# Assessing the Effectiveness of Semi-annual Vitamin A Capsule Distribution in Mali through National Nutrition Week (SIAN)

Child Health and Nutrition Research Initiative

CHNRI

*Finding solutions for global child health*

Assessing the Effectiveness of Semi-annual Vitamin A Capsule Distribution in Mali through National Nutrition Week (SIAN)

Principal Investigator:
Toumani Sidibé, Professor of Paediatrics, National Director of Health, Bamako, Mali.

Co Investigators:

Hamadoun Sangho, Associate Professor of Public Health, Director of CREDOS, Bamako, Mali
Baye Diakité, PhD, CREDOS, Bamako, Mali
Boureyma Belemou, CREDOS, Bamako, Mali
Seydou Doumbia, Professor of Epidemiology, CREDOS, Bamako, Mali
Moussa Keita, MPH, WHO, Bamako, Mali
Simon Cousins, Professor of Epidemiology, London School of Tropical Medicine and Hygiene, London, UK

Edited by Brent Ohata, Mohsena Hassan, Henry G Richards

Layout and Design: Ray Communications (Pvt.) Ltd.

# Assessing the Effectiveness of Semi-annual Vitamin A Capsule Distribution in Mali through National Nutrition Week (SIAN)

Child Health and Nutrition Research Initiative

CHNRI

*Finding solutions for global child health*

www.chnri.org

# Contents



Annexures are available in the web version at www.chnri.org

# List of Tables

## Abbreviation and Acronym

| | |
|---|---|
| < | Less than |
| > | More than |
| ARI | Acute Respiratory Infections |
| CHW | Community Health Workers (Relais) |
| DMO | District Medical Officer |
| DN | Division Nutrition |
| DNS | Direction Nationale de la Santé |
| EDSIII | Third Demographic and Health Survey |
| FELASCOM | Fédération Locale des Associations de Santé Communautaire |
| HKI | Helen Keller International |
| IEC | information, education and communication |
| MI | Micronutrient Initiative |
| MOH | Ministry of Health |
| NID | National Immunization Days |
| RMD | Regional Micronutrient Days |
| SIAN | National Nutrition Week |
| TBA | Traditional Birth Attendant |
| UNICEF | United Nations Children's Fund |
| URTNA | Consortium of National Radio and TV Stations of Africa |
| USAID | United States Agency for International Development |
| VAC | Vitamin A Capsules |
| VAD | Vitamin A Deficiency |
| WAZ | Weight-for-age |
| WFP | World Food Programme |
| WHO | Word Health Organization |
| WHZ | Weight-for-height |

# Acknowledgements

Centre de Recherche, D'etudes et de Documentation Pour La Survie (CREDOS) would like to thank Child Health and Nutrition Research Initiative (CHNRI) for funding and publishing monograph of this study.

In addition we appreciate all who have directly and indirectly contributed to the success of this study in particular, ATN/USAID for financial support, the Division Nutrition of the DNS, Government of Mali for its cooperation, the WHO and UNICEF for technical cooperation, the Regional Health Directors of Kayes, Sikasso, Tombouctou and Bamako districts personnel for their cooperation and availability, the District Medical Officers of Kita Hospital, Kolondiéba Hospital, Diré Hospital, and Commune VI Hospital as well as the head nurses of the centres in the visited study areas for having facilitated the survey in their areas and the chiefs and the peopleof the different villages involved in the survey.

# I.Abstract

There is sufficient evidence to show that mortality declines as much as 30% with the improvement of pediatric vitamin A status (Beaton et al.,1993). In response to these findings, broad-based supplementation programs were launched in many countries by linking vitamin A capsule distribution to National Immunization Days (NIDs), with support from WHO, UNICEF, USAID, and many other development organizations. This strategy has gained widespread acceptance and achieved consistently high rates of coverage among children (Sheman et al. 2003). However, as NIDs have been scaled down or phased out, many countries have adopted a semi-annual distribution of capsules or syrup as an alternative strategy to sustain the delivery of vitamin A to young children of six months to five years of age.

In June 2003, the Ministry of Health of Mali organized the first national nutrition week (SIAN) in partnership with USAID, UNICEF, Helen Keller International and Micronutrient Initiative. The goal of SIAN was to improve vitamin A status among children (6-59 months) and postpartum women (i.e., within 40 days of delivery) through vitamin A supplementation, and to reach at least 80% of the target groups. It also strove to increase awareness of vitamin A supplementation, exclusive infant breastfeeding and iodized salt consumption at the household level.

Preliminary evaluations of vitamin A supplementation mainly focused on coverage and provided inconsistent results. A report from the Ministry of Health (2004) indicates a 100% coverage rate for children 6-59 months in most of the regions of the country and less than 70% in the district of Bamako, the capital (National evaluation, 2004). The coverage rate was much lower for postpartum women, varying from 4.5% in Bamako to as high as 80% in only 3 of the 8 administrative regions of Mali. Evaluation data from an interview with mothers and fathers from a random sample of 210 households carried out between April and June 2004 (DN, 2004) found a vitamin A supplementation coverage rate of 83% but did not provide details on the variability of the coverage rate across the country or the coverage rate among postpartum women. The survey also did not provide any information on the proportion of children who actually received vitamin A in two consecutive SIANs.

This study aimed to fill in the above-mentioned gaps by providing a detailed evaluation of the delivery process and impact of SIAN on VAD-related outcomes and consumption of vitamin A-rich foods in Mali. Vitamin A coverage rates are assessed in the target population, and a strategy for the per capita cost of the program was devised. To reach the objectives noted above, two surveys were carried out in four randomly-selected health districts. In each of the health districts, direct observations, focus groups and interviews were conducted. Additionally, interviews were held with officials at the national level and with donor organizations.

In the regions assessed by our study, 90% of children and 80% of postpartum women received vitamin A as a result of SIAN. However, only 28% reported using iodized salt. Forty-seven percent of postpartum women surveyed were exclusively breastfeeding. Vitamin-A-deficiency-associated

diseases nonetheless occurred in 50% of the children surveyed, with children of 12-23 months suffering the most. Per region, Tombouctou had the highest prevalence of SIAN-targeted diseases at 87%. Malnutrition was present in 6% of study participants, and night blindness in 2%.

The implementation of SIAN was noted to be top-down in nature, which sometimes led to incorrect planning, suspected vitamin A shortages and inappropriate strategies for vitamin A delivery to the community. More consultation with the community may remedy these problems. The most effective means of mobilizing the community appeared to be word-of-mouth efforts by health workers, neighbours, and local leaders. Radio announcements were ineffectual in conveying information about vitamin A to the community, and should be reassessed. Health-centre-based distribution programs suffered low turnout, but door-to-door strategies appear to have been effective and should be included in future distribution strategies. Vitamin A capsule distributors rarely covered all of the SIAN themes in their lectures to women, and could benefit from more extensive training.

# II. Introduction

## 2.1 Background

Several studies have demonstrated that that mortality declines as much as 30% when vitamin A status of children is improved with the periodic administration of high-dose vitamin A supplements (Beaton et al., 1993; Fawzi et al. 1993; Pant et al 1996; Shemann et al. 2003). In response to these findings, a broad-based vitamin A supplementation program was launched in many countries, with support from WHO, UNICEF, USAID and other development organizations, and linked vitamin A capsule distribution to National Immunization Days (NIDs). The strategy has gained widespread acceptance and achieved consistently high rates of coverage among children (Sheman et al. 2003). However, NIDs are being scaled down or phased out; in response, many countries have adopted a twice-yearly distribution of vitamin A capsules or syrup as an alternative strategy to sustain the delivery of vitamin A to children of six months to five years of age.

Vitamin A deficiency (VAD) has been estimated to affect 47% of children under 5 years old and is responsible for 17600 deaths among this group each year (HKI-Africa 2003). Approximately 6% of pregnant women have night blindness.

## 2.2 History of Vitamin A Supplementation in Mali

From 1998 to 2002, Mali carried out vitamin A capsule (VAC) distribution with NIDs. Though this strategy achieved large coverage in some areas, the proportion of children under five who received VAC varied from 36% to 58% overall (DHS 2001). In 2000, a vitamin A distribution pilot program was organized through Regional Micronutrient Days (RMD) in one region by Helen Keller International (HKI) in collaboration with the MOH. The program was extended to 5 more regions in 2001. In June 2003, the MOH adopted the RMD strategy and organized the first National Nutrition Week (SIAN) in partnership with USAID, UNICEF, HKI and Micronutrient Initiative. The goal of the SIAN was to improve the vitamin A status of children (6 - 59 months) and postpartum women (within 40 days) in at least 80% of the target population through vitamin A supplementation. It also intended to increase awareness of vitamin A supplementation, exclusive infant breastfeeding and iodized salt consumption at the household level. To implement the SIAN, specific dates during the year were identified (in the first and third quarter) and a central theme about nutrition (e.g., vitamin A, exclusive breastfeeding, iodized salt consumption) was chosen for each week. These themes formed the basis for educational messages. Communities were mobilized through mass media (e.g. local radio, T-shirts, flyers), and other communication channels such as community groups and public announcers. Vitamin A capsules were distributed during this week at fixed health facilities or through outreach strategies such as mobile health teams. Since June 2003, the SIAN has been implemented every 6 month across the 8 administrative regions of Mali. A second SIAN was carried out in May 2006.

## 2.3 Preliminary evaluation of the SIAN

Preliminary evaluation of Vitamin A supplementation mostly focused on coverage and provided inconsistent results. A report from the Ministry of health (2004) indicated 100% coverage for children 6-59 months in most regions of the country and less than 70% in the District of Bamako, the capital city (DN, 2004). The coverage rate was much lower for postpartum women, varying from 4.5% in Bamako to as high as 80% in 3 of the 8 administrative regions of Mali. Evaluation data from an interview with mothers and fathers from a random sample of 210 households carried out between April and June 2004 (DN, 2004) found a coverage rate of Vitamin A supplementation of 83%. However, this data did not include details on the variability of the coverage rate across the country or the coverage rate among postpartum women. The survey also did not yield any information on the proportion of children who actually received Vitamin A in the 2 consecutive SIANs.

