

ACCELERATING CHILD SURVIVAL AND DEVELOPMENT (ACSD)

# Final Report The Retrospective Evaluation of ACSD: Mali



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# Summary

## Introduction

UNICEF implemented the Accelerated Child Survival and Development (ACSD) project between 2001 and 2005 in 11 countries in Africa with support from Canadian CIDA. The aim of ACSD was to reduce mortality among children less than five years of age by working with governments and other partners to increase coverage with a set of proven interventions. In the “high-impact” countries of Benin, Ghana, Mali and Senegal, a total of 16 districts worked to deliver the full set of interventions grouped into three packages: “EPI+” including vaccinations, vitamin A supplementation and the use of insecticide-treated nets (ITNs) for the prevention of malaria; “IMCI+” including promotion of exclusive breastfeeding for six months, timely complementary feeding, use of iodized salt and improved and integrated management at the health facility and community levels of children suffering from pneumonia, malaria and diarrhea, including home-based ORS use, treatment of malaria, and treatment of pneumonia with antibiotics; and “ANC+” including intermittent preventive treatment of malaria with SP (Fansidar) for pregnant women (IPTp), tetanus immunization during pregnancy to prevent maternal and neonatal tetanus and supplementation with iron/folic acid during pregnancy and with vitamin A post-partum. An internal evaluation by UNICEF estimated through modeling that the levels of coverage achieved through ACSD were associated with about a 20 percent reduction in all-cause under-five mortality relative to comparison districts in participating districts in four “high-impact” countries. This retrospective evaluation was commissioned by UNICEF to confirm these findings and provide additional information that could be used in planning effective programs to reduce child mortality and achieve the 4<sup>th</sup> Millennium Development Goal (MDG-4) in poor countries in Africa.

The IIP evaluation team worked with ACSD managers at international and national levels to develop a generic ACSD framework that defined the pathways through which ACSD activities were expected to lead to reductions in child mortality and improvements in child nutritional status. The generic framework served as the “backbone” of the evaluation design. The country-specific evaluations also addressed equity across socioeconomic and ethnic groups, for urban-rural residence and for girl and boy children. At the request of UNICEF, the evaluation does not include an economic evaluation or a full assessment of the effects of ACSD on national policy.

## Aim of the independent retrospective evaluation in Mali

The aim of the evaluation was to provide valid and timely evidence to child health planners and policy makers about the effectiveness of ACSD in reducing child mortality and improving child nutritional status in Mali, as a part of the larger retrospective evaluation designed to inform future programs intended to reduce child mortality and accelerate progress toward MDG-4. Equity was also assessed.

Two questions served as a guide to the analysis and reporting of the evaluation findings:

- a) Was ACSD implementation associated with improvements in coverage, nutrition and mortality over time?
- b) If so, was progress in the ACSD districts faster than that observed for the national comparison area?

## ACSD implementation in Mali

UNICEF-Mali received approximately \$3.7 million from Canadian CIDA to support ACSD activities in both the HIDs and the ACSD expansion areas, with an additional \$6.1 million from other funding sources from 2001 to the end of 2004. The US Fund for UNICEF and other donors supported ACSD activities after CIDA funds were exhausted. Six of Mali’s 59 districts in Mali were selected for “high impact” ACSD implementation: Banamba and Kolokani in the Koulikoro region, Niono and Bla in the Segou region, and Koro and Djenné in the Mopti region. Together the HIDs represented an estimated 1,356,972 people, or 12% of the Malian population in 2004. ACSD implementation began in two of the six HIDs in January

2002 and in the last district beginning in September 2002. ACSD inputs and activities in the HIDs in Mali focused on:

- 1) **Providing vaccines, supplies, equipment and training to support outreach visits** for the delivery of vaccines and vitamin A supplements for children between the ages of six and 59 months as well as national immunization days;
- 2) **Providing ITNs** for the prevention of malaria at no cost to pregnant women and to children who completed a full course of vaccinations at facilities or during outreach activities, and training of volunteers to promote and re-treat the nets;
- 3) **Training of health workers** covering 31 community health centers in a five-day, abbreviated IMCI course, and beginning in late 2003, support for community workers (“relais”) to visit all households in their area every month to record births and encourage mothers to engage in a set of 13 key family practices related to child survival. ACSD funds were used to provide workers with bicycles, and households were then eligible for a one-time purchase of a subsidized basic medical kit that included chloroquine, ORS and paracetamol. Replacement of kit items required the mother to visit the health facility, where they were available for purchase;
- 4) **Supporting outreach activities** to provide ANC services and interventions<sup>i</sup>, including tetanus toxoid vaccine, sulfadoxine and pyrimethamine for the treatment of malaria, insecticide-treated bednets and iron and folic acid supplements.

Important barriers to full implementation of the ACSD implementation plan, as reported by program staff and reflected in project documentation, included stock outs in insecticide-treated bednets for most of 2006, stock and equipment management and delays in making effective antimalarial drugs available in health centers for several years after resistance had rendered chloroquine ineffective.

## Evaluation design and methods

The IIP evaluation team worked with UNICEF-Mali, the Government of Mali and other partners to adapt the generic ACSD evaluation design to ACSD as implemented in Mali. The primary data sources for estimates of intervention coverage were the demographic and health surveys (DHS) conducted in 2001 and 2006, and a supplemental 2007 survey linked to the 2006 DHS that over-sampled in the six ACSD HIDs (table 1a). Full birth histories from the 2006-7 DHS were used to estimate child mortality both before and after ACSD implementation.

Information was collected and summarized in order to document ACSD intervention activities and contextual factors through key informant interviews, document reviews and field visits by a team from the University of Bamako to each of the HIDs between September and November 2007. Primary analyses compared levels and trends of intervention coverage, nutritional status and under-five mortality in the HIDs over time and relative to trends over time in a national comparison area. The comparison area was defined as all of Mali after excluding metropolitan Bamako and the HIDs. Changes to inequities by socioeconomic status were determined by comparing priority indicators across quintiles of household assets over time in both the HIDs and comparison areas; descriptive results are presented by the sex of the child, urban/rural residence and the primary ethnic group affiliation of the household head for both areas. All results and interpretations were reviewed with representatives of the Government of Mali and UNICEF-Mali on several occasions.

## Results

In Mali, coverage for many of the interventions supported by ACSD improved over time in the HIDs. Substantial gains were observed for vaccination, vitamin A for children and postpartum women, ITNs for children and pregnant women, antenatal care and skilled attendance at delivery. Coverage for these

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<sup>i</sup> As for EPI+ activities, key informants noted that ACSD support (per diems and transport) for outreach decreased and/or ceased in 2004 and 2005 in at least some of the HIDs.

interventions also improved in the national comparison area. For seven of these fifteen interventions showing improvement, however, the positive change in the HIDs was significantly greater than that in the comparison area. In the HIDs, careseeking for pneumonia remained at about the same level of coverage and exclusive breastfeeding declined by more than 10 percentage points, and these coverage declines were significantly steeper than those in the comparison area. Treatment with an antimalarial decreased in both the HIDs and comparison area.

For coverage, the findings were:

- (a) ACSD implementation was associated with increases of 10 pp or more for 11 of the 18 interventions targeted by ACSD and implemented in Mali;
- (b) Coverage increased significantly more rapidly in the HIDs than in the comparison area for six interventions, but decreased more rapidly for three interventions.

Based on the cause of death profile for children under-five in Mali, exclusive breastfeeding and careseeking for pneumonia are two of the interventions with the greatest potential impact. Coverage levels for both of these interventions improved in the comparison area but not in the HIDs.

For nutrition, the findings were:

- (a) The HIDs showed a reduction over time in stunting, no change in underweight and an increase in wasting prevalence. None of these changes were statistically significant except for the decline in stunting, which was largely due to a decrease in the prevalence of severe stunting;
- (b) Changes in nutritional status over the course of the study period were similar in the HIDs and the comparison area. The reduction in stunting prevalence was consistent with the nationwide trend during the study period. Increases in wasting documented in both HID and comparison area were likely to be due to seasonal differences the timing of baseline and endline surveys.

For mortality, the findings were:

- (a) There was a significant reduction of 24% in under-five mortality in the HIDs, very close to the stated goal of 25%.
- (b) Under-five mortality fell at a similar rate (31%) in the national comparison area, and rates of decline were generally similar between the HIDs and the comparison area for all age subgroups.

Finally, we examined trends in inequities in coverage, nutrition and mortality indicators. Our findings were:

- (a) ACSD implementation was associated with reduced inequities in intervention coverage across socioeconomic, urban/rural and ethnic groups in the HIDs. No evidence was found of an association between ACSD and changes in equity of nutritional status or mortality. Sex inequalities were virtually non-existent.
- (b) The HIDs were more successful than the comparison area in reducing socioeconomic and urban/rural inequities in coverage of selected interventions. Ethnic group disparities declined similarly in both areas.

## Discussion and interpretation

Our results show that ACSD had a positive impact on coverage for many of the ACSD interventions, and especially those delivered through outreach or Child Health Day campaigns. ACSD was associated not only with rapid increases in coverage for these interventions, but also with improvements in equity across socioeconomic groups. An important failure of ACSD in Mali is that two of the family practices most directly related to under-five mortality – exclusive breastfeeding and careseeking for pneumonia – did not increase at all in the HIDs, but did improve (albeit only slightly) in the comparison area. The HIDs also showed a reduction in stunting and a 24% decline in under-five mortality. The answer to our first question

– “was ACSD implementation associated with improvements in coverage, nutrition and mortality over time?” – is therefore positive when judged in terms of the intervention areas alone.

