy for government to increase nutrition budget allocation to enable the purchase of vitamin A supplements and deworming tablets. Reliance on partners reduces the potential for sustainability of this intervention. Overall, the SCHMT should take the lead and guide the planning and implementation of the activity even as the MoH works in collaboration with partners.

6. CONCLUSIONS

- The study findings have shown that the distribution of VASD through community health strategy (CHS) is feasible in a context where there are functional and government

supported CHUs with motivated CHVs. In the two wards in Alego Usonga Sub-County, where the intervention was undertaken, the coverage of VAS was raised from about 70 percent in the *Malezi Bora* to slightly over 90 percent. The WHO recommended coverage of VAS of over 80 percent, which was achieved in the pilot.

- The success of implementing VASD through CHS depends on a couple of factors. The factors include functionality of the CHUs, government support and leadership for CHS, deliberate planning cascaded from the county level to the sub-county level, training of CHAs and CHVs on VASD distribution through CHS; uninterrupted supply and availability of vitamin A capsules and albendazole; close supervision of the CHVs, regular and effective supervision, continuous availability of data reporting tools, and regular implementation review meetings at different levels.

- The implementation of VASD through CHS and Malezi Bora is cost-effective. The estimated cost per DALY in CHS and Malezi Bora was less than Kenya's per capita gross domestic product, which is a benchmark for very effective intervention according to the WHO and the World Bank.

7. RECOMMENDATIONS

- Revise the community health policy in the country to allow the distribution of vitamin A through use of CHVs.
- Scale up the VASD distribution through CHS for the entire county. This is because it can be easily integrated in the CHVs' daily activities without interfering with their duties. The findings of the OPS has demonstrated that with adequate training and close supervision CHVs can administer VASD at the households and significantly increase the coverage. The approach has a high potential for sustainability because it used the existing health structure and not a parallel system. Nonetheless, for this to be implemented it would require the review of the Community Health Strategy 2018 which does not authorize CHVs to distribute VAS but states that VAS could be distributed through the CHUs.
- The training for VASD distribution through CHS should be improved to include: more content coverage particularly for the health facility in-charges and CHAs; post-training evaluation for the CHVs and that a curriculum should be developed, tested and validated specifically for the training of VASD distribution through CHS the approach.

- In the CHS approach, it is indicated on the mother-child-child booklet when a child receives VAS and therefore this reduces the chances of overdosing the child. Probably this approach should also be adopted for the Malezi Bora VAS distribution platform;

- There is a need for increased community sensitization and nutrition education on the health benefits of VASD so that more caregivers avail their children of VASD. This can be attained through the use of additional channels such as the local radio and churches.
- Siaya County should prioritize and procure vitamin A capsules (100,000 IU and 200,000 IU) for the population of children under five years. This procurement needs to be done on an annual basis and included in the County Nutrition Action Plan. The vitamin A capsules and albendazole tablets are cheap, and the county should be able to afford them. For this to happen, there will be need for advocacy and lobbying for increased funding for nutrition activities.
- The VAS through CHS is strongly recommended for scalar up to the entire county and also the country. The analysis showed with fully running CHS programme when start-up cost are no longer incurred, the approach is more cost effective in VASD delivery than delviey through *Malezi Bora* approach.

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9. APPENDICES

Every Child Thrives (ECT) OPERATIONAL STUDY
JANUARY/FEBRUARY 2022
COVERAGE FOR VITAMIN A SUPPLEMENTATION AND DEWORMING

INFORMED CONSENT

Greetings. My name is _____. We are currently carrying out a survey of households in this area, in order to get information about health issues and in particular vitamin A supplementation and provision of deworming tablets for children under 5 years old. Your household has been selected by chance from all the households in the area. I would like to ask you some questions related to VASD about the children in this household. The information you provide will be useful to establish the health and nutrition situation in your community and will be used to improve or plan the health services provided in this community.