## 2.4 Objectives

Since many questions still remain surrounding the effectiveness of SIAN, the present study will provide a detailed evaluation of the delivery process and the impact of the SIAN on VAD-related outcomes and consumption of vitamin A-rich foods in Mali. The study will examine the operational structure of SIAN and its capacity to achieve the goals of the program, including both vitamin distribution and increased awareness of micronutrient-related issues in the target population. It will assess accessibility and coverage of the program. VAD-related outcomes in the region will also be characterized, both to serve as a means of evaluating the current impact of SIAN and also to provide baseline data for future activities. In order to fulfill these objectives, the following topics will be addressed:

a. Characterization of the delivery process of SIAN implementation:

- Examination of the content and overall managerial structure of SIAN
- Determination of how the intervention was planned and developed at national and local levels and how this evolved over time
- Assessment of the coverage of communication

channels used for SIAN

- Examination of the appropriateness of indicators used to monitor the impact of SIAN
- Examination of the supervision, support and data collection system
- Assessment of the availability of vitamin A capsules at the health facilities and community levels
- Determination of the adequacy of resources (i.e. financial, material, human and time) that were allocated for the program implementation

b. Documentation of the perception of parents, healthcare providers and other stakeholders on the vitamin A delivery process:

- Determination of the level of awareness and involvement of community leaders and other stakeholders in the implementation of SIAN
- Determination of the perception of the parents, healthcare providers and other stakeholders concerning the most and least important components of the SIAN
- Characterization of the extent to which SIAN was implemented as per the initial plan of the developers and providers
- Determination of the different expectations of participants and providers concerning SIAN
- Examination of the perception of parents, healthcare providers and stakeholders about the accessibility and feasibility of SIAN activities and how these influenced on their ability to deliver and access services

c. Baseline survey of knowledge about VAD-related outcomes in healthcare providers and in the target population

d. Vitamin A coverage in children 6-59 months of age and in postpartum women:

- Proportion of children 6-59 months of age whoreceived one dose of vitamin A during the last SIAN
- Proportion of children 6-59 months of age who received two consecutive doses of vitamin A through SIAN
- Proportion of postpartum women who received vitamin A during the last SIAN
- Proportion of children 12-35 months of age who received vitamin A-rich foods in the seven days preceding the survey

v. Prevalence of VAD related outcomes in children 6-59 month old and postpartum women

vi. Estimate the cost of the SIAN (per capsule delivered)

# III. Methodology

## 3.1 Study site

The Republic of Mali has 12 million inhabitants with 8 administrative regions and the District of Bamako (the capital city). The 8 administrative regions and the capital city Bamako encompass 59 health districts. However SIAN's vitamin A supplementation program was implemented in 42 health districts since 2003. In the remaining 17 health districts, vitamin A distribution is organized during one month. The study was carried out in 4 health districts randomly selected from the 42 health districts where the SIAN has been implemented. Further details surrounding sampling are described in section 3.2. A map identifying study sites is included in Annex 1.

## 3.2 Sample size

The sample size was calculated with clinical VAD (night blindness) chosen as the primary outcome. Based on a prevalence of 5% of clinical VAD among children 6-59 months, a risk alpha of 5%, a precision of 1.5% and the design effect of 2, the sample size required for the study is ~1621 children 6 months to 59 months of age. To get this sample size, the country was divided into 3 strata based on the population density over the territory. The stratum defined were: the northern regions (encompassing the regions of Tombouctou, Gao, and Kidal), which are mainly desert and where less than 10% of the overall population of the country lives; the stratum of Bamako District, where about 10% of the overall population live and where the population is predominantly urban with better access to health services; the stratum of the southern regions (encompassing Kayes, Koulikoro, Sikasso, Segou, and Mopti), where 80% of the overall population live. Still, to reflect population density plus budgetary constraints, one region in the northern regions stratum was randomly selected, two regions in the southern regions were randomly selected, and Bamako was selected for the District of Bamako stratum. The selected northern region was Tomboctou; Kayes and Sikasso were selected in the southern region. In each selected region, one health district was again randomly selected, making a total of 4 health districts for the whole country. The selected health districts were the district of Kolondiéba for Sikasso region, Kita for Kayes region, Diré for Tombouctou, and Commune VI for Bamako. Finally, in each health district, a two-stage cluster sampling method (WHO, 1980) was performed using the 2001 national census list for the sampling frame. Each cluster encompassed one or several villages, depending on the size of village. In each health district 25 clusters was randomly selected accordingly, raising a total of 100 clusters for the study. In the selected cluster, a random plot was chosen and all of the neighboring houses were visited gradually until the required number of children was reached. If a cluster was too small to recruit the required number of children (~17 per cluster), the closest village was chosen to complete the cluster. In each household visited, the mother was interviewed. Thus, approximately 800 mothers were included in the study.

## 3.3 Study design

The study assessed SIAN implementation, the prevalence of VAD-related outcomes, and the potential effect of SIAN on VAD-related outcomes:

a. Operational evaluation of SIAN: The operational evaluation examined the delivery channels for vitamin A distribution through a series of interviews, investigating what went well, what did not work, and why. The interview was performed at 3 levels: 1) At the national level with key ministry of health personnel responsible for program implementation at the regional level, 2) health providers involved in the distribution process at district level, 3) caregivers and community leaders at the community level.

Interviews with key personnel at the National levels (Ministry of health) and other stakeholders such as funding agencies of SIAN (UNICEF, USAID, HKI) investigated the management of the SIAN, their perspectives on issues involving success and failure, sustainability, feasibility and effect of the intervention. The availability of vitamin A capsules and funding for distribution at district levels was also examined. In addition, interviews with the 2 program supervisors for each health district were performed to examine the supervision process and supports for the data collection system.

Availability of vitamin A capsules at health facilities and community levels was investigated with health providers (usually nurses operating at a peripheral level). The adequacy of resources (financial, material, human and time) allocated for the program implementation was also examined.Health provider's knowledge of the importance of vitamin A distribution activities was assessed, along with the training they received for the SIAN implementation and their demand-creation activities (educational messages they provide to caregivers). Evaluations also included observations of capsule distribution (questionnaire 1, annex 2) and exit interviews with caregivers, with the purpose of ascertaining how much and what the caregiver understood from the encounter. These exit interviews were completed at the same time as the observation checklist (questionnaire 2, annex 2).

A focus group with community leaders and caregivers

was performed to assess their perceptions about the accessibility, awareness and impact of the program. They were also queried about their level of involvement and interaction with providers. Participants were asked to provide information about the local physical, social and political environment that might have impeded the implementation of the intervention. The focus groups with caregivers and community leaders were carried out in 10% of randomly selected clusters (10 clusters). Each target group included 6-10 individuals.

b. Coverage of Vitamin A supplementation and prevalence/risk of VAD-related outcomes

Household-based surveys were carried out using a questionnaire administered to caregivers. The questionnaire used by most of the project has been pre-tested (http://www.mostproject.org), and determines whether a child in a household has received vitamin A. It was adapted to include information about VAD-related outcomes. Using a cluster sample with a random selection of households within each cluster, an estimate of the proportion of children sampled provided a coverage estimate. The survey can also validate coverage reported from tally information (see below). During the survey, IEC indicators-including caregiver's awareness about the capsule distribution rounds, the common channels of information, knowledge about vitamin A and vitamin A-rich foods, and the timing and location of the vitamin A campaign-were also assessed.

The following were classified as VAD-related outcomes: 1) a two-week history of infectious morbidity events (episodes of fever, coughing, diarrhoea) in children 6 months to 5 years old; 2) measles when occurring during the 6 weeks prior to the survey; 3) malnutrition; 4) night blindness in children 2-5 years old. In addition to VAD-related outcomes, the risk of VAD in communities was also assessed.

In order to determine the prevalence of these VAD-related outcomes, in-depth interviews were performed at the household level with mothers, and data pertaining to household characteristics, demographic characteristics, and living standards were collected. The presence of a two-week history of infectious morbidity episode in a child was documented. Physical exams including anthropometric measurements were performed to determine the prevalence of malnutrition. The risk of VAD for communities was measured using a 7-day food-frequency questionnaire administered to caregivers during the survey to estimate the number of occasions on which food sources of vitamin A and carotenoid were consumed. A list of 21 foods, six of animal origin rich in retinol and 15 of vegetable origin rich in b-carotene were used according to Shemann et al (2002).

Survey implementation was done in two phases. The first phase took place while vitamin A capsule distribution was underway. The objectives of this phase were to directly observe capsule distributors, to record mothers' opinions at distribution sites, and to observe the channels of information used to pass on information on SIAN. This preliminary phase took place in each of the four health districts selected. However, for this survey, there was no sample size calculated or decided. Some, but not all, of the questionnaires were administered during this phase. Table 1 below gives the number of respondents per questionnaire and per health district.

The second phase of the survey took place two weeks after the first round of SIAN. More questionnaires were administered in this phase. Table 2 below gives the repartition of the sample per health district and per questionnaire. For more details about each questionnaire, see Annex 2.

Table 1: Questionnaires used during the first phase of the survey, per health district

| Health districts | Types of questionnaires | Number defined | Number completed |
|---|---|---|---|
| Kita | Mother/caregiver having a child of 6-59 months | None | 40 |
| | Direct observation sheet | None | 48 |
| | Social mobilization | None | 4 |
| | Supervision sheet - DNS | None | 3 |
| Diré | Mother/caregiver having a child of 6-59 months | None | 60 |
| | Direct observation sheet | None | 59 |
| | Social mobilization | None | 4 |
| | Supervision sheet - DNS | None | 4 |
| Kolondiéba | Mother/caregiver having a child of 6-59 months | None | 61 |
| | Direct observation sheet | None | 60 |
| | Social mobilization | None | 6 |
| | Supervision sheet - DNS | None | 5 |
| Commune VI | Mother/caregiver having a child of 6-59 months | None | 48 |
| | Direct observation sheet | None | 40 |
| | Social mobilization | None | 5 |
| | Supervision sheet - DNS | None | 4 |
| Total | Mother/caregiver having a child of 6-59 months | None | 209 |
| | Direct observation sheet | None | 207 |
| | Social mobilization | None | 19 |
| | Supervision sheet - DNS | None | 16 |