The national comparison area in Mali also showed substantial improvement in intervention coverage, stunting prevalence and under-five mortality during this period, however, so our answer to the second question, “was progress in the ACSD districts faster than that observed in the national comparison area?” is “no”. If ACSD was aimed at “accelerating” progress above and beyond that of the nation as a whole, this goal was not achieved in Mali.

We examined the possible role of contextual factors as explanations for our results, and conducted secondary analyses where warranted. We were unable to identify any major changes in socioeconomic or environmental conditions, humanitarian crises or national policies affecting the HIDs and the national comparison area differentially that would have changed our major conclusions. The main factor affecting the interpretation of our results was the strong presence of other health programs, including ACSD expansion areas in 38 of the 47 comparison districts. Additionally, available information suggests that ACSD served as a catalyst for other partners to adopt similar strategies and in 2007, the Malian Ministry of Health approved a national child survival strategy that contained many elements based on the ACSD experience.

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UNICEF-Mali staff were responsible for working with governments and partners to implement the ACSD project and collaborate in activities related to the independent retrospective evaluation and we thank them for their commitment to child survival and to the evaluation process as a means of improving program effectiveness. We would like to express our appreciation to Marcel Rudasingwa, Robert Ndamobissi, Raimi Osseni, Etienne Dembelé, Dougoufana Bagayoko and Alpha Telly Diallo. UNICEF-Mali also provided financial support for the supplemental survey and advanced technical assistance from Macro, International. This support was essential, as without it there would have been few data to analyze. We would also like to thank UNICEF staff at regional and global levels for their efforts to provide us with documentation about ACSD and the values and conceptual frameworks that guided its implementation.

Additionally, we would like to thank the members of the IIP-JHU for their insights and help throughout the evaluation, as well as Macro International and Trevor Croft for technical assistance. Finally, we thank the leadership of UNICEF and CIDA, for their continuing commitment to the importance of independent evaluations and their efforts to see that this work was completed.

## Acronyms

ACSD	Accelerated Child Survival & Development Project
ACT	Artemisinin combination therapy for use in treating fever/malaria.
ANC	Antenatal care
ANC+	One of the ACSD intervention packages, consisting of antenatal care and the intermittent prevention of malaria during pregnancy (IPTp)
BASICS	Basic Support for Institutionalizing Child Survival, a project supported by the United States Agency for International Development.
CFA	Central African Francs, the currency used in Benin, Mali and Senegal. On 7 January 2007, Forex quoted the exchange rate as USD1 = CFA 504.
CDC	US Centers for Disease Control and Prevention
CHW	Community health worker
CIDA	Canadian International Development Agency
C-IMCI	Community component of Integrated Management of Childhood Illness
CPS	<i>Cellule de Planification et de Statistique</i> (National statistics office under the Malian Ministry of Health)
DHS	Demographic and Health Surveys (DHS), supported by USAID.
DNSI	<i>Direction Nationale de la Statistique et de l'Informatique</i> , (National statistics office under the Malian Ministry of Planning and the Interior)
DPT	Diphtheria, Pertussis, Tetanus immunization
EPI	Expanded Programme on Immunization
EPI+	One of the ACSD intervention packages, consisting of the full EPI schedule as well as the provision of vitamin A and deworming twice each year for children aged six to 59 months, and the provision of insecticide-treated nets for the prevention of malaria.
F-IMCI	Facility component of Integrated Management of Childhood Illness, which includes improving the skills of facility-based health workers as well as strengthening aspects of the health system needed to provide appropriate care for children less than five years of age.
Hib	<i>Haemophilus influenzae</i> type b immunization
HIDs	“High-impact” districts for ACSD implementation, defined as Kolokani, Banamba, Bla, Niono, Koro and Djenne in Mali
IEC	Information, Education and Communication
IIP	The Institute for International Programs at JHU
IMCI	Integrated Management of Childhood Illness

IPTi	Intermittent preventative treatment for malaria in infancy
IPTp	Intermittent preventative treatment for malaria in pregnancy
ITN	Insecticide-treated net
JHSPH	The Johns Hopkins University Bloomberg School of Public Health
MBB	Managing Budgets for Bottlenecks, a tool developed by UNICEF and the World Bank to support results-based planning for maternal, newborn and child survival in developing countries.
MDG	Millennium Development Goal
MDG-4	The fourth millennium development goal, which aims to reduce mortality among children less than five years of age by two-thirds from levels in 1990.
MICS	Multiple Indicator Cluster Survey designed by UNICEF
MOH	Ministry of Health
NGO	Non-governmental organization
ORS	Oral Rehydration Salts, usually pre-packaged in a sachet
ORT	Oral Rehydration Therapy, can be either pre-packaged in a sachet or prepared in the home
PMTCT	Prevention of mother-to-child transmission of HIV
SIAN	<i>Semaines d'Intensification des Activités de la Nutrition</i> (Weeks of Nutritional Activity Intensification)
SP	A combination of two drugs, sulfadoxine and pyrimethamine. This drug combination is commonly known as Fansidar.
TT	Tetanus toxoid vaccination
USAID	United States Agency for International Development

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# 1. The external retrospective evaluation of ACSD in four countries

UNICEF implemented the Accelerated Child Survival and Development (ACSD) project between 2002 and 2005 in 11 countries in Africa with support from Canadian CIDA and other partners. The main objective was to use results-based planning techniques to increase coverage with three packages of high-impact interventions known to reduce child mortality (see Box 1). In Benin, Ghana, Mali and Senegal, 16 “high-impact” districts worked to deliver all three packages; in the remaining countries, the focus was on the “EPI+” package that included vaccination, Vitamin A and insecticide-treated nets (ITNs) for the prevention of malaria. Internal UNICEF evaluations in 2003 and 2004 showed increases in coverage for the EPI+ package in all countries; UNICEF modeled the associated reductions in mortality using the “Marginal Budgeting for Bottlenecks” (MBB) tool and estimated an overall mortality reduction of 20% in the “high-impact” districts in the four countries, relative to comparison districts.

UNICEF and the evaluation team recognized the limitations of a retrospective evaluation, including the difficulties associated with reconstructing project assumptions and activities on a *post hoc* basis, and making the best possible use of available data and information despite their shortcomings.<sup>2</sup> Readers are reminded to treat the results with caution.

The aim of the evaluation is to provide valid and timely evidence to child health planners and policy makers about the effectiveness of ACSD Phase I in reducing child mortality and improving child nutritional status. The specific objectives are:

1. To evaluate the impact of ACSD on mortality and nutritional status among children under five.
2. To document the process and intermediate outcomes of ACSD and results-based planning as a basis for improved planning and implementation of child health programs.
3. To document the contextual factors necessary for effective implementation of efforts to reduce child mortality in order to be able to extrapolate evaluation findings to other settings.
4. To assess the process, outcomes and impact of ACSD and results-based planning on socio-economic, ethnic and gender inequities.

Achievement of these objectives should also expand regional and global capacity for large-scale effectiveness evaluations of strategies, programs and interventions designed to improve child health in low-income countries.

## Box 1:

### ACSD High-Impact Implementation Packages\*

#### **Immunization plus (EPI+)**

- Routine immunization and periodic measles catch-up and mop-up
- Vitamin A supplementation bi-annually
- Distribution and promotion of Insecticide Treated Nets for all children who are fully vaccinated as well as pregnant women, and re-dipping of bednets every six months

#### **Improved management of pneumonia, malaria and diarrhea (IMCI+)**

- Promotion of exclusive breastfeeding for six months, timely complementary feeding
- Improved and integrated management (at the health facility, community and family levels) of children suffering from ARI, malaria and diarrhea, including home-based ORS use, treatment of malaria with anti-malarial blisters, and treatment of ARI with antibiotic blisters
- Promotion of household consumption of iodized salt

#### **Antenatal Care (ANC+)**

- Intermittent preventive treatment (IPT) of malaria with SP (Fansidar) for pregnant women
- Tetanus immunization during pregnancy to prevent maternal & neonatal tetanus
- Supplementation with iron/folic acid during pregnancy and with vitamin A post-partum.

\* UNICEF grouped these interventions into paragraphs in different ways at various points during the project; we have adopted the grouping used in the final report from UNICEF to CIDA for the ACSD project in 2005.<sup>1</sup>

## 1.1 Evaluation design

### ***Geographic focus.***

The global retrospective evaluation covers the four countries within which UNICEF defined districts as “high impact” for the ACSD project. Within each country, we focus on these “high-impact” districts (HIDs).

### ***Development of a generic impact model for ACSD.***

The first step in any evaluation is to define what those implementing the project expect to happen because of project activities. We developed an impact model that specifies the pathways through which UNICEF and implementing countries expected ACSD activities to result in reductions in child mortality.<sup>3</sup> Figure 1 presents the generic ACSD impact model in two parts. Figure 1A shows the “top” of the framework describing expected ACSD inputs and processes from the point of introduction at national level in a country through the definition of the three packages of interventions recommended for accelerated implementation (see Box 1 for a description of the three packages). We derived the “top” of the framework from ACSD documents<sup>8,9,4</sup> and discussions with ACSD implementers at all levels. Figure 1B shows the “bottom” of the framework, defining the pathways through which each of the three packages was expected to result in reductions in under-five mortality and improvements in the nutritional status of infants and young children. ACSD documents did not describe the pathways in the “bottom” of the model in detail, but made reference to other sources where the effects of the interventions are defined and quantified.<sup>5,6</sup> For the internal evaluation,<sup>1</sup> UNICEF utilized the estimates of effectiveness published in these sources and changes in intervention coverage as the basis for modeling the impact of ACSD on child mortality.