Participation in the survey is voluntary, and you can choose not to take part. You are free to stop participating in the research at any time if you feel uncomfortable. If you do this, there will be no penalties and you will not be prejudiced in any way.

All the information you give will be kept confidential and will not be shown to other persons. The information will be used to prepare reports, but will not include any specific names. There will be no way to identify that you are the one who gave the information.

There is minimal risk for you from participating in this interview study. This study is purely for collecting information and offers no immediate benefit to you. But by participating in the study, you will help to strengthen and improve VASD delivery in Siaya County.

This research has been approved by the Maseno University ERC and a member of the research team and a member of the research team can be contacted:

Prof. Sophie Ochola: telephone number 0721 449 803

Principal Investigator (PI)

Dr. Julius Korir: Telephone number 0722 754482

Co-Principal Investigator

At this point do want to ask me anything about the survey?

Do you agree to participate in this interview?

1. YES ( ) 2. NO ( )

Full name:_____Signature_____Date_____

Witness:
_____Signature_____Date_____

SECTION A: QUESTIONNIARE IDENTIFICATION

101: Household ID: **……/……/……/** **102: Enumerator ID:** **……/…../…../**

103: Supervisor ID: **…../……./……./** **104: Interview date:** **……/……../……../**

DD / MM/ YY

105: Sub-County code: 1**)** Alego Usonga 2) Bondo

106: Ward Code 1) South East Alego 2) West Alego 3) Central Sakwa 4) North Sakwa 5) South Sakwa 6) West Sakwa 7) West Yimbo 8) Yimbo East

108: Village Code

109: Interview start time (Use 12-hr system; Hour Minutes)……

Was voluntary informed consent given? Respondent to keep a copy and researcher to take a copy for safe keeping

SECTION C: BIODATA OF INDEX CHILD

301Name of Index Child: ……302: Date of Birth of Index Child:___/____/____/____/____/____/

303: Age of Index child in completed months……304: Age verified or not: a) YES b**) No (Circle Response)**

305: Sex of Child 1) Male 2) Female **(CIRCLE)**

SECTION B: BIODATA OF RESPONDENT- the questions in this questionnaire are meant for the MOTHER or the PRINCIPAL CAREGIVER of a child 6-59 months old in the absence of the mother

CIRCLE RESPONSES

201: Respondent's gender 1) Male 2) Female 202: Age of respondent_____(Years)

203: Relationship with child 1) Mother 2) Father 3) Grandmother 4) Older Sibling 5) Others (Specify)……

SECTION D: VITAMIN A SUPPLEMENTION AND DEWORMING COVERAGE

Question No	Question	Responses	Skip Pattern
401	Has (NAME OF CHILD) received a Vitamin A capsule like this one in the last five r months (Show sample)	YES = 1 NO = 2	**IF NO, GO TO QUESTION 410**
402	IF YES, when did the child receive Vitamin A?	1= In the last one to two weeks 2= In the last one month 3= In the last two months 4= In the last three months 5= Other (Specify)……..	
403	What was the source of Vitamin A capsule given to the child?	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 6= Other, (Specify)……	
404	What are the sources of Vitamin A capsule in this community? **Multiple responses**	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 6= Other, (Specify)……	
405	Which of **one** these sources do you prefer in accessing VAS?	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 6= Other, (Specify)……	
406	What are the health benefits of Vitamin A supplementation to children? **Multiple responses**	1= To make them grow healthily 2= To prevent infections 3= To ensure good eyesight 4= To build strong bones 5= Other, specify……	
407	How many times in a year should	1= Once 2= Twice 3= Thrice	

	children receive VAS?	4= Other, (Specify)…….	
408	How frequently should children receive VAS?	1= Six months 2= Every three months 3= Every two months 4= Other, (Specify)……	
409	What age of children should get vitamin A capsules? Please specify the age range	**(from ---- to -----Months)**	
410	What is your source of information on VAS? **Multiple responses**	1= Health Facility 2= Friends 3= Relatives 4= Outreaches 5= CHVs 6= Others, (Specify)…….	
411	Is the information received on VAS sufficient?	YES = 1 NO =2	
412	If NO, what other information would you like to receive?	1) …… 2) …… 3) …… 4) ……	
413	Has (NAME OF CHILD) received a deworming tablet like this one in the last four months? (Show sample)	YES = 1 NO = 2	**IF NO, END THE INTERVIEW**