Table 2: Redistribution of questionnaires completed per district during the second phase of the survey

| Districts | Types of questionnaires | Number defined | Number completed |
|---|---|---|---|
| Kita | Mother having a child of 6-59 months | 425 | 424 |
| | Postpartum women | 125 | 34 |
| | Distributor | 40 | 25 |
| | Supervisor | 2 | 2 |
| | District medical officer (DMO) | 1 | 1 |
| | Decision-maker | 2 | 1 |
| | Local radio | 3 | 3 |
| | Focus group. TBA/Elderly women | 3 | 2 |
| | Focus group fathers | 3 | 2 |
| | Economic costing | 2 | 1 |
| | Development partner | 4 | No local partner |
| Diré | Mother having a child of 6-59 months | 425 | 425 |
| | Postpartum women | 125 | 52 |
| | Distributor | 40 | 20 |
| | Supervisor | 2 | 2 |
| | District medical officer (DMO) | 1 | 1 |
| | Decision-maker | 2 | 1 |
| | Local radio | 3 | 2 |
| | Focus group. TBA/Elderly women | 3 | 3 |
| | Focus group fathers | 3 | 3 |
| | Economic costing | 2 | 2 |
| | Development partner | 4 | No local partner |

| Districts | Types of questionnaires | Number defined | Number completed |
|---|---|---|---|
| Kolondiéba | Mother having a child of 6-59 months | 425 | 425 |
| | Postpartum women | 125 | 24 |
| | Distributor | 40 | 40 |
| | Supervisor | 2 | 1 |
| | District medical officer (DMO) | 1 | 1 |
| | Decision-maker | 2 | 1 |
| | Local radio | 3 | 1 |
| | Focus group. TBA/Elderly women | 3 | 3 |
| | Focus group fathers | 3 | 3 |
| | Economic costing | 2 | 2 |
| | Development partner | 4 | 1 |
| Commune VI | Mother having a child of 6-59 months | 425 | 425 |
| | Postpartum women | 125 | 41 |
| | Distributor | 40 | 40 |
| | Supervisor | 2 | 2 |
| | District medical officer (DMO) | 1 | 1 |
| | Decision-maker | 2 | 2 |
| | Local radio | 3 | 2 |
| | Focus group. TBA/Elderly women | 3 | 3 |
| | Focus group fathers | 3 | 3 |
| | Economic costing | 2 | 2 |
| | Development partner | 4 | No local partner |
| National level | Decision-maker | 2 | 2 |
| | Development partner | 6 | 5 |
| Overall | Mother having a child of 6-59 months | 1808 | 1807 |
| | Postpartum women | 500 | 151 |
| | Distributor | 160 | 125 |
| | Supervisor | 8 | 7 |
| | District medical officer (DMO) | 4 | 4 |
| | Decision-maker | 12 | 8 |
| | Local radio | 12 | 11 |
| | Focus group. TBA/Elderly women | 12 | 11 |
| | Focus group fathers | 8 | 7 |
| | Economic costing | 8 | 7 |
| | Development partner | 16 | 6 |

## 3.4 Data analysis

Qualitative data was analyzed to provide information on delivery process. Quantitative data entry and management were performed using a multi-relational database approach using Microsoft Access®. Data was processed and analyzed using SPSS11 software. For more details about questionnaires used to reach each objective, please see Annex 2.

### 3.4.1 Data analysis for operational evaluation

Program evaluation requires output and process indicators. Whereas output indicators measure the impact of a program, process indicators measure progress at the different stages of program implementation (Bloem et al 2002). Three main process indicators were considered in order to characterize and comprehend the successes and failures of the program:

a. District level coverage rates of vitamin A capsule supplementation: Vitamin A capsule coverage is the most basic process indicator for monitoring vitamin A capsule distribution programs. It was used to measure the progress or success over time of SIAN in the study health districts. The coverage rate was estimated (proportion of children age 6-59 months or postpartum women having received vitamin A supplement during immediate round and/or previous round) per health district. Multilevel modeling was used to investigate factors associated with low or

high coverage rates at cluster levels. These include social cultural factors, the overall managerial/organizational aspect at each district level, coverage of communication channels used (e.g., awareness and involvement of community leaders and caregivers), availability of vitamin A capsules at health facilities and in the community (e.g., number of facilities distributing capsules), and adequacy of resources (financial, material, human and time).

b. Number of capsules ordered on national and district levels : This was examined to ensure that vitamin A capsule supply was not a limiting factor. The proportion of distribution sites with adequate capsules during distribution (sites with adequate capsules/number of sites) also was determined.

c. IEC indicators (health care facilities, household level): In addition to vitamin A capsule coverage rates, a number of other indicators have been generated to raise awareness about the capsule distribution rounds. Data from a household survey was used to identify common channels of information, the caregivers' knowledge about vitamin A and vitamin A-rich foods, and the timing and location of the vitamin A campaign.

The last 2 indicators have contributed to understanding differences in vitamin A coverage rates between clusters.

● Data analysis for vitamin A-deficiency-related outcomes:

The main VAD-related outcomes are 1) the proportion of children under 5 years old with a two-week history of the following infectious morbidity events: episodes of fever, coughing, diarrhoea and measles; 2) night blindness; 3) the proportion of children with malnutrition. Measurements of stature (cm) and weight (kg) for each child included in the survey were used to calculate the normal standard deviation (Z) scores. Three anthropometric indices were obtained, based on reference values from the National Center for Health statistics (WHO, 1986). Weight-for-age scores (WAZ) were used to identify underweight children, height-for-age scores captured stunted growth or chronic malnutrition, and weight-for-height scores (WHZ) were used to identify wasting malnutrition. A Z-score below the threshold of -2 in any of these parameters was considered a moderatenutritional deficiency, and a Z-score less than -3 was considered severe malnutrition.

In addition, the risk of VAD in communities was estimated to assess the impact of IEC on consumption of vitamin A-rich foods. Specific vitamin A scores were calculated using the Helen Keller International (HKI) method. The "animal score" is defined by adding the number of eating occasions per week based of animal vitamin A sources, and the "vegetable score" is calculated by summing the eating occasions per week of vegetable sources of vitamin A. A community was considered to be at high risk of vitamin A deficiency when the average value of the animal score was less than 4 (HKI, 1994).

The prevalence of vitamin A deficiency outcomes was compared among clusters with high or low vitamin A distribution coverage and between children who received vitamin A and those who did not. Likewise, comparisons were made between communities at high risk of VAD and those who are not. Prevalence was compared using statistical tests such as chi2, and continuous data were compared across groups using ANOVA or non parametric tests.

The prevalence of VAD-related outcomes and risk of VAD have provided not only baseline data for future evaluation of SIAN but also to assess potential current impact of SIAN.

● Data analysis of the cost of vitamin A supplementation:

The cost-per-person of double-dose vitamin A supplementation is equal to the ratio of vitamin A distribution program costs divided by the number of persons who received vitamin A twice. In Mali, such an indicator has not been calculated yet. It was hoped that health planners, program managers and decision makers would find a useful indicator here that would enable them to: i) assess the effectiveness of vitamin A supplementation program in comparison to other programs; and ii) estimate the resources necessary for running vitamin A distribution programs at different levels of coverage.

To estimate double-dose vitamin A supplementation costs in a district, the estimated cost of one SIAN vitamin A distribution week was determined and then doubled. To estimate the cost of one SIAN distribution week, one district hospital and one community health center were surveyed per study site depending on their accessibility. The district hospital coordinated vitamin A distribution at the district level, whereas community health centers coordinated activities at the community level. To determine the total cost for community health centers, the average costs incurred by surveyed community health centers were multiplied by the total number of community health center in each district. Since there is one district hospital per district, the total cost for the whole district was anticipated to be the summation of the total costs of all the community health centers and those of the district hospital. Total

costs per center/hospital were calculated as the sum of program-specific costs, personnel costs, and "other costs". Personnel costs included time devoted by health workers to SIAN, e.g., SIAN preparation, implementation of SIAN activities, and SIAN assessment. To determine the total time the health staff devotes to SIAN at each level, the average time each staff devotes to the projected was multiplied by the total number of each category of staff. Time devoted was valued at a local price to get personnel costs. Data on health staff's time were obtained from time sheets and from interviews with health staff about their time allocation across activities during SIAN. "Other costs" included expenditures incurred nosolely for SIAN, such as the cost of storing vitamin A capsules. For the purpose of computing "other costs" and program-specific costs (understood here as costs incurred solely by SIAN), a distinction was made between recurrent costs and capital costs. Capital costs are expenditures on items whose useful lifetime is over a year (e.g. vehicle, motorbike); whereas recurrent costs are items whose life span is less than a year (i.e., gasoline, stationary, etc.). To calculate the value of capital costs, the value of items that would have been purchased before the latest SIAN was recalculated using the consumer price index. These latter values were actualized using a discounting rate based on their useful lifetime, and then an amortization annuity was computed by dividing by the expected life span. Amortization annuities were added to recurrent costs to obtain a single SIAN program cost. It is worth mentioning that all donated items were taken into account and were valued at their local price.

Data about the number of persons who received double-dose vitamin A was obtained from SIAN's information system records. Records were centralized at the district hospital and were obtained from health management information system officers at these locations. District hospital financial officers and human resources managers were consulted for the data necessary for costing.

## 3.5 Ethical considerations

Individual informed consent was obtained from all participants of the study. The protocol was submitted for approval to the Institutional Review Board of the Faculty of Medicine, Pharmacy and Odonto - stomatology at the University of Bamako. Approval from administrative and health authorities was requested. All study participants were free to refuse or stop their participation anytime they desired without any penalty. Respecting the anonymity of records has preserved confidentiality of interview data.

# IV. Results

## 4.1 Survey period

The first survey took place from May 22 through May 28, whereas the second was carried out from June 15 through 30, 2006. In all health districts except Bamako, accessibility problems were encountered. Because of these problems, some villages or clusters were replaced with others that were more easily accessible.

## 4.2 Operational Evaluation of SIAN

### 4.2.1 Description of structures involved in the organization of the SIAN

Four structures are involved in the management of SIAN: the national level, the regional level, the district level, and the peripheral or community level. Below the role and responsibility of each body are described:

The national level through the Direction Nationale de la Santé (National Direction of Health, abbreviated DNS) is responsible for the coordination, supervision, and control of SIAN implementation. Within the DNS, the above managerial responsibilities are bestowed upon the Division Nutrition (Nutrition Division, abbreviated DN). The national level works closely with development partners regarding planning and SIAN implementation. The main partners for the implementation of the SIAN are: UNICEF, ATN/USAID, HKI, the World Food Program, and the FENASCOM (The National Federation of Community Health Associations of Mali, who ensure the coordination of all the community health centres of the country). The role of the development partners includes, but is not limited to, financial support, logistical and technical support, and the provision of vitamin A.

The regional level through the Direction Régionale de la Santé (Regional Health Direction), under the national level, is responsible for coordination, supervision, and control of SIAN implementation. In each of the 8 regions and the District of Bamako, there is a regional health direction responsible for its catchment area. The regional health direction works closely with development partners and the district level.

The district level, under the regional level, is responsible for the implementation and supervision of SIAN. The district level provides technical support to the peripheral level. Of note, it is at level that district hospitals are located.

The peripheral level, under the district level, is responsible for the distribution of vitamin A throughout SIAN. During SIAN, teams of 2-4 persons give away vitamin A capsules in public areas such as schools, health centres, etc. and keep records of activities. Distribution of vitamin A starts from 8 AM through 5-6 PM.

The description above shows that the district and peripheral level are the bodies in touch with the population and are responsible for providing vitamin A to communities. The other two levels, the national and regional levels, are more administrative bodies in charge of planning, evaluation, and supervision.

### 4.2.2 SIAN planning

The planning stage of SIAN consists of two steps: the preparatory meetings and the micro-planning workshop.