A central tenet of the evaluation is that the coverage, family practices and impact reflected in the “bottom” of the framework cannot be attributed to ACSD alone. UNICEF and country partners designed ACSD to reinforce existing activities in child survival by the government of each country and its partners. Therefore, increases or decreases in coverage and mortality must be understood as the result of a combined implementation effort, tempered by contextual factors. A key challenge for the current evaluation is to arrive at a qualitative assessment of ACSD’s role as a part of this overall effort; quantified attribution of the results to ACSD alone is not warranted given the implementation approach.

### ***Definition of priority indicators for coverage and family practices.***

Priority *coverage indicators* address the prevalence of key family practices and intervention coverage for each of the elements defined in the “bottom” of the framework. Although some of these indicators reflect behaviors—such as exclusive breastfeeding and complementary feeding—rather than intervention coverage, these will be referred to as coverage indicators throughout the text. Appendix D defines the priority indicators of coverage utilized in the evaluation. Whenever possible, the ACSD priority coverage indicators are consistent with those supported by a consensus of United Nations (UN) agencies and multi- and bi-lateral partners for tracking progress toward MDG-4.<sup>7,8</sup> Where no international consensus indicator exists, we contacted technical experts in the topical area to obtain advice on selection of a valid coverage indicator that could be calculated using the data available in Mali.

### ***Definition of priority indicators of impact (nutrition and mortality).***

The main objective of the ACSD project was to reduce mortality among children less than five years of age. Our primary impact indicator in the evaluation is the under-five mortality rate, expressed as the probability of dying between birth and exact age five years. Additional priority indicators include infant and child mortality. Some ACSD project documents described expected improvements in child nutritional status, reflecting the synergy between undernutrition and infectious disease.<sup>9</sup> Priority impact indicators include prevalence of stunting, wasting and underweight. Appendix D presents the detailed definitions of the priority indicators for mortality and nutritional status.

Figure 1A

## ACSD impact model: “Top” model showing inputs and processes

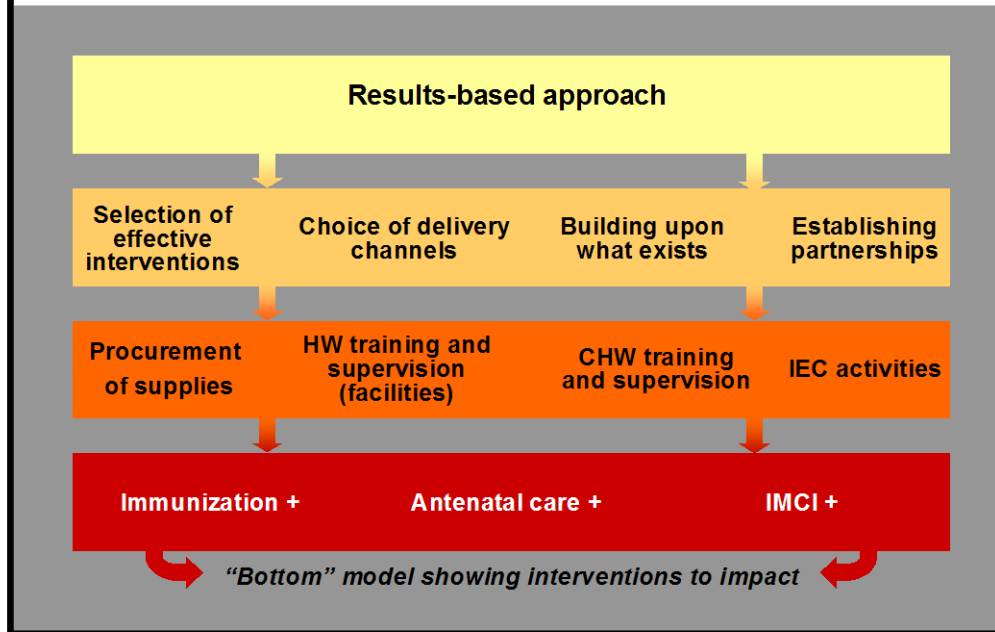
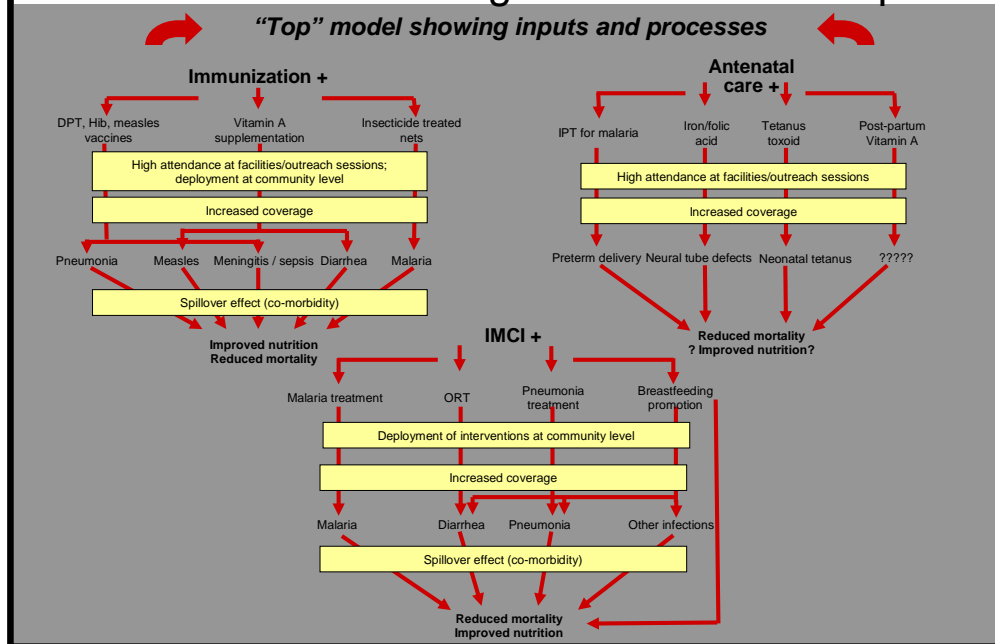


Figure 1B

## ACSD impact model: “Bottom” model showing interventions to impact



### ***Equity.***

We also examine inequity in coverage and impact indicators, including socio-economic status, sex of the child, place of residence (urban or rural) and ethnic groups.

### ***Documenting contextual factors.***

Contextual factors, defined as variables that can confound the association between the delivery of interventions and their health impact, or modify the effects of the approach,<sup>10</sup> were documented in each of the HIDs. Two types of contextual indicators were documented: (1) indicators of implementation-related contextual factors such as characteristics of the health system (e.g., utilization rates), child health policy, drug policy, and availability of drugs; and (2) indicators of impact-related contextual factors including baseline levels and patterns of child morbidity and mortality that can affect the potential magnitude of program impact.<sup>10</sup>

## 2. Evaluation Methods

### 2.1 Evaluation design

#### ***Overall design.***

The overall design was retrospective, drawing on existing population-based surveys with oversampling in the six ACSD “high-impact” districts (HIDs); the additional samples were commissioned for the purpose of this evaluation. We re-analyzed data sets whenever possible to ensure that the indicator definitions were correct and consistent. Preliminary results were reviewed in meetings of the evaluation team with representatives of the Mali Ministry of Health, the national statistics offices (CPS and DNSI), and the UNICEF country office in Bamako, Mali in October 2007, Dakar, Senegal in October 2007 and Bamako, Mali in June 2008.

#### ***Coverage and family practice indicators.***

We reanalyzed existing household survey data to calculate the ACSD priority coverage and family practice indicators. As described above, these indicators are consistent with those used internationally for monitoring progress toward the Millennium Development Goals<sup>7,8</sup> and are presented in appendix D. Appendix E provides the specific survey questions used for indicator calculations.

#### ***Nutrition and mortality indicators.***

We reanalyzed existing household surveys to calculate the priority nutrition indicators using the 2006 WHO Growth Standards.<sup>11</sup> Appendix L and section 6 present more details on these methods. For calculation of priority mortality indicators, we analyzed mortality retrospectively, using direct child mortality estimates based on full birth histories collected in the 2006-7 DHS.

#### ***Intervention areas.***

The intervention areas included the six health districts selected for ACSD “high-impact” implementation: Banamba and Kolokani in the Koulikoro region, Niono and Bla in the Segou region, and Koro and Djenné in the Mopti region. These will be referred to as HIDs or “high-impact” districts.

#### ***Comparison groups.***

We defined the comparison area as all of Mali excluding the HIDs and the metropolitan area of Bamako. Bamako was excluded because access to services and living conditions differ considerably from the predominantly rural HIDs.

#### ***Intervention activities.***

We documented the timing and scale of intervention activities using information collected from field visits to the HIDs, key informant interviews and document review, such as administrative and supervision reports and monitoring data, (See appendix B for details).

#### ***Equity.***

To examine inequities, we performed analyses of selected intervention coverage and impact measures stratified by sub-groups of the population, including household assets (expressed in quintiles), sex of the child, place of residence (urban/rural) and ethnic group.