414	IF YES, when did the child receive it?	1= In the last one to two weeks 2= In the last one month 3= In the last two months 4= In the last three months 5= Other (Specify)……..	
415	What was the source of the deworming tablet?	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 6= Shops/pharmacies 7= Other, (Specify)…….	
416	What are the sources of deworming tablets in this community? **Multiple responses**	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 7= Shops/pharmacies 8= Other, (Specify)…….	
417	Which of **one** these sources do you prefer in accessing de-worming tablets?	1= Malezi Bora 2= Brought to the household by CHV 3= ECD 4= Health Facility 5= Outreaches 7= Shops/pharmacies 8= Any other (specify)……	
418	Why are children given de-worming tablets? **Multiple responses**	1= Worms can lead to malnutrition 2= Worms cam lead to poor growth 3= Other, specify ……	
419	How frequently should children be given deworming tablets?	1= Once a year 2= Twice a year 3= Every three months 4= Others, Specify……..	
420	What age of children should be given de-worming tablets? Please specify the age range	From ----- to ---------months	

421	What is your source of information on de-worming of children? **Multiple responses**	1= Health Facility 2= Friends 3= Relatives 4= Outreaches 5= CHVs 6= Shops/pharmacies 6= Others, (Specify)…….	
422	Is the information received sufficient?	YES = 1 NO = 2	**IF YES, END THE INTERVIEW**
423	If NO, what other information would you like to receive?	1…… ……. 5) ……2…… ….. 6) ……3. ……. 7) ……4…… ….	

Informed Consent Form – Provider Key Informant Interview

Consent form:

As part of a comprehensive set of activities promoting the provision of quality VASD HKI and Siaya County Department of Health is carrying out a study to assess of tow approached to the provision of VASD. In this context, we are conducting key informant interviews with CHMT, and health care providers and we are requesting your participation in a discussion to help us better understand a number of aspects with the service delivery approaches. Your participation is very important. If you agree to participate, please check the box below. The key informant interview will take approximately 40 minutes. To ensure accuracy, discussions may be recorded.

Please understand that your participation is voluntary, and you are not being forced to take part in this study. The choice of whether to participate or not, is yours alone. You are free to stop participating in the research at any time if you feel uncomfortable. If you do this, there will be no penalties and you will not be prejudiced in any way.

There is minimal risk for you from participating in this focus group/key informant interview. This study is purely informational and offers no immediate benefit to you. But by participating in the study, you will help to strengthen and improve VASD delivery in Siaya County.

This research has been approved by the Meseno University ERC and a member of the research team can be contacted at:

Prof Sophie Ochola

The Co-Principal Investigator,

Dr. Julius Korir

You can keep one copy of this form for your records.

Do you agree to participate in this key informant interview?
1 □ **YES** 0 □ **NO**

Full name: _____

Signature: _____

Date: ____ / ____ / ____
Month Day Year

Or thumb print

4.3.2 County and Sub-County Management Team members

County Management Team members (this tool will be used for **county team members** and **Alego Usonga sub-county** who will be asked questions on both *Malezi Bora* and CHS distribution platforms)

Identification Information	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview _____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Key informant interview guide

Questions on Malezi Bora

1. Please describe the planning process for VASD during Malezi Bora in the county. (Probe for who are involved, what is involved in the planning and the frequency of planning).
2. What are the successes and strengths in using the Malezi Bora platform for delivering VASD?
3. What are the lessons learnt and best practices in delivering VASD thorough the Malezi Bora platform?
4. What are the limitations and challenges experienced in delivering VAS through the Malezi Bora platform?
5. What are the opportunities for delivering VASD through Malezi Bora that are not fully exploited?
6. Who supports the implementation of the activities under Malezi Bora (probe for funding and other support, probe for the relative importance of the different sources)?