Preparatory meetings are the first step of the planning stage. The meetings, chaired by the DN and attended only by development partners, are a call for pledges. During these meetings, the DN comes up with estimates of vitamin A quantities based on the size of the target population, the total budget required for the SIAN, and the cost for the logistics. Based on these estimates, and after discussion, development partners make pledges depending on their individual abilities. The remaining funding is provided by the government. Contributions from development partners may be in kind (e.g. UNICEF and Micronutrient Initiative may provide vitamin A), money, logistics or technical expertise. For the first round of SIAN 2006, which is under assessment, the DN held 8 preparatory working sessions within a 4-month period (February 2006 to May 2006)). During these working sessions, the following topics were addressed:

- Estimation of overall vitamin A quantities;
- Additional order of vitamin A sent to the financial department of the MoH;
- Harmonization of distribution dates;
- Elaboration and validation of micro-planning parameters;
- Organization of the micro-planning workshop in Bamako;
- Debriefing of the national workshop on micro-planning;
- Validation of communication tools;
- Elaboration and validation of messages on SIAN;
- Financial and technical contribution of development partners;
- Raising additional funds from the government;
- Organization of SIAN supervision.

nterviews with 5 key development partners (UNICEF, USAID/ATN, HIK, WFP, FENASCOM) showed that the mobilization of funds was not a problem for them. However, they were upset with the delay of the government in wiring the funds to the health districts. The development partners' complaint about the government appeared to be legitimate.

A micro-planning workshop immediately followed the preparatory meetings. Chaired by the DN, the micro-planning workshop was attended by the Regional Directors of the health and the development partners and was held in Bamako on May 16, 2006. Each of the 9 health directors had brought their target population estimates and logistical needs. The micro-planning workshop objectives were:

- To present and explain the national strategy of supplementation;
- To discuss the methodology of implementing SIAN activities;
- To estimate the target population of each region;
- To estimate vitamin A quantities and needs in management tools (supervision, recording, and so forth);
- To estimate logistical needs;
- To establish provisional budgets; a guideline was provided to this end.

At the end of the workshop, each regional health direction was supposed to bring its quantity of vitamin A to its health districts. Regional health directions sent their vitamin A and recording sheets (for documenting vitamin A distribution) to all health districts in time. While regional health directors were in charge of dispatching vitamin A capsules and other items, most decision makers have provided support to the SIAN organization.

Vitamin A capsule distribution strategies adopted by the micro-planning workshop include: a health-facility-based strategy in which vitamin A capsules are given away within health facilities; an outreach strategy for populations living between 5-15 km from a health facility (in this strategy, capsule distributors go from village to village and distribute capsules at specified sites); and a mobile team for populations living more than 15 km from a health facility (this strategy is similar to the outreach strategy, but the mobile team uses vehicles).

Strategies adopted for social mobilization during preparatory meetings were: local radios, public announcers, and traditional animation.

Coverage objectives assigned to SIAN were:

- 80% coverage of vitamin A for children of 6-59 months;
- 80% coverage of vitamin A for women in immediate postpartum period;
- 50% of children exclusively breastfed;
- 90% of households consuming iodized salt.

### 4.2.3 SIAN implementation

a. Social mobilization: According to interviews with decision-makers at the national and district levels, different modes of communication were used to disseminate information. The most widely used methods were local radio stations (mentioned by 6 of the 7 decision makers interviewed), public announcers (mentioned by 5 of the 7 decision makers), and community health workers (CHWs) (mentioned by 2 of the 7 decision makers). According to the decision makers interviewed, these means of communication were chosen because of the seriousness with which the population takes any announcement from these sources. In the districts visited, all the district medical officers (DMO) met reported having used either local radio stations or public announcers. Some DMOs, depending on their local situation, resorted to using CHWs and community leaders.

By comparing the channels mentioned by the interviewed decision makers with those communication channels decided upon by the preparatory meetings of the SIAN, it can be seen that decisions taken by preparatory meetings were more or less in line with the field reality. However, the use of other means of disseminating information such as CHWs or community leaders were not identified or mandated by preparatory meetings. Thus, local health decision-makers did not abide by the decisions made in preparatory meetings; they added modes of communication to enable them to reach their coverage target. This initiative on their part is laudable and should be encouraged.

b. Educational sessions (IEC) by vitamin A capsule distributors: During vitamin A distribution in the community, distributors conducted "information, education and communication" (IEC) sessions about vitamin A with mothers or caregivers who had brought their children for vitamin A supplementation. Not all SIAN components were covered by the distributors (see table below). . Topics that were to be addressed in IEC sessions are listed in Table 3.

c. Community leaders' involvement: With regard to community involvement in SIAN, the leaders of the 6 out of 11 areas where focus groups were conducted reported having been involved in the organization of these campaigns. The leaders were religious leaders,

opinion leaders or representatives of villages at the district council. Their role consisted of passing on messages about the advantages of vitamin A, exclusive breastfeeding and the use of iodized salt.

The community leaders who were not involved in SIAN organization said that they had not been informed in time by the health authorities. They only received information about the SIAN organization on the day of the SIAN. Because of this lack of information they did not have time to inform all the villagers about vitamin A supplementation days. Thus, the information about SIAN did not reach the entire target population as hoped.

d. Local radio involvement: Of the local radio stations surveyed, 6 of the 8 reported having been involved in SIAN activities. However, none of them took part in micro-planning because it was centralized. According to local radio station managers, their stations reported the advantages and target population of vitamin A, the advantages of iodized salt, and called on the population to attend the distribution to the capsules. Thus, most SIAN components were covered by local radios.

There is an agreement between the Direction Nationale de la Santé and URTNA (Consortium of National Radios and TV of Africa). Radio stations that are not members of this grouping are not financed by SIAN. According to our investigations, two local radio stations were not members of this organization.

Table 3: Topics covered by vitamin A distributors during "information, education and communication" (IEC) sessions.

| Topics | Number of distributors (n=114) | % |
|---|---|---|
| Night blindness prevention | 65 | 57% |
| Food rich in vitamin A | 16 | 14% |
| Protection against malnutrition | 14 | 12% |
| Appointment for next SIAN round | 12 | 11% |
| Protection against disease | 8 | 7% |
| Information on routine immunization | 7 | 6% |
| Call to parents to bring children to the distribution sites | 5 | 4% |
| Weaning feeding for children of 6-11 months | 2 | 1% |
| Intelligence growth | 2 | 1% |
| Advice on iodized salt use | 1 | 0% |

### 4.2.4 Attendance at SIAN

The direct observations made during the first phase of this survey indicated that the target population did not turn out in great numbers. According to some mothers interviewed, this low turnover was due to the lack of information received by the population, and the lack of information may have been due to the retention of information by some stakeholders in the chain of information transmission. According to women interviewed in villages visited, the chiefs of villages passed on the information to imams (mosque leaders) who informed men after prayers; but most of the men seem to have failed to inform their wives. Another possible explanation is the limited broadcast coverage of radio stations in the area. In fact, all local radio stations cannot broadcast to the entire district they are located in. Thus, women in villages that did not receive radio broadcasts and who were not informed by their husbands remained uninformed. Some women have told us that they brought their children for supplementation because they had seen other women bringing their children.

This low turnout led capsule distributors to change their strategy. In the areas visited, the health-based strategy was replaced by a door-to-door strategy. Discussing the positive impact of this change in strategy, an auxiliary midwife of the Massala health centre (health district of Kolondiéba) said, "without the door-to-door strategy, it would have been impossible for us to reach the coverage objectives".

### 4.2.5 Supervision, training and data collection system of SIAN

The DNS had initially planned the supervision as follows:

- The national level supervises the regional and district level; regional level supervises the district level; the district level supervises the Cscom, and the Cscom supervises the distributor.
- Each supervision team consists of two persons; the number of supervisory team members depends on the number of distribution teams.
- Each supervision team is tasked with: checking the

recording slips of distributors; checking the appropriate administration of capsules; counting the number of target population by age range; calculating the loss rate of vitamin; making recommendations when necessary, and giving guidelines for the next day; making corrections when necessary; and encouraging the team to do good work.

During the first round of SIAN 2006, on the 4 sites, 7 supervision teams were interviewed. The figures on supervision team composition were a bit different from those decided by the central government. In Bamako there were two teams of 3 supervisors each. In Sikasso there were 2 teams composed of 2 supervisors each, in Tombouctou region 2 teams composed of 1 supervisor each, and in Kayes region, 7 teams with a supervisor each.

The supervision was done either in car or by bicycle. The supervisors reported that these means of transportation were appropriate.

Regarding training, all the supervisors (7/7) declared that they did not receive any training before the implementation of the SIAN. The reasons given were that they had been trained during the previous SIAN, that the training had not been funded, or that they did not know the reason.

The distributors (91/125 or 73%) also said they did not receive any training. They indicated that training would have allowed them to distinguish easily between capsules for women and for children and enabled them to talk easily about the advantages of vitamin A and the other components of SIAN. Thus, it is clear that capsule distributors were not comfortable with all the components of SIAN. This may explain why each distributor did not systematically cover each component of SIAN while doing IEC sessions.

During supervision, the distributors mentioned some difficulties encountered, namely the low turnout of the population, transportation problems, the preference of the population for the door-to-door strategy, and the difficulties of mobilizing postpartum women for cultural reasons. It is widely believed that a postpartum woman should not go out before 40 days after her delivery.

During supervision, supervisors noticed the shortage of vitamin A, the lack of information on SIAN, the low social mobilization and the difficulties of using of vitamin A with yellow color.

Supervisors (4/7) found that the recording tools were well used in non supervised zones. With regard to the quality of tools, 6/7 supervisors have found it useful and have sent them to the district. In addition, the supervision teams knew how to fill in the supervision sheet even though they had not been trained.

### 4.2.6 Availability and accessibility of vitamin A capsules at community level

All the decision-makers interviewed at the national and regional level reported an availability of vitamin A capsules at all levels. However, three of the district medical officers (DMOs) reported shortages of capsules in their districts. According to them, shortages were due to errors of shipping and errors of population estimates. Capsule distributors also reported shortages of capsules, but apparently the shortages did not last more than one hour to two days.

With regard to shipping, all 4 DMOs reported that capsules were sent in time and that they did not encounter any transportation problems from the Direction Nationale de la Santé in Bamako to the health districts. However, only three DMOs reported having a safe storage location.

As can be seen, administrative officials (decision-makers) and implementer (DMOs and distributors) do not speak the same language: while the former seem to deny shortages, the latter seem to indicate that there were shortages of vitamin A capsules. However, since the opinions of all stakeholders on the shortages are not available, it is not possible to definitely conclude that there were shortages.

### 4.2.7Adequacy of resources (financial, material, and human) allocated to the program

a. Financial resources: Seven decision-makers were interviewed about their opinion on the adequate funding of SIAN. Only two decision makers thought the resources allocated were insufficient. Those who thought that the resources were sufficient reported that the daily allowances given to the distributors were lower than those given to distributors in the past SIAN. Representatives from all the seven local radio stations were interviewed about payment. Two of the radio stations received payment while two others did not. The remaining three stations were not aware about the budget allocation of the government and provided free advertisements. As two radio stations were not members of URTNA, it can be expected that at least the five remaining stations were entitled to SIAN financed broadcast. Rather oddly only two URTNA member radio stations among five received money. There seems to have been inappropriate allocation of resources among local radio stations for SIAN message broadcast.