#### ***Contextual factors.***

We collected standard information on contextual factors, defined above, in order to assist in interpretation of the results and the potential contributions of ACSD. Certain elements, such as economic status, ethnicity and access to clean water were reanalyzed for HIDs and comparison areas using existing household survey data. Field visits to the HIDs, key informant interviews and document review provided

contextual information not available in existing surveys. A program mapping exercise, carried out by investigators at the University of Bamako, documented health and development activities in the HIDs and nationally between 1999 and 2007. Appendix B provides further details on the methods used to collect contextual factors.

## 2.2 Data sources and methods

Tables 1a and 1b summarize the different types of information used in the evaluation. The primary data sources for estimates of intervention coverage were the demographic and health surveys (DHS) conducted in 2001 and 2006, and a supplemental 2007 survey linked to the 2006 DHS that over-sampled in the six ACSD HIDs (table 1a). These surveys used comparable methodologies, with data quality controlled by Macro International. We used the 2006-7 DHS to estimate child mortality both before and after ACSD implementation. The full-birth history method used to collect mortality data allows the calculation of period estimates of mortality ranging from the previous 12 months to 10 or more years in the past. The oversampling of the DHS 2006 allowed for more precise child mortality estimates. Section 7 describes the mortality analysis methods in detail.

Other survey data were available, but were given lesser prominence in the analyses because they did not fully meet the quality criteria established for the evaluation. These criteria were: 1) full data sets and documentation, including sampling weights, available to the evaluation team so that the data could be reanalyzed using the standard definitions for priority indicators; and 2) no more than 5% missing values on key socio-demographic variables (e.g., child age) or the variables needed to construct the priority indicators. We did not use the data from the CDC-ACSD 2003 survey in our primary analyses because they did not fulfill these criteria. However, these data are used to explore time trends between 2001 and 2006-7. Appendix F provides descriptions of the methodology and conduct of all surveys presented in the evaluation, as well as overviews of other data not utilized in the evaluation. Full documentation of 2003 ACSD-CDC survey data quality issues is available upon request from JHU evaluation team.

Table 1b presents sources of information used in the documentation of intervention activities and contextual factors. We collected information through: 1) key informant interviews; 2) field visits; 3) review of documents, including administrative and monitoring reports; and 4) searches and review of published and grey literature. Available information regarding ACSD expenditures from 2002 to 2004 was also utilized to confirm the inputs associated with ACSD implementation. Much of the required information was only available at the regional and district levels. A team from the University of Bamako carried out field visits to each of the HIDs between September and November 2007 in order to compile routine health information system data, to collect administrative documents and to interview key informants.

Due to the retrospective nature of the evaluation, it was difficult to collect complete and standardized information on ACSD implementation and other health activities in the HIDs. Many of the individuals involved in the implementation of ACSD are no longer in their original posts. Furthermore, the collaborative nature of ACSD makes it difficult to distinguish which activities were: 1) carried out as part of the ACSD program, 2) carried out with only partial technical and/or financial support from the ACSD program, or 3) carried out by ACSD partners, but independent of the ACSD program. Documents providing full and quantitative descriptions of the ACSD activities were not available for all activities; for example, information about ACSD implementation in Bla and Niono in the Segou region is less complete than for the other HIDs.

**Table 1a:** Data sources for the independent retrospective evaluation of ACSD in Mali, population-based surveys.

TYPE OF DATA	DESCRIPTION	USE IN EVALUATION
<b>Population-based surveys that met inclusion criteria</b>	<u>DHS 2001</u> : Nationally representative household survey conducted from January to May 2001.	Used to establish baseline levels of priority coverage and nutrition indicators in HIDs and comparison areas.
	<u>DHS 2006</u> : Nationally representative household survey conducted from April to December 2006.	Used to estimate coverage, nutrition and mortality indicators in comparison areas in 2006.
	<u>Supplemental survey in high impact districts</u> : Additional 2672 households in HIDs surveyed using DHS methods in June and July 2007.	Used in combination with data collected by DHS 2006 in the six HIDs to estimate coverage, nutrition and mortality indicators in ACSD HIDs.
<b>Other population-based surveys</b>	<u>CDC-ACSD 2003</u> : Household survey of 2503 households in HIDs carried out in August 2003.	Reported, but given limited weight in analysis due to concerns about data quality.

**Table 1b:** Data sources for the independent retrospective evaluation of ACSD in Mali, routine data, administrative reports and key informant interviews.

TYPE OF DATA	DESCRIPTION	USE IN EVALUATION
<b>Administrative reports</b>	<p><u>Training and workshop reports:</u> Over 15 summative reports pertaining to training of trainers, training of health providers and community workers, and workshops to develop strategies, materials and capacity.</p> <p><u>Supervision and monitoring reports:</u> Over 60 summative reports describing supervision and monitoring activities and findings.</p> <p><u>Administrative and routine activity reports:</u> Over 70 documents pertaining to ACSD and MOH planning and activities, including notes from routine meetings, ACSD consultant activity reports, outbreak investigations, etc.</p>	Documentation of ACSD and partners' activities.
<b>Job aids and tools</b>	Job aids and tools, such as visual aids and register books, used in the implementation of ACSD were collected and reviewed where possible.	Documentation of ACSD and partners' activities.
<b>Summary reports &amp; presentations</b>	Over 30 reports and presentations compiled by UNICEF and partners summarizing the activities, results and challenges of ACSD and other child survival activities.	Documentation of ACSD activities.
<b>Survey reports, maps &amp; other documents</b>	Over 50 survey reports, maps, and other documents pertaining to contextual factors and child survival activities in Mali were collected during field visits and through literature searches.	Documentation of contextual factors.
<b>Key informant interviews</b>	Over 25 interviews and focus groups conducted with key informants in the six HIDs and Bamako.	Documentation of ACSD activities and contextual factors.
<b>Working discussions</b>	Reports of collaborative discussions in Bamako and Dakar (October 2007) and Bamako (June 2008) to review preliminary results and refine analyses with UNICEF-Mali staff, MOH officials, and Mali statistical agencies (CPS and DNSI) staff.	Discussion and documentation of ACSD activities and contextual factors.

## 2.3 Analysis

We have employed the Habicht et al. framework for real-life evaluations.<sup>12</sup> Start with an adequacy evaluation, we assessed whether trends in coverage, nutrition and mortality indicators moved in the expected direction within the ACSD area, and whether goals were met. Next, we carried out a plausibility evaluation, in this case a controlled, non-randomized study that assessed whether observed impact can be attributed to program implementation. ACSD in Mali was a combination of separate interventions – vaccines, mosquito nets, vitamin A supplementation, etc – that are highly efficacious if delivered optimally at high coverage. This evaluation does not assess the efficacy of these interventions, but instead focuses on their impact when delivered under routine conditions. The evaluation team worked with national counterparts to conduct the analysis of coverage and nutrition in four steps.<sup>ii</sup> Each step is explained below.

### **Step 1: Generating indicator levels for each survey in the analysis.**

*Objective:* To describe levels of priority indicators for coverage and family behaviors in all surveys included in the analysis, overall and for specific subsets of children defined by age, sex, geographic location of the household, and mothers' education and socioeconomic status, where sample sizes permit. We applied standard indicator definitions for the reanalysis of all datasets to ensure the comparability of indicators over different surveys. For each indicator, only data for women and children with known responses for that indicator were included in the analyses; cases with missing or unknown data were excluded. The point estimates of indicators presented here may therefore differ slightly from those calculated using standard DHS and MICS tabulation programs, which do not exclude missing records from the analyses.

### **Step 2: Comparing rates of change over time within HIDs (“time trends”).**

*Objective:* To determine whether there were statistically significant differences in indicator levels within the HIDs in each country from *before* ACSD was implemented to *after* ACSD was implemented, with a mid-point during the process of implementation where data are available, overall and for specific subsets of children. This step refers to the adequacy evaluation.

### **Step 3: Comparing rates of change between ACSD and non-ACSD districts within each country (“time trend with comparison”).**

*Objective:* To determine whether there were statistically significant differences in the rates of change for indicator levels between the HIDs and a defined comparison area where ACSD was not implemented (the comparison area is comprised of the rest of Mali, excluding Bamako and the HIDs), overall and for specific subsets of children.

### **Step 4: Attributing improvements to ACSD and related child survival activities at country level.**

*Objective:* To determine whether any statistically significant changes in indicator levels can be attributed to ACSD activities, including activities implemented by others in collaboration with ACSD and the national child survival plan, overall and for specific subsets of children. Steps three and four refer to the plausibility evaluation, assessing whether progress was greater in the HIDs than in the comparison area, and whether or not external factors can account for these differences.

For all comparisons of coverage and prevalence of undernutrition across time and geography, we initially calculated a simple chi-square statistic of difference. The simple chi-square statistic does not take into account the design effect of the survey, thus it under-estimates the variance. If no statistical differences were observed using the simple chi-square statistic, we assumed that none would be observed after the design effect was taken into consideration (adding to the variance) and that the groups were therefore not statistically different from one another. For comparisons with a significant chi-square, we calculated standard errors and 95% confidence intervals that take into account the survey design effect, using the Taylor Linearized Variance method. We used a “difference-in-differences” approach to compare whether

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<sup>ii</sup> Section 7 explains the analysis of mortality in more detail.

the change in each indicator over time differed significantly between the HIDs and comparison area for the plausibility analyses.

### 3. Characteristics of the “high-impact” districts and comparison area

This section presents pertinent characteristics of Mali as a whole and the HIDs and comparison area. We emphasize differences between the HIDs and comparison area, as well as factors that have changed over the evaluation period to help guide the interpretation of evaluation results. Some of the quantitative results (table 2) presented here are based on our re-analyses of available survey data, because these provide the most recent information disaggregated by the HID and comparison area. Appendices A and J present additional information on the geographic, socio-demographic, economic, health and health service factors in Mali and the HIDs.