7. What is your view about the sustainability of delivering VASD through Malezi Bora?
8. What are your suggestions for improvement on VASD through Malezi Bora?

Questions on delivery of VASD through CHS

1. Please describe the planning process for VASD through the CHS in the county. (Probe for who are involved, what is involved in the planning and the frequency of planning). How does this compare with the planning of VASD distribution through Malezi platform?
2. What are the successes and strengths in using the CHS platform for delivering VASD?
3. What are the lessons learnt and best practices in delivering VASD thorough the CHS platform?
4. What are the limitations and challenges experienced in delivering VAS through the CHS platform?
5. What in your view are the opportunities for delivering VASD through CHS that could be considered in the future?
6. What is your view about the sustainability of the delivering VASD through CHS?
7. What are your suggestions for improvement on VASD through CHS?
8. What is your considered opinion on the feasibility of delivering VASD through CHS?
9. How are stocks of Vitamin A capsules and deworming tablets managed within the health structure?
10. Are there any stock-outs at the community unit/each health facility at the end of each month? (probe for overall availability etc.)
11. How is supervision conducted for CHS? (probe who was involved, frequency, if it is integrated supervision, what tool are used, what were the main results of the supervisions from past).
12. What problems and challenges are encountered in supervision for CHS in general and for VASD through CHS in particular?
13. How is data quality audit conducted for CHS in general and VASD through CHS?
14. What recommendation and perspectives do you have for the VASD through CHS?
15. What are the key steps that should be considered in planning, implementing, and monitoring VASD at the CHU level?
16. What other comments do you have on VASD delivery in the community?
17. Please compare the two strategies of VASD distribution through Malezi Bora and through CHS on the following aspects:
    a. The process of planning and time involved
    b. Supervision
    c. Successes and best practices
    d. Constraints and challenges
    e. Opportunities
    f. Constraints and challenges
    g. Sustainability
    h. Coverage
    i. Resources required (probe for funding and the relative importance of the different sources of funding; human resource and capacity)

Sub-county Management Team members (this tool will be used at the Bondo sub-county to respond to questions on Malezi Bora only)

Identification Information	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Key informant interview guide

Questions on Malezi Bora

1. Please describe the planning process for VASD during Malezi Bora in the county. (Probe for who are involved, what is involved in the planning and the frequency of planning).
2. What are the successes and strengths in using the Malezi Bora platform for delivering VASD?
3. What are the lessons learnt and best practices in delivering VASD thorough the Malezi Bora platform?
4. What are the limitations and challenges experienced in delivering VAS through the Malezi Bora platform?
5. What are the opportunities for delivering VASD through Malezi Bora that are not fully exploited?
6. Who supports the implementation of the activities under Malezi Bora (probe for funding and other support such as human resources, Vitamin A supplements and deworming tablets, logistics etc.)?
7. What is your view about the sustainability of delivering VASD through Malezi Bora?
8. What are your suggestions for improvement on VASD through Malezi Bora?

Health Care Workers –in Bondo Sub-County (*Malezi Bora* distribution)

Identification Information	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Interview guide

1. Describe the planning process for VASD distribution through Malezi Bora?
2. What is your role in the process of VASD distribution through Malezi Bora? (Probe for involvement in planning, training, distribution, M&E, supervision, reporting).
3. Describe the process involved in VASD distribution through the Malezi Bora programme?
4. Are the CHVs involved in the distribution at the community level? If Yes, what is their role?
5. What are the successes, best practices and lessons learnt from delivering VASD through Malezi Bora?
6. What are the constraints and challenges in delivering VASD through Malezi Bora?
7. What are the opportunities not fully exploited in the delivery of VASD through Malezi Bora?
8. What is your opinion on the sustainability of delivery of VASD through malezi Bora?
9. What recommendations do you make for improvement of the delivery of VASD through Malezi Bora?