At the implementation level, three out of seven DMOs reported that the money did not arrive in time due to the delay in resource mobilization at central level.

To overcome the lack of funds, the DMOs used funds raised from user fees. Therefore, without sufficient user fees at the district level, the first round of SIAN 2006 would have not taken place on the agreed dates. The delay of the central government in mobilizing its pledged finances was unfortunate and should be discouraged in the future. Given that the central government commited to the implementation of SIAN, it should have secured the funding early during the preparatory meetings.

b. Human resources: Among four DMOs, two reported sufficient human resources to implement their tasks. However, the remaining two DMOs resorted to paying additional health workers to complete the work done.

### 4.2.8 Reception of target population to mobilization strategies

According to mothers interviewed, 32% remembered radio messages inviting them to attend capsule distribution. Although SIAN radio announcements were aired often and also included information about routine immunization, exclusive breastfeeding and iodized salt consumption, much of the content of these messages went unnoticed (see table 4). It is possible that mothers did not remember all of the SIAN components when being interviewed. It is also possible that the language used to air the messages was not understandable by the targeted women. In fact, French, the official language of Mali, is frequently used for sensitization although very few people understand it.

Of the other strategies to increase awareness of SIAN, health workers (probably encompassing CHWs) and neighbors were the main sources of information for women (Table 5). The posters and flyers, which were created by the central government as a strategy of disseminating information, were not used. It appears that these tools were shipped late to the sites.

### 4.2.9 Appraisal of SIAN by the stakeholders

a. Appraisal by the mot hers, health workers and development partners: According to the mothers interviewed at the capsules distribution sites, 94% of them stated that they had easy access to distribution sites. Of the mothers who had attended a health facility-based distribution site, 89% appreciated the appropriate organization of SIAN. Mothers who were unsatisfied with the arrangements complained about long waiting times and the lack of chairs.

According to DMOs, capsules were available at all levels. One of the development partners contradicted this and stated that capsules where not available everywhere. Despite this, all the development

Table 4: Content of the messages aired according to the mothers who had listened to radio

| Message contents | Sample size interviewed (1,699 mothers or caregivers) | % of mothers who noted the content |
|---|---|---|
| Date of SIAN | 444 | 17.8 |
| Target population: children aged 6 to 59 months | 450 | 18.0 |
| Target population: postpartum women | 306 | 12.3 |
| Mothers requested to bring their children aged 6-59 months to the health center for vitamin A capsules | 784 | 31.5 |
| Vitamin A protects sight and life of children and postpartum women | 129 | 5.2 |
| Other information | 379 | 15.2 |

Table 5: Sources of information about SIAN obtained by mothers according to the attendants interviewed at the gates of capsule distribution sites

| Sources of information | Sample size (200 mothers) | % |
|---|---|---|
| Health workers | 39 | 38.6 |
| Religious leaders | 5 | 5 |
| Local leaders | 24 | 23.8 |
| Posters/flyers | 0 | 0 |
| Neighbours/friends/relatives | 36 | 35.6 |
| Radio | 25 | 24.8 |
| Others | 7 | 7.4 |

partners were satisfied with the implementation of SIAN.

Capsule distributors had a different opinion about the management of SIAN. They complained, among other things, about the low turnout of the population in general and of postpartum women in particular. Importantly, they complained about the lack of transportation. Remarkably, to overcome the low turnout, the capsule distributors initiated a door-to-door capsule distribution strategy, which was not planned by the central government.

According to the two of seven supervisors interviewed, there were shortages of vitamin A capsules in their supervised zones, which confirmed development partner's claim of capsule shortages. Capsule shortages were also reported by the sixteen of hundred and twenty-five distributors. Based on these findings and contrary to the opinion of the decision-makers and DMOs who reported that sufficient capsules were available everywhere, it is reasonable to assume that there were shortages of vitamin A capsules. Logically, vitamin A capsule shortages could be attributed to the top-down planning process, which did not involve the grass-roots level.

b. The perceived importance of individual components of SIAN: According to the women who participated in the focus group discussions, all the components were important because they found all the information related to health to be useful.

Table 6: Socio-demographic characteristics of mothers whose children received vitamin A

| Variables | Number | % |
|---|---|---|
| AGE of mothers | | |
| <15 yrs | 2 | 0.1 |
| 15-24 yrs | 667 | 39.3 |
| 25-34 yrs | 743 | 43.7 |
| 35-44 yrs | 253 | 14.9 |
| >44 yrs | 34 | 2.0 |
| Total | 1699 | 100.0 |
| MARITAL STATUS | | |
| Married | 1611 | 94.9 |
| Single/widow/divorced | 88 | 5.1 |
| EDUCATIONAL LEVEL | | |
| Literacy | 1168 | 68.7 |
| Primary | 387 | 22.8 |
| Secondary and University | 51 | 3.0 |
| Others | 9 | 5.5 |

The minimum age of mothers was 12 years, the median 33 years and the maximum age was 53 years.

However, according to the male community leaders from seven of the ten areas where focus group discussions were organized, the most important component of SIAN was its push for exclusive breastfeeding. The group discussed the increased resistance to disease in children who are exclusively breastfed. The participants in the focus groups then criticized canned milk, which they believed was the cause of many diseases among children.

Male participants in the focus groups thought iodized salt consumption and weaning feeding were less important components of SIAN. The male participants had already heard about the advantages of iodized salt but continue to ignore its positive impact on health. They also believed that children should be breastfed up to one year. They adamantly thought there was no need for supplementary food.

The interview results showed that women participants grasped the importance of each SIAN component. Therefore, efforts should be made to help men understand the positive impacts of all components of SIAN.

## 4.3 Assessment of vitamin A coverage and prevalence of SIAN-targeted diseases

In this section, descriptive results of the analysis are showcased in a series of tables:

Table 7: Socio-demographic characteristics of children who received vitamin A

| Variables | Number | % |
|---|---|---|
| Age of children in months | | |
| <6 | 2 | 0.1 |
| >59 | 4 | 0.2 |
| 12-23 | 475 | 28.0 |
| 24-35 | 376 | 22.1 |
| 36-47 | 353 | 20.8 |
| 48-59 | 250 | 14.7 |
| Gender | | |
| Male | 883 | 52.0 |
| Female | 816 | 48.0 |
| Total | 1669 | 100.0 |

Most children (28%) were aged 12 to 23 months. Boys represented 52% of the study population. Children aged less than 6 months could be the result of errors by mothers about their children ages.

Table 8: Socio-demographic characteristics of vitamin A capsule distributors

| Variables | Number | % |
|---|---|---|
| Age of distributors in years | | |
| 19-24 | 17 | 13.6 |
| 25-34 | 42 | 33.6 |
| 35-44 | 46 | 36.8 |
| >44 | 20 | 16 |
| Education | | |
| Primary | 90 | 72 |
| Secondary/University | 33 | 26.4 |
| Illeterate | 2 | 1.6 |
| Profession | | |
| Nurse assistant | 35 | 28 |
| Nurse | 17 | 13.6 |
| Drug dispenser | 6 | 4.8 |
| Housekeeper | 3 | 2.4 |
| Auxiliary midwife | 31 | 24.8 |
| Community health worker | 27 | 21.6 |
| Mid-wife | 1 | 0.8 |
| Secretary | 1 | 0.8 |
| Stagiaire (intern) | 4 | 3.2 |
| Total | 125 | 100 |

The minimum age of the distributors was 19 years old, the median age 36 years, the average age 35 years, and the maximum age 56 years.

Table 9: Proportion of children and postpartum women who received vitamin A during the first round of 2006 SIAN

| Administration of vitamin A | Total | Number | % |
|---|---|---|---|
| Children | 1699 | 1520 | 90% |
| Postpartum women | 151 | 120 | 80% |

The above table shows 90% of children and 80% of postpartum women received vitamin A.

Table 10 shows Kayes region provided the highest number of children (93%) with single dose vitamin A. Tombouctou region had the highest double dose coverage of vitamin A in children (81.2%). In Bamako, 75.6% of postpartum women received vitamin A-the highest coverage in this demographic.

Table 11 shows 70% of children drank milk in the past 7 days, a food rich in vitamin A.

Table 10: Vitamin A indicators by region

| Vitamin A coverage | Regions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bamako | | Kayes | | Sikasso | | Tombouctou | |
| | N | % | n | % | n | % | n | % |
| Children with 1 dose | 343 | 80.7 | 395 | 93.2 | 395 | 92.9 | 387 | 91.1 |
| Children with 2 doses | 327 | 76.9 | 318 | 75.0 | 330 | 77.6 | 345 | 81.2 |
| Postpartum women | 31 | 75.6 | 19 | 55.9 | 16 | 66.7 | 35 | 67.3 |

Table 11: List of foods given containing vitamin A during the last seven days

| Foods | Number (n=1699) | % |
|---|---|---|
| Liver | 195 | 11.5 |
| Egg yolk | 448 | 26.4 |
| Meat | 1090 | 64.2 |
| Yellow sweet potato | 171 | 10.1 |
| Squash | 7 | 0.4 |
| Papaya | 57 | 3.4 |
| Milk | 1189 | 70.0 |
| Mango | 1064 | 62.6 |
| Carrot | 26 | 1.5 |
| “Fretin” (small fish) | 375 | 22.1 |
| Green leaves | 913 | 53.7 |

Table 12: List of foods given to children during the last 7 days containing vitamin A by region

| Food containing vitamin-A | Regions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bamako N=425 | | Kayes N=424 | | Sikasso N=425 | | Tombouctou N=425 | |
| | n | % | n | % | n | % | n | % |
| Liver | 57 | 13.4 | 16 | 3.8 | 71 | 16.7 | 51 | 12.0 |
| Egg yolk | 156 | 36.7 | 45 | 10.6 | 183 | 43.1 | 64 | 15.1 |
| Meat | 355 | 83.5 | 224 | 52.8 | 280 | 65.9 | 231 | 54.4 |
| Yellow sweet potato | 41 | 9.6 | 4 | 0.9 | 5 | 1.2 | 121 | 28.5 |
| Squash | 3 | 0.7 | 2 | 0.5 | 0 | 0 | 2 | 0.5 |
| Papaya | 36 | 8.5 | 11 | 2.6 | 7 | 1.6 | 3 | 0.7 |
| Milk | 308 | 72.5 | 305 | 71.9 | 296 | 69.6 | 280 | 65.9 |
| Mango | 347 | 81.6 | 242 | 57.1 | 330 | 77.6 | 145 | 34.2 |
| Carrot | 19 | 4.5 | 3 | 0.7 | 1 | 0.2 | 3 | 0.7 |
| “Fretin” (small fish) | 99 | 23.3 | 51 | 12.0 | 2 | 0.5 | 223 | 52.5 |
| Green leaves | 301 | 70.8 | 234 | 55.4 | 366 | 86.1 | 11 | 2.6 |

Among vitamin-A-enriched edibles, milk was most consumed in the Kayes region: 71.9% of children drank milk in Kayes. 81.6% of the children in Bamako reported eating mango, making it the region with the greatest mango consumption. The children of Sikasso region ate the mostly green leafy vegetables compared to other regions (86.1%).