#### 3.1 The Mali context

Mali is a land-locked country located in West Africa, and is one of the poorest countries of the world, ranked 175 out of 177 countries in the 2006 Human Development Index.<sup>16</sup> Its estimated population is 13.8 million, and the country is divided into 8 regions, comprised of 59 health districts, including the communes of Bamako. In the most recent DHS, the under-five mortality rate was estimated at 191 and an infant mortality rate at 96.<sup>17</sup> The French colonized Mali in the mid-1800s, and Mali declared independence in 1960. After 23 years of military dictatorship, the government was returned to civilian rule in 1991. Amadou Toumani Touré, who led the 1991 overthrow and ceded power to elected civilians the following year, was elected

Figure 2: Map of Mali and its neighbors

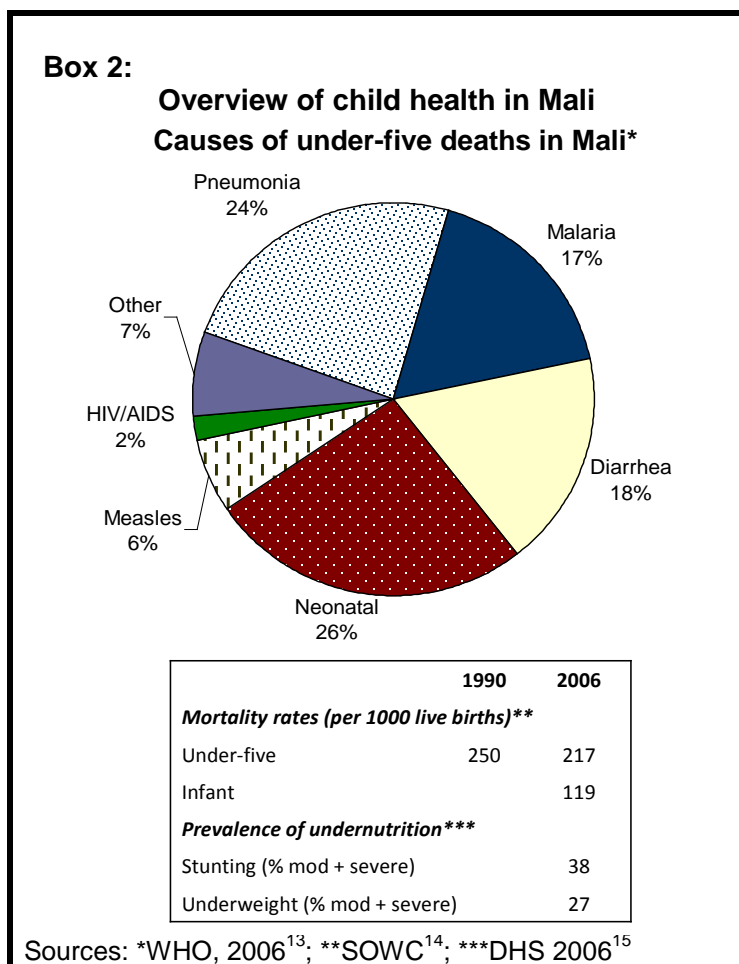


president in 2002. He recently won a second term in the first round of presidential elections in April 2007.

Mali is one of Africa's largest cotton producers and is a member of the West African Financial Community, which uses the CFA as currency. The World Bank estimated the GNI per capita in 2006 as US\$380.<sup>18</sup> Appendix A presents further information about Mali.

#### 3.2 Child health in Mali

The population of children under age five was estimated at about 2.3 million in 2006. The under-five mortality rate has decreased from 250 per 1000 live births in 1990 to 217 per 1000 live births in 2006, a reduction of 13%. This rate of reduction falls short of that needed for Mali to achieve the two-thirds reduction from 1990 levels defined by the fourth Millennium Goal (83 per 1000 live births). Box 2 shows the major causes of under-five deaths in Mali in 2003, as reported by WHO.<sup>13</sup> About one-quarter of all under-five deaths occur in the neonatal period. Among these deaths, infections account for approximately one-third (34%) with the remainder attributed to preterm births (24%), asphyxia (19%), tetanus (10%)





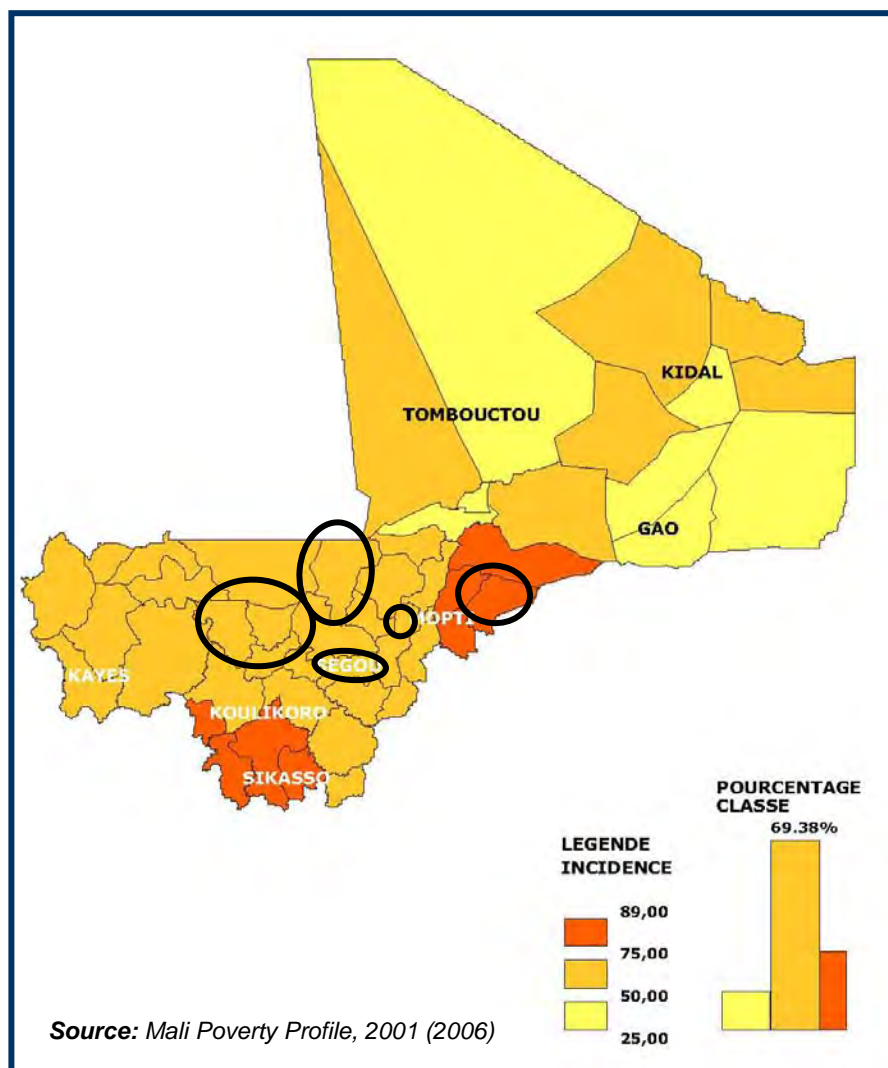
### 3.4 Socio-economic and demographic factors

Figure 4 shows the incidence of poverty in the HID, and the geographic comparison area as measured in 2001.<sup>20</sup> The estimated incidence of poverty in Mali was high; the six HID, noted in the call-out boxes, are similar to the rest of the country in their poverty profile. Table 2 presents socio-demographic variables as measured in household surveys in 2001 and 2006-7 in the HID and comparison area. We measured relative socioeconomic position using wealth quintiles developed from household asset and housing material variables. Households in the HID were significantly poorer than households in the comparison areas at baseline. In 2006-7, the HID and comparison areas were not significantly different in relative household wealth. Available data suggests that economic indicators are improving in Mali as a whole, the World Bank estimates that the percent of the population living poverty fell from 55.6 to 47.4% between 2001 and 2006. Similarly, a higher proportion of households in both the HID and comparison area reported owning consumer goods, such as televisions, telephones and motorcycles in 2006-7 relative to 2001. Improvements in infrastructure and housing quality over time are also evidenced by the growing proportion of households with electricity and finished flooring, with slightly greater gains in the HID (table 2). Summing up, socioeconomic conditions improved over time in both areas, and were slightly worse off in the HID at baseline, but similar to the comparison area in 2006-7.

As a whole, women's education levels and literacy in Mali are among the lowest in the world.<sup>14</sup> Education and literacy among women were less favorable in the HID at baseline, while in 2006-7 the frequency of any formal education among women was similar in the two areas.

The Dogon ethnic group makes up a higher proportion of the population in the HID than in the comparison area, reflecting the fact that they are concentrated in the northern districts of Koro and Djenné in the region of Mopti. Other than slight fluctuations likely due to sampling, the ethnic make-up of households in each area was similar between 2001 and 2006-7.

**Figure 4:** Incidence of poverty in Mali in 2001, with ACSD "high impact" districts in call-outs



**Table 2:** Selected characteristics of the ACSD high-impact districts and the geographic comparison area (all other areas of the country excluding the high-impact districts and Bamako), as measured in the DHS 2001 and 2006-7, Mali.