Health Care Workers –in Alego Usonga Sub-County (CHS distribution)

Identification Information	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Interview guide

1. Describe the planning process for VASD distribution through CHS?
2. What is your role in the process of VASD distribution through CHS? (Probe for involvement in planning, training, distribution, M&E, supervision, reporting).
3. Describe the process involved in VASD distribution through the CHS programme?
4. Are the CHVs involved in the distribution at the community level? If Yes, what is their role?
5. What are the successes, best practices and lessons learnt from delivering VASD through CHS?
6. What are the constraints and challenges in delivering VASD through CHS?
7. In your view what are the opportunities not fully exploited in the delivery of VASD through CHS?
8. What is your opinion on the sustainability of delivery of VASD through CHS?
9. What recommendations do you make for improvement of the delivery of VASD through CHS?
1. How would you rate the availability of vitamin A and deworming medicines during Malezi Bora and in the CHS?
2. What is your considered opinion on the feasibility of delivering VASD through CHS?
3. How is supervision conducted for CHS? (Probe who was involved, frequency, if it is integrated supervision, what tool are used, what were the main results of the supervisions from past).

4. What problems and challenges are encountered in supervision for CHS in general and for VASD through CHS in particular?
5. What recommendation and perspectives for the VASD through CHS?
6. What are the key steps that should be considered in planning, implementing, and monitoring VASD at the CHU level?
7. What other comments do you have on VASD delivery in the community?

COMMUNITY HEALTH ASSISTANTS – tool for those in Alego Usoga sub-county

IDENTIFICATION INFORMATION	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Interview guide

1. Describe the planning process for VASD distribution through CHS?
2. What is your role in the process of VASD distribution through CHS? (Probe for involvement in planning, training, distribution, M&E, supervision, reporting).
3. Describe the process involved in VASD distribution through the CHS programme?
4. Are the CHVs involved in the distribution at the community level? If Yes, what is their role?
5. What are the successes, best practices and lessons learnt from delivering VASD through CHS?
6. What are the constraints and challenges in delivering VASD through CHS?
7. In your view what are the opportunities not fully exploited in the delivery of VASD through CHS?

8. What is your opinion on the sustainability of delivery of VASD through CHS?
9. What recommendations do you make for improvement of the delivery of VASD through CHS?
8. How would you rate the availability of vitamin A and deworming medicines during Malezi Bora and in the CHS?
9. What is your considered opinion on the feasibility of delivering VASD through CHS?
10. How is supervision conducted for CHS? (probe who was involved, frequency, if it is integrated supervision, what tool are used, what were the main results of the supervisions from past).
11. What problems and challenges are encountered in supervision for CHS in general and for VASD through CHS in particular?
12. What recommendation and perspectives for the VASD through CHS?
13. What are the key steps that should be considered in planning, implementing, and monitoring VASD at the CHU level?
14. What other comments do you have on VASD delivery in the community?
18. Please compare the two strategies of VASD distribution through Malezi Bora and through CHS on the following aspects:
    j. The process of planning and time involved
    k. Supervision
    l. Successes and best practices
    m. Constraints and challenges
    n. Opportunities
    o. Constraints and challenges
    p. Sustainability
    q. Coverage
    r. Resources required (probe for funding and the relative importance of the different sources of funding; human resource and capacity)

COMMUNITY HEALTH ASSISTANTS – tool for those in Bondo sub-county

IDENTIFICATION INFORMATION	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

1. Describe the planning process for VASD distribution through Malezi Bora?
2. What is your role in the process of VASD distribution through Malezi Bora? (Probe for involvement in planning, training, distribution, M&E, supervision, reporting).
3. Describe the process involved in VASD distribution through the Malezi Bora programme?
4. Are the CHVs involved in the distribution at the community level? If Yes, what is their role?
5. What are the successes, best practices and lessons learnt from delivering VASD through Malezi Bora?
6. What are the constraints and challenges in delivering VASD through Malezi Bora?
7. What are the opportunities not fully exploited in the delivery of VASD through Malezi Bora?
8. What is your opinion on the sustainability of delivery of VASD through malezi Bora?
9. What recommendations do you make for improvement of the delivery of VASD through Malezi Bora?