According to distributors, (Table 14) night blindness was the main targeted disease by SIAN among children. However, of the 125 distributors, 83 (66.4%) reported finding postpartum women suffering from SIAN-targeted diseases.

The main SIAN targeted disease (Table 15) among postpartum women was night blindness.

Table 13: Knowledge of SIAN targeted diseases by mothers

| Diseases | Number (n=1971) | % |
|---|---|---|
| Diarrhoea | 218 | 11.1 |
| Measles | 162 | 8.2 |
| Night blindness | 121 | 6.1 |
| Malnutrition | 68 | 3.4 |
| ARI (cough and fever) | 226 | 11.5 |
| Don’t know | 1176 | 59.7 |

Table 14: List of children's diseases targeted by SIAN according to distributors

| Diseases | Number | % |
|---|---|---|
| Malnutrition | 34 | 49.3 |
| Diarrhoea | 12 | 17.4 |
| Measles | 5 | 7.2 |
| ARI | 5 | 7.2 |
| Night blindness | 44 | 63.8 |
| Others | 25 | 36.2 |

Table 15: Listing of SIAN- targeted diseases among postpartum women according to distributors

| Diseases | Number | % |
|---|---|---|
| Anemia | 4 | 4.8 |
| Eclampsia | 1 | 1.2 |
| Night blindness | 73 | 87.9 |
| Infections | 2 | 2.4 |
| Goiter | 1 | 1.2 |
| Vitamin A deficiency | 2 | 2.4 |

Table 16: Distribution of the prevalence of diseases according to vitamin A supplementation status

| Diseases | Supplementation of vitamin A | | | |
|---|---|---|---|---|
| | One dose of vitamin A | | Two doses of vitamin A | |
| | n | % | n | % |
| Diarrhoea | 395 | 23.2 | 294 | 17.3 |
| Night blindness | 38 | 2.2 | 32 | 1.9 |
| Malnutrition | 95 | 5.6 | 72 | 4.2 |
| ARI | 326 | 19.2 | 246 | 14.5 |

Diarrhoea was the most frequent disease amongst patients who received single-dose and double-dose vitamin A. All the diseases (Table 17) had a high prevalence among children of 12-24 months.

Table 17: Prevalence of diseases by child age

| Age of children in months | prevalence of diseases | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Diarrhoea | | Blindness | | Malnutrition | | ARI | |
| | n | % | n | % | n | % | n | % |
| <6 | 1 | 0.2 | 0 | 0 | 0 | 0 | 2 | 0.6 |
| >59 | 1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12-23 | 145 | 36.7 | 12 | 31.6 | 30 | 31.6 | 86 | 26.4 |
| 24-35 | 82 | 20.8 | 6 | 15.8 | 23 | 24.2 | 59 | 18.1 |
| 36-47 | 69 | 17.5 | 8 | 21 | 17 | 17.9 | 67 | 20.5 |
| 48-59 | 41 | 10.4 | 7 | 18.4 | 11 | 11.6 | 56 | 17.2 |
| 6-11 | 56 | 14.2 | 5 | 13.2 | 14 | 14.7 | 56 | 17.2 |
| Total | 395 | 100.0 | 38 | 100.0 | 95 | 100.0 | 326 | 100.0 |

Table 18: Distribution of diseases by region

| Diseases | Regions | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Bamako | | Kayes | | Sikasso | | Tombouctou | |
| | N=425 | % | N=424 | % | N=425 | % | N=425 | % |
| Diarrhoea | 90 | 51.7 | 91 | 56.5 | 75 | 50.3 | 139 | 37.6 |
| Blindness | 12 | 6.9 | 4 | 2.5 | 3 | 2.0 | 19 | 5.1 |
| Malnutrition | 28 | 16.1 | 3 | 1.9 | 20 | 13.4 | 44 | 11.9 |
| ARI | 44 | 25.3 | 63 | 39.1 | 51 | 34.2 | 168 | 45.4 |
| Total | 174 | 100 | 161 | 100 | 149 | 100 | 370 | 100 |

## 4.4 Cost assessment of vitamin A supplementation

District hospital financial officers and human resources managers were consulted for the data needed for the costing. However, many problems were encountered in this endeavor. The quantities of vitamin A capsules given by the central level were not recorded at the local level by the district hospital financial officers. An additional survey at each regional health direction was also stymied by a lack of registered information. Interviews undertaken there with officials did result in good estimates. It was therefore necessary to exclude the information. Of note, recording systematically all expenditures is not yet a spontaneous reflex in the Malian state-owned health system, nor are efforts at analytic accounting.

Another problem encountered was that the health staff could not recall the amount of time they spent on SIAN activities. Interviews aimed at approximating the time spent on SIAN activities were unsuccessful. Of note, it is not common in the Malian health system for human resources management officers to keep records of staff time across activities. It had been hoped that because of the short time that had elapsed between capsule distribution and our survey, the health staff would have been able to remember how much time was spent on SIAN activities. This was not the case. Here too, there was no choice but to exclude the information gathered.

Finally, some expenditure were funded locally, but were not reported in the accounting system. Interviews with the staff to obtain good estimates were unsuccessful.

Due to the above mentioned problems, it was not

possible to undertake an analysis of this costing exercise. Whenever the information was reliable, the sample size (after dropping the useless responses) was not large enough to generalize. Thus, the lesson learned from this costing exercise is that a retrospective survey is not appropriate for the Malian context. The best way to get precise information is to undertake a prospective survey of SIAN from beginning to end. However, if one does want a retrospective survey of SIAN-related costs, a very large sample size would be required since many questionnaires might need to be discarded. Proponents of this approach should also bear in mind recall biases that are not encountered in the prospective survey.

# V. Discussion

## 5.1 Assessment of operational aspects of SIAN

The results of our study differ from an earlier assessment of SIAN by the DN/DNS in several ways. Our assessment of the strengths and weaknesses of SIAN are articulated below, and compared to findings of the 2004 DN/DNS report.

a. Social Mobilization: Some differences were noted with respect to information received from the DMOs and from the mothers interviewed during the study about the primary source of information. DMOs described the local radio broadcast and public announcement as the primary mean of raising awareness, while most of the mothers felt that they were informed mainly by the health workers, neighbours and local leaders. None of the female interviewees learned about SIAN through posters or flyers, and some community-level workers reported that these materials did not arrive in time. In comparison, a similar study involving 210 mothers was conducted by DN/DNS in 2004, and revealed that 49% of mothers learned about SIAN through public announcements, relatives, health workers, CHWs or from a friend. According to the same study, 20% of mothers mentioned radio broadcasts as their only source of information, 11% mentioned television as the only source of information, and 9% mentioned both radio and television as their sources of information. Finally, according to the same study, very few mothers (4%) received information through posters and or flyers. In both our study and the DNS study, mothers reported receiving information about SIAN from similar sources. Both studies also reveal that flyers and posters were not an effective means of communicating information about SIAN. Distribution mechanisms of the posters and flyers should be improved so that their impact can be assessed. If additional funds were to become available from donors, the Ministry of Health might also consider pilot programs to investigate the effectiveness of distributing vitamin A capsules in association with folk festivals animated by popular local musical bands. Save the Children-USA, in its zinc trial in Bougouni health district, utilized such an approach to great effect. Subsequent to their implementation of this program, attendance rates at diarrheal health centres significantly increased. Within the context of SIAN, such an approach would require training musicians to cover all the components of SIAN in their messages. Nonetheless, this strategy may have significant potential since the women and mothers targeted by SIAN are usually fond of such popular bands. Social mobilization efforts should focus on creating permanent behavioural change, so that government programs are no longer necessary to prompt women to supplement vitamin A in their and their children's' diets.

b. Effectiveness of radio announcements: Our study found that 32% of interviewees were aware that the radio announcements were asking them to attend SIAN, 18% were able to recall that the message was directed at children and postpartum women and 18% were able to remember the dates of SIAN from the radio messages. The DN/DNS report differs in its assessment of the effectiveness of the radio campaign. In their report, interviewees remembered the date of SIAN appointments 56% of the time, but only 5% were able to recognize that women were being asked to attend the event.. Thus, most interviewees were only able to recall the date of SIAN appointments and that women were being requested to attend. The mothers for the most part could not recall the other parts of the radio message. Based on these findings, the quality of radio messages deserves re-examination. Our findings suggest either incomprehension or poor retention on the part of the audience. It is possible that mothers did not remember all of the SIAN components when being interviewed. It is also possible that the language used to air the messages was not understandable by the targeted women. In fact, French, the official language of Mali, is frequently used for sensitization although very few people understand it.

c. Top-down planning process: SIAN management was not in accordance with the decentralization policy that Mali in principal prefers to centralized community planning. Neither the regional nor the district level was involved in the preparatory meetings. The regional level in charge of supervising the implementation was only informed later about the outcome of the preparatory meetings, thus a top-down planning process was used. Even if regional health directors could discuss preparatory meeting outcomes during micro-planning workshops, they would have little chance to modify the budget already agreed to with partners during preparatory meetings. Another possible pitfall of this approach is the uniformity of implementation strategies applied in regions with different realities in the field. As health districts do not participle in micro-planning, each of them has to accept and deal with the funds and other resources that its regional health director has been able to negotiate during the micro-planning workshop. Yet, since neither the regional level nor the district level is involved in the planning process, they do not feel responsible for seeking funds that meet their needs. Finally, as it is necessary to estimate the target

population in the micro-planning workshop, there is a likelihood of a shortage of vitamin A in many areas if preparatory meetings' estimates are different from those of the micro-planning workshop. These multiple weaknesses suggest that a decentralized planning process may be appropriate. Nevertheless, a positive aspect of the top-down process is the involvement of development partners in the decision-making process, which lets development partners meet the pledges of each stakeholder, including the government.

d. Low turnout of target population: There was an unexpectedly low turnout of the target population. This might have been due to the inadequacy of the mobilization strategies defined by the central government. Poor attendance at SIAN can also be seen as a failure of the top-down organizational process. The coverage strategies as defined by the central government do not fit with the field realities. Once again, health workers and local decision-makers have been creative in devising a door-to-door strategy, and it is thanks to that that they have been able to reach their coverage rates. As strategies defined by the central level seem to show their limitations, it might be wise to integrate the door-to-door strategy into SIAN's package of strategies.

e. Inadequate training: Capsule distributors displayed poor knowledge about SIAN components. Consequently, distributors failed to cover all SIAN components while leading IEC sessions. The capsule distributors also found it difficult to distinguish between capsules of 100 000 and 200 000 IU. The supervision teams, although of different sizes, achieved their missions in spite of inadequate training: all the areas under their supervision seem to have been supervised. In addition, the supervision teams knew how to fill in the supervision sheet even though they had not been trained, thanks to well-designed data collection tools. Because of these positive results, the central level did not err in not training supervisors, and this is laudable.

f. Other operational strengths and weaknesses: From an operational perspective, SIAN was successful in its collaborations with the donor community and local radio stations. The development partners enthusiastically participated in all steps of planning and pledged funding without hesitation. With the exception of URTNA-affiliated stations, most radio stations also eagerly complied with the airing of SIAN messages. Although unplanned, the door-to-door capsule distribution strategy was also integral to the success of SIAN and essential in reaching the target coverage rate. Operational weaknesses of SIAN include the slow mobilization of pledged funds on the part of the Malian government. This was compensated for by the pre-funding of SIAN's user fees, without which SIAN probably could not have been organized on schedule. SIAN suffered vitamin A capsule shortages, which may have been obviated had local and regional officials been involved the planning process and the estimation of the target population size. Lastly, mobilization and education efforts were not successful in increasing awareness about SIAN components in men. Given that men are key decision-makers in their families, poor knowledge among men is unacceptable.