INDICATORS	2001 DHS					2006-2007 DHS				
	HIGH IMPACT DISTRICTS		GEOGRAPHIC COMPARISONS‡		p	HIGH IMPACT DISTRICTS		GEOGRAPHIC COMPARISONS‡		p
	n*	%	n*	%		n*	%	n*	%	
<b>Ethnicity</b>										
Bambara		39		33			38		26	
Malinke		3		9			3		8	
Peulh		11		14			10		16	
Sarakole	1355	10	9248	13	<0.01	3884	13	12479	12	<0.01
Sonrai		2		7			3		11	
Dogon		21		6			18		5	
Tamacheç		2		2			2		5	
Senoufo		8		9			8		9	
Bobo		0		5			1		2	
<b>Wealth quintiles</b>										
Poorest		34		24			24		22	
Poorer	1572	19	9348	19	<0.01	3884	21	10044	20	>0.10
Poor		18		19			20		21	
Less poor		15		19			20		18	
Least poor		14		19			16		19	
<b>Selected Assets</b>										
Electricity		2		5	0.03		8		10	>0.10
Television	1572	5	9348	9	<0.01	3884	15	10044	16	>0.10
Phone (landline/mobile)		0		1	>0.10		11		10	>0.10
Motorcycle		20		18	>0.10		33		27	<0.01
Finished floor		14		29	<0.01		69		63	0.03
<b>Education among women</b>										
Any education	1377	11	11472	21	<0.01	4552	16	12479	17	>0.10
<b>Literacy among women</b>	1374	7	9297	9	>0.10	4526	11	10911	12	>0.10
<b>Hygiene§</b>										
Improved water source	1581	35	9353	36	>0.10	3882	49	10044	50	>0.10
Improved sanitation	1565	41	9122	43	>0.10	3884	48	10051	54	0.05
<b>Rural residence</b>	1581	86	9353	85	>0.10	3884	88	10051	77	0.01

\*Weighted  
‡Excluding Bamako and High Impact districts  
§ MDG definitions

### 3.5 Environmental characteristics

Mali is a vast, sparsely populated country, with over 1.2 million square kilometers of territory and, on average, fewer than nine persons per square kilometer. The climate is characterized as subtropical to arid; with levels of rainfall varying substantially from the south to the north of the country. The HIDs, located in the central areas of the country, are part of the Sudan zone (550-1000 millimeters average annual rainfall) and the Sahel zone (250-500 millimeters average annual rainfall). To the north of the HIDs lies the Sahara desert, with sporadic rainfall, averaging less than 250 millimeters annually. Longer growing seasons and greater annual rainfall (over 1,100 millimeters) characterize the Sudano-Guinea and Guinea zones to the south of the HIDs. The rainy season usually spans June to November.<sup>21</sup> Malaria transmission follows climactic patterns, with highly seasonal transmission throughout the country, ranging from six months of transmission in the south to relatively little malaria transmission in the Saharan north.

The HIDs fall in the central swath of malarial transmission, with transmission seasons of between three and five months in length.<sup>22,23</sup> During the evaluation period, resistance of malaria parasites to chloroquine grew.<sup>24</sup>

Water sources and sanitation facilities were similar in both areas at baseline, and increased over time in both the HIDs and comparison areas. The proportion of urban to rural residences was similar at baseline; however, in 2006-7 the proportion of rural residents in the comparison areas had decreased 8 percentage points and was significantly different than urban-rural distribution of households in the HIDs. Urbanization occurred more rapidly in the comparison areas than in the HIDs during this time period.

Through our documentation, we attempted to identify any humanitarian crises or natural disasters. The Saharan north of Mali experiences sporadic food crises, due to erratic rains. The Saharan and Sahel regions experienced a massive food crisis in 2005 and 2006, caused by a locust invasion and erratic rainfall. The crisis particularly affected the northeastern districts of the country bordering Niger. We did not find evidence of additional humanitarian crises or natural disasters.

### **3.6 Baseline health conditions**

Section 3.2 presents a profile of child health in Mali as a whole, including the cause of death profile. Cause of death information is not available disaggregated by HIDs and comparison area. We present and consider baseline levels of undernutrition in section six and under-five mortality in section seven.

### **3.7 Health services characteristics**

#### ***Structure of health services.***

The public health sector in Mali is decentralized and largely based on a “sanitary map” (*carte sanitaire*) for each health district (*cercle*), which specifies the locations of all the community health centers (CSCoM) and their respective catchment areas, as well as district referral hospitals (CSRef). The Bamako Initiative, with its community participation and cost recovery principles, is the basis for the provision of health services. Local community associations play a management role at the district and sub-district levels, as well as determining consultation fees for services. At community health centers, these fees can range from approximately US\$0.50 to US\$2.00. Additionally, patients pay nationally set fees for medications, ranging from a few cents to tens of dollars. The health system in Mali, especially more peripheral levels, uses these user fees to support and sustain routine curative services.<sup>25</sup>

#### ***Availability of health services.***

The decentralization of the health system and financing has led to an expansion of functioning community health centers, and the associated sub-district health teams. Table 3 demonstrates the marked increase in health centers between 2002 and 2006 in the HIDs and comparison area. In Koro and Bla, six new community health centers opened in each district during the period between 2002 and 2006. The approximate coverage of health centers in the HIDs increased from 18,337 persons per health center at the beginning of 2002 to 14,991 persons per health center in late 2006. The increase in health center coverage was similar in the comparison area—increasing from approximately 19,929 to 14,786 persons per health facility between 2002 and 2006.

Table 3: Expansion of functioning community health centers between 2002 and 2006 in the ACSD “high-impact” districts, Mali

REGION	DISTRICT	EST. TOTAL POPULATION*	NUMBER OF FUNCTIONING COMMUNITY HEALTH CENTERS**	
			Jan 2002	May 2006
Koulikoro	Banamba	161,190	8	10
	Kolokani	201,807	10	10
Mopti	Djenne	169,168	13	14
	Koro	302,287	11	17
Segou	Bla	247,489	16	22
	Niono	275,031	16	18
<b>TOTAL HIDs</b>		<b>1,356,972</b>	<b>74</b>	<b>91</b>
<b>TOTAL National Comparison area‡</b>		<b>8,709,017</b>	<b>437</b>	<b>589</b>
<p>*Total population by district extracted from 2004 health statistics report and based on estimations from 1998 census</p> <p>**Extracted from administrative records listing opening dates of community health centers, through May 2006</p> <p>‡ Mali, excluding Bamako and HIDs</p>				

### Changes in health policies.

A number changes in national policies influencing child health took place during the period under evaluation. Due to growing chloroquine resistance, national policy changed to recommend ACTs as the first-line antimalarial drug in late 2005. ACTs became available in health facilities in mid to late 2007; national policy did not authorize the community-based distribution of ACTs as of June 2008.

The Government adopted a policy of providing certain interventions to mothers and children at no cost, in contrast to the national cost recovery system. ITNs, previously costing up to US\$10, were provided free of charge to women at their first ANC visit and to children upon full vaccination. ACSD first introduced this strategy in 2002 in the HIDs, and the policy has since been adopted nationally. Furthermore, in 2005 Mali changed national-level policy to provide cesarean sections free of charge.

### 3.8 Other projects that may impact child health

#### Child health partners and activities in the HIDs.

In addition to routine health services, a number of other development partners support activities in the various HIDs. World Vision has promoted appropriate infant feeding and care seeking to health centers through mothers' groups in **Koro**, and since 2005 has supported vaccination, nutrition and other child health activities in Kolokani. Plan Mali and GAVI also supported vaccination activities in the **Banamba** district during the ACSD period. In **Bla** district, *Projet Moyen Bani* has provided equipment and support to practically all community health facilities since 2001. Local NGOs have provided support for community-based workers in a number of districts, often through contracts issued by ACSD in later periods. Appendix J includes a detailed description of activities by HID.

### ***Child health partners and activities in the rest of Mali.***

Numerous development partners supported and carried out child survival and related health activities, in addition to routine government health services, in the rest of Mali (comparison area) at the same time as ACSD. The CARE-Ciawara project, with substantial bilateral funding from USAID, supported and implemented activities similar to those supported by ACSD (including vaccination, ITNs, C-IMCI, ANC) in 17 districts throughout Mali. During the period under evaluation, the USAID mission in Mali had annual health budgets over US\$10million per year, with approximately US\$5 million per year focused on child survival activities. Plan International, Helen Keller International (HKI), World Vision (WV) and Save the Children (STC), USA implemented a variety of child survival projects with USAID-Washington and other external support in the Koulikoro (Plan, HKI and WV) and Sikasso (STC) regions.

Additionally, UNICEF supported 26 “ACSD expansion” districts (out of 53 non-metropolitan districts nationally) in the regions of Koulikoro, Segou, Mopti, and Kayes in addition to the six ACSD HIDs. Support for these districts focused on the EPI+ package, including ITNs. Of the forty-seven districts included in the comparison area for this evaluation, 38 had one or more of the programs described above. Annex J provides more details on these activities and their estimated coverage and intensity.



## 4. ACSD as implemented in Mali

This section provides an overview of the ACSD activities in the HIDs. We consider adaptation of the generic ACSD package, funding, results-based planning and the timeline of activities; the inputs and activities for each ACSD component are then briefly described. The resources and time frame available for the evaluation did not allow us to document intensively ACSD activities in areas outside the HIDs.<sup>iii</sup> Appendix C includes further descriptions of ACSD implementation in the HIDs.