COMMUNITY HEALTH VOLUNTEERS- data collection tool for those in Alego Usonga sub-county

IDENTIFICATION INFORMATION	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Interview guide

1. What is your role(s) in CHS service delivery?
2. How is VASD delivered at your community unit?
3. What is your role in the delivery of VASD your community unit?
4. Did you undergo training for VASD delivery though CHS?
5. Is the training adequate? If Not, what aspects should be improved?
6. How would you rate the availability of vitamin A and deworming medicines for VASD in the community in general and in your CU in particular?
7. What are the successes and good practices of delivering VASD through CHS?
8. What are constraints and difficulties do you and other CHVs face in the provision of VAS in the community?
9. What is your opinion on the practicability of delivering VASD in the community?
10. Do the beneficiaries appreciate the VASD through CHS mode of delivery?
11. What recommendations do you have for the VASD through CHS?
12. What other comments do you have on VASD delivery in the community?
13. Have you ever been involved in the distribution of VASD through Malezi Bora?
14. What are the differences between the two modes of delivery? (Probe for coverage, ease of delivery, preference by the beneficiaries etc.

COMMUNITY HEALTH VOLUNTEERS- data collection tool for those in Bondo sub-county

IDENTIFICATION INFORMATION	
Name of Respondent	
Designation:	
Name of Interviewer _____ Date of Interview_____ Signature _____	
Name of supervisor_____ Signature _____ Date _____	
Start Time: End Time:	

Interview guide

1. What is your role in the process of VASD distribution through Malezi Bora? (Probe for involvement in planning, training, distribution, M&E, supervision, reporting).
2. Describe the process involved in VASD distribution through the Malezi Bora programme?
3. Are the CHVs involved in the distribution at the community level? If Yes, what is their role?
4. What are the successes, best practices and lessons learnt from delivering VASD through Malezi Bora?
5. What are the constraints and challenges in delivering VASD through Malezi Bora?
6. What are the opportunities not fully exploited in the delivery of VASD through Malezi Bora?
7. What is your opinion on the sustainability of delivery of VASD through malezi Bora?
8. What recommendations do you make for improvement of the delivery of VASD through Malezi Bora?

Focus Group Guide for Mothers and Care Givers in Alego Usonga sub-county

Item	Provide details in this column
Number of FGD respondents	
Name of ward	
Name of the community unit	
Name of data transcriber	
Signature of data collector	
Name of moderator	
Signature of supervisor	
Date of FGD	

Guiding questions

Questions on Vitamin A supplementation

1. What is the age of children who should get vitamin A supplements?
2. Where did you get information about vitamin A supplementation?
3. Are there other sources of information of vitamin A supplements in this community?
4. Which is the preferred source of information on vitamin A supplements in this community and why?
5. Is the information provided on vitamin A sufficient? If NO, what aspects are not adequately addressed?
6. What are the food sources of Vitamin A?
7. What are the benefits of vitamin A supplements for children?
8. How frequently should a child receive vitamin A supplements?
9. Do many children in this community receive vitamin A supplements? If NO, Why? (PROBE for challenges e.g. stock outs, access to health facilities, inadequate knowledge on the health benefits)
10. What are your views on the health benefits of vitamin A supplementation to the child?