## 5.2 Vitamin A coverage and the prevalence of SIAN-targeted diseases

Here as well, the discussion compares our results to those of other studies, identifies the methodological flaws of this study, and also identifies the weaknesses and strengths of the first round of 2006 SIAN.

With regard to monitoring and evaluation indicators of SIAN's impacts, the ambitions of the DN/DNS were the following: 80% coverage for vitamin A among children of 6-59 months; 80% coverage of vitamin A among postpartum women; 50% coverage of children exclusively breastfed; and the consumption of iodized salt by 90% of households.

According to the report of DN/DNS, the coverage rates from the different regions were:

- Kayes: vitamin A coverage among children of 6-11 months was 87%; 76% among children of 12-59 months; and 81% among postpartum women;
- Sikasso: vitamin A coverage among children of 6-11 months was 111%; 95% among children of 12-59 months; and 92% among postpartum women;
- Tombouctou: vitamin A coverage among children of 6-11 months was 86%; 88% among children of 12-59 months; and 83% among postpartum women;
- Bamako: vitamin A coverage among children of 6-11 months was 90%; 71% among children of 12-59 months; and 63% among postpartum women.

The coverage rate of 111% among children of 6 to 11 months may be explained by a poor estimate of the target population in the Sikasso region: the expected target was 47,097 children and those who received vitamin A capsules were 52,123 children.

The quick assessment system used by the supervision teams of DN/DNS and the different reports produced by the health districts do not allow the DNS to know the percentage of children exclusively breastfed nor the percentage of families using iodized salt. Thus the DNS/DN only assessed the coverage rates of

vitamin A.

Our study found that 90% of children and 80% of postpartum women received vitamin A; thus SIAN did reach its coverage rates. However, only 28% reported using iodized salt. This low rate could be explained by the poor knowledge of women about iodized salt: 59% of women did not know about iodized salt. Additionally, 47% of postpartum women surveyed were exclusively breastfeeding. This low rate might also be explained by the following reasons: 27% of women had poor knowledge about exclusive breastfeeding; 17% mentioned the need of water for children; and 5% of mothers did not have breast milk.

However, our coverage rates were higher than those of the third Demographic and Health Survey (EDSIII) where only 41% of children were calculated to have received vitamin A capsules. Of note, EDSIII involved all 7 regions of the country plus the district of Bamako, whereas our study covered only 3 regions plus the district of Bamako. Per region, our coverage rates are higher than those of EDSIII. According to EDSIII, Bamako had the highest rate of vitamin A coverage (58%); it was followed by Kayes with 43% and by Sikasso with 35%. Tombouctou region was combined with the 2 other northern regions in EDSIII; the coverage rate for this grouping was 51%.

Our results show that Bamako had the highest rate of vitamin A coverage in postpartum women (76%). Bamako is followed by Tombouctou and Sikasso, each with 67% coverage; Kayes was last with 56%. Our overall coverage rate of 80% remains higher than that of EDSIII, where 18% of women reported receiving vitamin A. In EDSIII there was a disparity among regions. Bamako had the highest rate with 33% of women; it was followed by Sikasso and Kayes with respectively 20% and 19%. These coverage rates of EDSIII per region are lower than our study's results. However, EDSIII was published in 2001, and its findings may not reflect more recent coverage rates. SIAN became effective in 2003, two years after EDSIII's publication. Bamako's high coverage rate among postpartum women in our study could be explained by the weak influence of traditional beliefs. In Mali, it is widely believed that a postpartum woman should not go out of her home for 40 days after delivery. Another explanation could be the high educational level in Bamako compared to those of other regions.

With regard to the prevalence of SIAN targeted diseases, our study has found that the signs of the targeted diseases have occurred in 50% of the children surveyed. A particularly high prevalence of each of the diseases occurred in the age range of 12-23 months. Per region, Tombouctou had the highest prevalence of targeted diseases at 87%, versus 40% in Bamako, 38% in Kayes, and 35% in Sikasso. Per targeted pathology, diarrhoea and ARI (acute respiratory infections) had the highest prevalences at 23% and 19%, respectively. ARI were predominant in Tombouctou, whereas in other regions diarrhoea was the prevailing disease.

It is possible that differing regional prevalences of single-dose and double-dose vitamin A administration may explain the different prevalences of these targeted diseases. The prevalence among those who received one dose was 90% versus 77% among those who received one dose. Overall the prevalence of these diseases diminished among those who received two doses passing from 50% to 38%.

Our results also indicate that the Tombouctou region, which had the highest prevalence of targeted diseases (87%), was paradoxically an area where more than 81% of children had received the two doses of vitamin A. The high rate in our study may be explained by the poor hygiene or by the lack of safe water in Tombouctou, where people use river water without sterilizing it.

EDS III, which involved all regions, found a prevalence rate of 19% for diarrhoea. The prevalence of VAD-related diseases per region was as follows: Bamako 14%, Sikasso 18%, Kayes 23%, and the northern regions (encompassing Tombouctou, Gao, and Kidal) 28%. With regard to ARI, it is not possible to compare our results with those of EDSIII on account of differing diagnostic criteria. EDSIII used as diagnosis criteria cough and breathing frequency, and excluded fever with the aim of eliminating malaria and measles. Our study includes fever in the diagnostic criteria.

Our study has found malnutrition among 6% of those surveyed; only 2% had night blindness signs. According to EDS III, 38% of children under 5 suffered from severe malnutrition. A study by Ahmed F et al in Bangladesh found night blindness in 4% of schoolchildren under 5 in 1982-1983. With vitamin A supplementation, this rate dropped from 2% in 1989 to 0.6% at the end of 1996.

Amongst postpartum women, 13% reported having the symptoms of night blindness before receiving vitamin A. Our rate is higher than that of EDS III where 6% of postpartum had declared having night blindness. In the current study, only one woman reported having persistent night blindness after vitamin A supplementation. Of note, of the 19 postpartum women who had night blindness, 4 did not receive any capsules.

To summarize, SIAN was successful in reaching the targeted vitamin A distribution goals, and provided

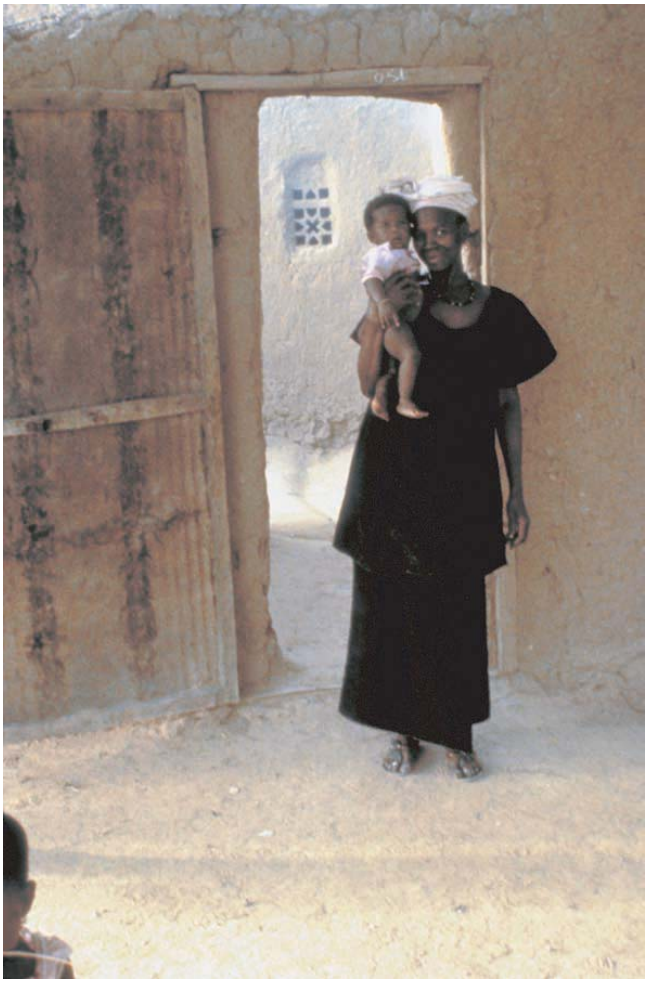
vitamin A capsules to 90% of targeted children and 80% of postpartum women. However, paediatric vitamin A coverage was low in Bamako as compared to other regions, and no region achieved 100% coverage of both children and postpartum women. With regards to the non-vitamin-A-related goals of SIAN, the program was less successful: 28% of households surveyed used iodized salt, and 47% of postpartum women were exclusively breastfeeding. The poor training of capsule distributors may have contributed to these low percentages, and it was noted that women often had poor knowledge of SIAN components, in spite of their attendance of capsule distributor educational sessions. In spite of the high vitamin A coverage achieved by SIAN, high prevalence of SIAN-targeted diseases persisted.

With regards to methodological flaws, this study did not undertake clinical assessment of malnutrition. The high costs of the equipment as well as the high costs related to their transportation in the field led us to forego clinical assessment.