### 4.1 Adaptation and introduction of the generic ACSD intervention package and approach

The generic ACSD package was adapted at the national level and introduced through series of meetings at the district and sub-district levels in 2001 and 2002. ACSD worked with local government, community health committees and health staff at the district, sub-district and village levels to develop performance contracts related to the implementation of the ACSD approach.

### 4.2 Funding

UNICEF-Mali received approximately \$3.7 million from Canadian CIDA to support ACSD activities in both the HIDs and the ACSD expansion areas, with an additional \$6.1 million from other funding sources from 2001 to the end of 2004.<sup>i</sup> Additionally, UNICEF staff report that ACSD activities have been sustained since 2004 through support from UNICEF-Mali program funds as well as other external funding sources. It was not possible to estimate the additional investment per child in the HIDs given the available data.<sup>iv</sup>

### 4.3 Results-based planning

ACSD implementers at the international level chose the package of interventions to be implemented in the four “high-impact” countries based on evidence and cost-effectiveness, using the Marginal Budgeting for Bottlenecks (MBB) tool. Key informants reported that a situation analysis and planning using the MBB took place in districts and sub-district levels. The ACSD strategy set specific targets for each package. Project documents and tools refer to “micro-planning” and report that support was provided for bi-annual planning and budgeting workshops at the district and sub-district levels. We were not able to learn more about the organization or outcomes of these workshops.

Performance contracts were a part of ACSD implementation in Mali. These contracts specified the responsibilities of regional, district, local staff and community committees, and were also used as a job aid by community-health workers. The performance contracts specified that ACSD would provide essential resources (commodities, equipment and operation costs) for project activities. Unspecified rewards for catchment areas with the highest achievements in coverage and those meeting coverage targets were indicated in the contracts. Key informants reported that incentives—such as an ITN for village chiefs—were provided for local actors, although criteria for awards were not clear. We were unable to find more information about the functioning of this system in the HIDs. In the Mopti region of Mali, where two of the ACSD HIDs are located, there is a written report on the use of performance contracts within a project supported by GAVI, UNICEF and WHO.<sup>26</sup> These contracts included incentives and disincentives based on coverage rates for vaccinations and antenatal care visits.

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<sup>iii</sup> The expansion districts included the remaining districts in the regions Koulikoro (7 districts), Mopti (6 districts), and Segou (6 districts), as well as the region of Kayes (7 districts); these 26 expansion districts plus the 6 “high-impact” districts covered 32 out of 59 districts in Mali; or 32 out of 53 districts with the exclusion of urban districts in Bamako

<sup>iv</sup> We were not able to disaggregate funding by implementation area, i.e. to identify support in the HIDs versus expansion areas. UNICEF’s final report to CIDA estimated a per capita annual cost US\$0.30 through all funding sources and per capita annual costs of US\$0.12 through CIDA funding for children in the HIDs and expansion regions.

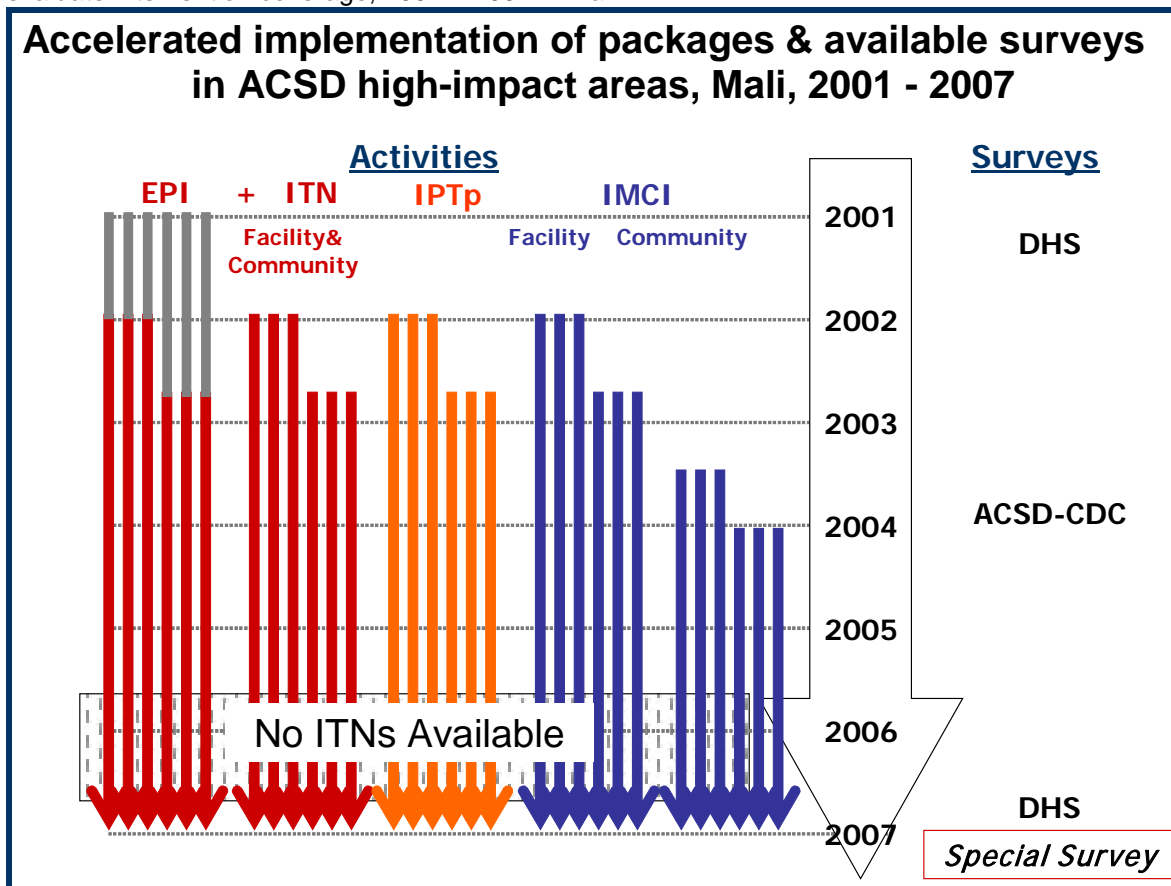
#### 4.4 National advocacy related to ACSD

Key informants reported that ACSD in Mali made important contributions to national policy. The National Health and Development Program (PRODESS II) included elements of ACSD and in 2006, the non-targeted fund of technical financial partnership incorporated ACSD activities. Key informants reported that ACSD served as a catalyst for other partners to adopt similar strategies, including USAID in 2005. In 2007, the Malian Ministry of Health approved a national child survival strategy that contained many elements based on the ACSD experience.

#### 4.5 Timeline for ACSD activities in the “high-impact” districts

Introduction of the ACSD approach at district level was staggered throughout 2002, beginning in January in Djenné district and ending in September in Koro district.<sup>27</sup> Figure 5 presents a summary timeline for the acceleration or implementation of the ACSD intervention packages, as well as for household surveys conducted in the six HIDs. These timelines are based on information obtained from key informants and document review. Table 4 provides complementary information about the timing of ACSD activities in Mali. Appendix C provides further data available concerning the timing of specific ACSD activities in each HID.

Figure 5: Time line for implementation of ACSD packages of interventions and surveys conducted to evaluate intervention coverage, 2001 – 2007 in Mali.



**Figure 5 Key:** --Bars represent districts in the following order: Kolokani, Bla, Djenné, Banamba, Niono, Koro  
 --Grey bars represent implementation before “acceleration” through ACSD

Table 4: Start times for implementation of ACSD intervention packages in the ACSD HIDs of Mali.

INTERVENTION PACKAGE	~ START IN KOLOKANI, BLA, DJENNE	~START IN BANAMBA, NIONO, KORO
EPI	Previously on-going; acceleration in 1 <sup>st</sup> quarter 2002	Previously on-going; acceleration in 3 <sup>rd</sup> /4 <sup>th</sup> quarter 2002
ITNs	1 <sup>st</sup> quarter 2002	3 <sup>rd</sup> /4 <sup>th</sup> quarter 2002
IPTp <sup>1</sup>	1 <sup>st</sup> quarter 2002	3 <sup>rd</sup> /4 <sup>th</sup> quarter 2002
Facility IMCI	1 <sup>st</sup> quarter 2002	3 <sup>rd</sup> /4 <sup>th</sup> quarter 2002
C-IMCI:	January 2003	July 2003

#### 4.6 Description of ACSD activities in the “high-impact” districts

##### **EPI+.**

##### Vaccination and vitamin A supplementation.

The HIDs began with an acceleration of the EPI+ package, including the provision of vitamin A supplements to children 6-59 months of age. These activities were already in place through the Ministry of Health (MOH) system prior to the introduction of ACSD. The health system in Mali delivers vaccines to children in four principal ways: 1) routine, facility-based vaccination; 2) routine outreach activities from community health facilities (*stratégie avancée*); 3) outreach activities to remote areas without health facilities by district-teams (*stratégie mobile*); and 4) vaccination campaigns. Key informants report that the majority of vaccine doses are administered through outreach activities rather than in fixed facilities. Vitamin A is primarily delivered through the SIAN or Weeks of Nutritional Activity Intensification (*Semaines d’Intensification des Activités de la Nutrition*) campaigns, which are jointly supported by the Government of Mali, UNICEF, USAID, WHO, Red Cross, and other partners. This national campaign combines measles and polio vaccination, supplementation of vitamin A, de-worming and distribution of bednets.