Questions on the de-worming

11. What is the age of children who should de-worming tablets?
12. Where did you get information about de-worming?
13. Are there other sources of distribution of deworming tablets in this community?
14. Which is the preferred source of information on de-worming in this community and why?
15. Is the information provided on de-worming sufficient? If NO, what aspects are not adequately addressed?
16. What are the benefits of de-worming for children?
17. How frequently should a child be de-wormed?
18. Do many children in this community receive de-worming tablets? If NO, Why? (PROBE for challenges e.g. stock outs, access to health facilities, inadequate knowledge on the health benefits)
19. What are your views on the health benefits of de-worming to the child?

Questions on distribution of VASD through CHS and Malezi Bora

20. What are your views on the distribution of VASD through CHS?
21. What are your views on the successes/strengths of VASD distribution through CHS?
22. What would you say are the limitations or gaps of VASD distribution through CHS?
23. Which one of the platforms, Malezi Bora CHU platforms do you prefer and why?
24. What recommendations do you make for the improvement of VASD distribution in this community?

Focus Group Guide for Mothers and Care Givers in Bondo sub-county

Item	Provide details in this column
Number of FGD respondents	
Name of ward	
Name of the community unit	
Name of data transcriber	
Signature of data collector	
Name of moderator	
Signature of supervisor	
Date of FGD	

Guiding questions

Questions on Vitamin A supplementation

1. What is the age of children who should get vitamin A supplements?
2. Where did you get information about vitamin A supplementation?
3. Are there other sources of information of vitamin A supplements in this community?
4. Which is the preferred source of information on vitamin A supplements in this community and why?
5. Is the information provided on vitamin A sufficient? If NO, what aspects are not adequately addressed?
6. What are the food sources of Vitamin A?
7. What are the benefits of vitamin A supplements for children?
8. How frequently should a child receive vitamin A supplements?
9. Do many children in this community receive vitamin A supplements? If NO, Why? (PROBE for challenges e.g. stock outs, access to health facilities, inadequate knowledge on the health benefits)
10. What are your views on the health benefits of vitamin A supplementation to the child?

Questions on the de-worming

11. What is the age of children who should de-worming tablets?
12. Where did you get information about de-worming?
13. Are there other sources of distribution of deworming tablets in this community?
14. Which is the preferred source of information on de-worming in this community and why?

15. Is the information provided on de-worming sufficient? If NO, what aspects are not adequately addressed?

16. What are the benefits of de-worming for children?

17. How frequently should a child be de-wormed?

18. Do many children in this community receive de-worming tablets? If NO, Why? (PROBE for challenges e.g. stock outs, access to health facilities, inadequate knowledge on the health benefits)

19. What are your views on the health benefits of de-worming to the child?

Questions on distribution of VASD through Malezi Bora

20. What are your views on the distribution of VASD through Malezi Bora?
21. What are your views on the successes/strengths of VASD distribution through Malezi Bora?
22. What would you say are the limitations or gaps of VASD distribution through Malezi Bora?
23. Which one of the platforms, Malezi Bora and health facility delivery platforms do you prefer and why?
24. What recommendations do you make for the improvement of VASD distribution in this community?

COSTING DATA SHEETS

Identification Information

Item	Provide details in this column
Programme (1 = Malezi bora 2 = CHS)	
Respondent's identification number	
Name of ward	
Name of the community unit	
Name of data collector	
Signature of data collector	
Name of supervisor	
Signature of supervisor	
Date of interview	

Key Activities	Sub Activities	Inputs (list one by one below and give expenditure details) (include personnel, equipment, medicines, consumables etc.)	Unit price [KSh]	Quantity	Days (if applicable)	Number of times per year (if relevant	Total expenditure [KSh}
Planning							
Development of tools							

Training							
Follow-up							
Awareness							
Distribution and service provision							
Supervision							

Others (specify)							

For personnel involved in any of the activities above, provide the following (as appropriate) Cadre (list one by one)	Job group	Average monthly basic salary	Total allowance	Total pay per month

Community service delivery workload

Service description	**Number of patients/clients served during the study period**
VAS	
Deworming	
Immunisation	
FP	
Others (please specify)	