# VI. Recommendations

The weaknesses identified above allow us to make the following recommendations:

- The DN/DNS should think about adopting the door-to-door strategy in its package of strategies. This assessment has enabled us to notice that it would have been difficult to reach the coverage rate targets without the door-to-door strategy because women were not attending in great numbers the distribution sites;
- The DN/DNS should also try to find out why SIAN-related radio messages are not understood by women. Women declared that they listened to messages related to SIAN on radio but were unable to identify the content of the messages;
- Although the coverage rates were high for vitamin A supplementation, all the targeted people were not reached. The DN/DNS should try to understand the reasons for this and should design appropriate strategies targeting hard-to-reach populations;
- Bamako, compared with other regions, has good coverage of health services, but the child supplementation rate with vitamin A is lower in Bamako than in other regions. The DNS/DN, in collaboration with local health authorities, should undertake strategies to overcome this phenomenon;
- Capsule distributors demonstrated poor knowledge of SIAN-related issues and require better training by the DNS/DN. Without appropriate training, capsule distributors will have little impact on women's knowledge of SIAN during IEC sessions. Mass media outlets seem to have a limited ability to increase awareness, so more resources should be focused on capsule distributor training.



# VII. References


Beaton, et al. Effectiveness of vitamin A supplementation in the control of young child morbidity and mortality in developing countries. ACC/SCN State-of-the-Art Series, Nutrition Policy Paper No. 13. 1993.

Bechir Rassas et al (2004). Cost analysis of the national vitamin A supplementation program in Zambia, 26 pages, a publication of the MOST, The USAID Micronutrient program.

Bechir Rassas et al (no date). Cost analysis of the national vitamin A supplementation program in Ghana, 26 pages, a publication of the MOST, The USAID Micronutrient program.

Ching, P. et al. Childhood mortality impact and costs of integrating vitamin A supplementation into immunization campaigns. American Journal of Public Health 2000; 90(10): 1526-1529.

Demographic and Health Survey of Mali, Macro International, Washington, 2002

Helen Keller International (HKI). How to use the HKI's frequency method to assess community risk of vitamin A deficiency. New York: HKI, 1994.

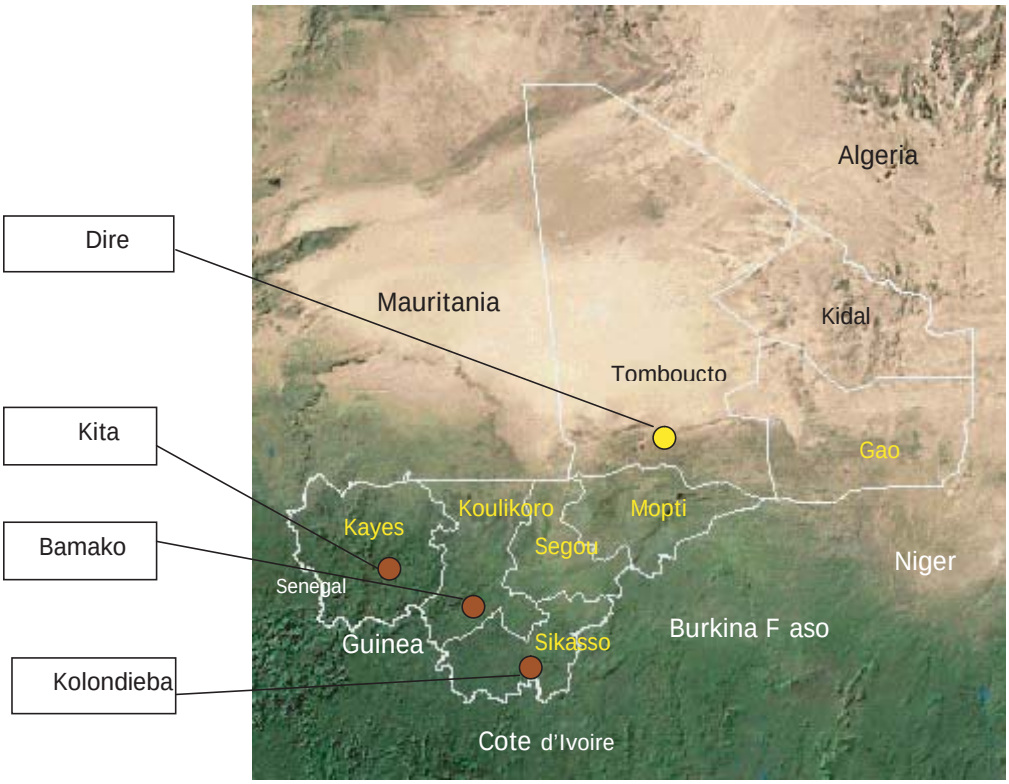
Ministère de la Santé du Mali : Evaluation des semaines d'intensification des semaines d'intensification des activités de nutrition (SIAN) au Mali,Octobre 2004, Bamako, Mali.

Pant CR, Pokharel GP, Curtale F, Pokhrel RP, Grosse RN, Lepkowski J, Muhilal, Bannister M, Gorstein J, Pak-Gorstein S, Atmarita, Tilden RL. Impact of nutrition education and mega-dose vitamin A supplementation on the health of children in Nepal. Bulletin of the World Health Organization. 1996;74(5):533-45.

Schemann JF, Banou A, Malvy D, Guindo A, Traore L, Momo G. National immunisation days and vitamin A distribution in Mali: has the vitamin A status of pre-school children improved? Public Health Nutrition. 2003 May;6(3):233-44

WHO Working Group. Use and interpretation of anthropometric indicators of nutritional status. Bulletin of the World Health Organization. 1986; 64: 929-41.
World Health Organization (WHO). Methods of Assessment of Avoidable Blindness. WHO Offset Publication No. 54.Geneva: WHO, 1980

Annex 1. Map of Mali showing study sites



Annex 2. Questionnaires used to reach each study objective

| Specific | Questionnaires Used | Level | | | |
|---|---|---|---|---|---|
| | | National | Regional | District | Community |
| **Operational evaluation** | | | | | |
| Delivery process | | | | | |
| Content and managerial structure | Q1 Decision-makers | DN/DNS, partners (UNICEF,etc.) | Regional Directions of Health (DRS) | District Medical Officers (DMOs) | |
| Planning and development at national and local level, evolution over time | Q1 Decision-makers | DN/DNS, partners (UNICEF,etc.) | DRS | DMOs | |
| Coverage of communication channels used | Q1 Decision-makers<br>Q2 Households<br>Q3 Focus groups<br>Q4 Local radios<br>Direct observation, posters | DN/DNS, partners (UNICEF) | DRS | DMOs<br>Local radio | Heads of post<br>Mothers<br>Leaders, TBAs, elderly women |
| Appropriateness of indicators used to monitor SIAN | Q1 Decision-makers | DN/DNS | DRS | DMOs | |
| Supervision, supports and data collection system | Q1 Decision-makers<br>Q5 Supervisors<br>Review of data collection tools | DN/DNS | DRS | Two supervisors | Head nurse of clusters selected |
| Availability of vitamin A capsules at health facilities and community levels | Q1 Decision-makers<br>Q5 Supervisors | DN/DNS | DRS | Two supervisors | Head nurse of clusters selected |
| Adequacy of resources allocated for the program implementation | Q1 Decision-makers<br>Q5 Supervisors | DN/DNS | DRS | DMOs | Head nurse of clusters selected |

| Specific | Questionnaires Used | Level | | | |
|---|---|---|---|---|---|
| | | National | Regional | District | Community |
| Perspectives of parents, providers and other stakeholders of how the vitamin A delivery was implemented | | | | | |
| Level of awareness and involvement of community leaders and other stakeholders in implementation | Q Focus leaders<br><br>Q Distributors of vitamin A (about info. provided to mothers) | | | | Leaders |
| Perceptions on the most and least important components of the SIAN by the participants (parents), providers and other stakeholders | Focus | | | | Parents<br>Leaders |
| Extent to which intervention developers and providers perceive that SIAN is delivered as planned, and how this differs for participants and providers | Q1 Decision-makers | DN/DNS, partners (UNICEF, etc.) | | | |
| Perception of parents, providers and stakeholders on the accessibility and feasibility of SIAN activities and how these impact on their delivery and uptake | Q1 Decision-makers,<br>Parents,<br>Healthcare workers,<br>Partners | | | | |

| Specific | Questionnaires Used | Level | | | |
|---|---|---|---|---|---|
| | | National | Regional | District | Community |
| Baseline survey on VAD - related outcomes and consumption of vitamin A -rich foods | | | | | |
| Vitamin A coverage in children 6-59 months of ages and postpartum women | Q Children | | | | Children |
| Proportion of children 6-59 months who received 1 dose of vitamin A | Q Children | | | | |
| Proportion of children 6-59 months who received 2 doses of vitamin A | Q Children | | | | Children |
| Proportion of postpartum women who received vitamin A during the last SIAN | Q Postpartum women | | | | Postpartum women |
| Proportion of children 12-35 months who received vitamin A-rich foods in the previous 7 days preceding the survey | Q Children | | | | Children |
| Knowledge of parents and providers about VAD-related outcomes | Q Children<br>Q Postpartum women<br>Q Distributors | | | | Mothers<br>Postpartum women<br>Distributors |
| Prevalence of VAD-related outcomes in children 6-59 month olds and postpartum women. | Q children<br>Q Postpartum women | | | | Mothers<br>Postpartum women |
| Estimate the cost of the SIAN (per capsule delivered) | Economic evaluation questionnaire | | | | |

| Sl. | Full names of data collectors (Alphabetically) |
|---|---|
| 01 | Boureima Belemou |
| 02 | Baba Cissé |
| 03 | Fatoumata Coulibaly |
| 04 | Hassimou Coulibaly |
| 05 | Alimatou Danioko |
| 06 | Boubou Diall |
| 07 | Kancou Diallo |
| 08 | Issa Diallo |
| 09 | Coulibaly F. Dicko |
| 10 | Alkadri Diarra |
| 11 | Assa Diarra |
| 12 | Dr Assan Diarra |
| 13 | Dr Samba Diarra |
| 14 | Mahamoud Djiteye |
| 15 | Karim Goïta |
| 16 | Mamoutou Koné |
| 17 | Yacouba Koné |
| 18 | Dr Hamadoun Sangho |
| 19 | Moulkhère Mint Tayeb |
| 20 | Boubacar Touré |
| 21 | Nana Touré |

Published by Child Health and Nutrition Research Initiative (CHNRI) 2009



For more information, please contact

Child Health and Nutrition Research Intiative (CHNRI)
Secretariat Location:
ICDDR,B
68 Shahid Tajuddin Ahmed Sharani
Mohakhali (GPO Box 128)
Dhaka-1212, Bangladesh

1-5 route des Morillons
PO Box 2100
1211 Geneva 2
Switzerland

www.chnri.org

Published by Child Health and Nutrition Research Initiative (CHNRI) is an international foundation with the vision to improve child health and nutrition of all children in low and middle-income countries through research that informs health policy and practice.

Child Health and Nutrition
Research Initiative

CHNRI

*Finding solutions for global child health*

**Child Health and Nutrition Research Intiative (CHNRI)**
**1-5 route des Morillons**
**PO Box 2100**
**1211 Geneva 2**
**Switzerland**
**www.chnri.org**