ACSD reinforced existing vaccination activities through provision of vaccines and supplies, provision of cold chain materials such as refrigerators, and support and supervision for outreach activities, including motorcycles and transportation costs. ACSD also provided support for National Immunization Days (NIDs) and SIAN campaigns, and re-training of health staff. Key informants in the districts of Koro and Djenné noted that ACSD support (per diems) for outreach activities stopped in 2004 and 2005, respectively. In Banamba, outreach visits to remote areas (*stratégie mobile*) were completed in all 12 months of 2004, but only six visits were carried out in 2005.

Table 5 summarizes available information extracted from administrative and summary reports about ACSD contributions to vaccinations and vitamin A supplementation. This information should be regarded as only partially complete, due to varying levels of detail in documents describing ACSD inputs. Appendix C presents more details about the timing of vaccination and vitamin A activities.

**Table 5:** Description of inputs related to the accelerated implementation of the EPI+ intervention package in the ACSD HIDs of Mali.

DESCRIPTION OF ACTIVITY	TIMING	GEOGRAPHIC AREA	INTENSITY OF ACTIVITY
Provision of basic medical materials, vaccines, refrigerators for cold chain and commodities; computers for monitoring	2002-2003	All 6 HIDs	Quantitative data incomplete <sup>v</sup>
Provision of new motorcycles & pinasses	2002 – 2003	All 6 HIDs	Quantitative data incomplete <sup>vi</sup>
	2006	<u>Koulikoro</u>	Distribution of 23 motorcycles for 15 health centers
Provision of 4x4 vehicles		General	Purchase of 6 Toyota 4x4
Training of facility-based health workers in EPI provision, monitoring and surveillance	2002	<u>Koulikoro</u> : Banamba	36 workers trained
Support for NIDs, local vaccination campaigns, catch-up vaccination, supervision and monitoring activities	2002-2006	All 6 “high-impact” districts	Quantitative data incomplete
Provision of vitamin A capsules	2002-2006	All 6 “high-impact” districts	Quantitative data incomplete

***Insecticide-treated nets (ITNs).***

In the ACSD strategy in Mali, children were given ITNs at no cost upon completion of the full course of EPI vaccination at age 11 months. Pregnant women were provided an ITN at the first of three recommended antenatal visits. Distribution of ITNs through these delivery platforms occurred at both facilities and through outreach activities. Key informants from Bla noted that the majority of ITN distribution occurred through outreach activities from community health centers. All nets distributed up until recently were treated with insecticide prior to distribution, and needed re-treated at 12-month intervals to remain effective. Re-treatment of bed nets is organized by the district, but is performed at the community health centers and by village volunteers, or community health workers (CHW). UNICEF fully subsidized retreatment. The only documentation of re-treatment available is reports from sub-districts to district managers about the total number of bed nets retreated annually. In some areas, household visits are also conducted by CHWs to promote and verify the use of ITNs by members of the household.

<sup>v</sup> District documents noted that ACSD provided 1 motorcycle and 1 refrigerator for the cold chain to each of 8 community health centers in Banamba district

<sup>vi</sup> In 2007, districts reported the number of functional motorcycles given by UNICEF:

- Koro: 19 functioning motorcycles
- Djenné: 14 functioning motorcycles & 12 functional boats
- Banamba: 11 functioning motorcycles

Almost total stock-outs of bednets occurred in late 2005/early 2006, and up until the first trimester of 2007. Trends observed in available monitoring data reflected these stock-outs. Key informants noted these stock-outs were associated with a decision by the government of Mali to transition to long-lasting ITNs. In addition to the global shortages of ITNs in 2005/2006, various administrative reports noted periodic stock outs of ITNs throughout the evaluation period, at both the community health center and at the district levels.

Table 6 presents a summary of available information, extracted from administrative and summary reports, about ACSD contributions to bed net distribution, promotion and treatment. As stated above, this information should not be regarded as fully comprehensive; available information is presented as an example of ACSD inputs. To provide rough guidance on the potential coverage of these activities, several of the indicators are presented as ratios per 1,000 children under 5 years, even though it is recognized that the nets were also targeted to pregnant women and may have been used by non-targeted members of the population. The data in Table 6 suggest that distribution of nets was well below what would be needed to reach every child aged under five years in 2004 and 2006 in selected districts; no information is available on the number of nets distributed prior to 2004. Appendix C provides more detail about bednet distribution, promotion and treatment.

**Table 6:** Description of inputs related to the distribution, promotion and treatment of bednets in the ACSD “high-impact” districts of Mali.

DESCRIPTION OF ACTIVITY	TIMING	GEOGRAPHIC AREA	INTENSITY OF ACTIVITY	COVERAGE ESTIMATE
Provision (stock) of bednets	2002	<u>Koulikoro, Segou &amp; Mopti</u>	Nets and treatment delivered to each region	Incomplete data
	2003	<u>Mopti</u> : Djenné	18,650 nets in stock	612 bednets in stock per 1000 children U5*
	2004	<u>Koulikoro</u> : Banamba	14,825 nets in stock	510 bednets in stock per 1000 children U5*
		<u>Mopti</u> : Djenné	11,000 nets in stock	361 bednets in stock per 1000 children U5*
	2005 & 2007	<u>Koulikoro</u> : Banamba	~ 5,000 nets in stock	172 nets in stock per 1000 children U5*
Distribution of bednets	2002-2005	All 6 HIDs	Quantitative data incomplete	
	2004	<u>Mopti</u> : Djenné	6,205 nets to children	204 nets distributed per 1000 children U5*
			7,056 nets to women	178 nets distributed per 1000 women of reproductive age
	2006	<u>Segou</u> : Bla	1,328 nets distributed	30 nets distributed per 1000 children U5*
<u>Mopti</u> : Djenné		2,633 nets distributed	86 nets distributed per 1000 children U5*	
Training of volunteers to promote and treat bednets	2003	All 6 HIDs <sup>vii</sup>	Quantitative data incomplete	
Community campaigns for retreatment of bednets	2003	Koulikoro & Segou	Retreatment campaign	Incomplete data
		<u>Mopti</u> : Djenné	95,343 nets trtd <sup>viii</sup>	3181 nets treated per 1000 children U5*
		<u>Mopti</u> : Koro	46,700 nets trtd	873 nets treated per 1000 children U5*
	2004	Koulikoro	Retreatment campaign	Incomplete data

\*Number of children estimated from 2004 health statistics report, based on estimations from 1998 census

<sup>vii</sup> 69 & 120 community volunteers trained for ITN retreatment in Djenné and Koro districts, respectively

<sup>viii</sup> Carried out in two separate treatment campaigns in Djenne district

## **IMCI+.**

ACSD supported the implementation of the Integrated Management of Childhood Illness (IMCI) strategy in all six HIDs. Health workers in 31 community health centers (out of 74 functioning community health centers in the HIDs in 2002) were trained in IMCI case management using materials adapted from the generic WHO training modules. The recommended 11-day course was shortened to five days, and there are no reports indicating that the follow-up visit to trained health workers that is an integral part of the training was implemented in the ACSD areas. No information is available to assess whether the trained workers remained in the health centers after IMCI training, or the type and frequency of clinical supervision they received. Administrative reports and key informants report that ACSD supported monitoring and micro-planning activities aimed at reinforcing the functioning of health facilities and their catchment areas, but again no further details are available.

Implementation of community IMCI strategies started somewhat later than the acceleration of EPI+ activities in the ACSD HIDs. Village health committees identified and selected community health workers (CHWs)<sup>ix</sup>, known as *relais* in French. The CHWs were to cover approximately 35 households or one village further than five kilometers from a health center. District health staff trained the chosen CHWs for a period ranging from three to five days. CHWs were then expected to make monthly visits to all households within a defined area, and record information using a monitoring notebook. The responsibilities of the CHWs include birth registration, identification and monitoring of infants and pregnant women in need of vaccines or vitamin A, monthly reporting of health events to the community health center and promotion and monitoring of 13 key family practices (shown in box 2). After training, each CHW was to receive a bicycle to carryout his/her responsibilities. Households in the area also became eligible to purchase an essential medicine kit for each child less than five years of age. Kits included chloroquine, 10 sachets of ORS and paracetamol, with different formulations for children less than one year and children aged one to five years, and were priced at about 200 francs CFA (~ USD 0.40). Mothers could replace the items in the kit by visiting the community health facility. The cost of replacement—established locally—was more expensive than the cost of the initial kit, for example, two sachets of ORS often cost 200 francs CFA or more. In some health zones (sub-districts), ACSD provided iodine testing kits and iodized salt to families. Key informants reported that the ACSD strategy of household kits was not sustained past the first donation of the subsidized kits provided through ACSD. Treatment of pneumonia with antibiotics, and later treatment of fever with ACTs, was not allowed under national policy and not included in the ACSD C-IMCI package.

Key informants reported that in most districts, CHWs

### **Box 2: Key Family Practices promoted by CHWs in ACSD**

1. Households complete vaccination for children less than one year of age and administer vitamin A supplements every 6 months through five years of age.
2. Children under-five and pregnant women sleep under an ITN
3. Pregnant women use ANC services and postnatal services
4. Households possess an essential medicine kit for household treatment of fever and seek care for childhood illnesses at health services
5. Men and women in the household practice at least one preventative measure for HIV/AIDS
6. Households practice birth spacing
7. Mothers practice exclusive breastfeeding and give complementary food to infants at age six months
8. Households regularly consume iodized salt
9. Households regularly consume potable water
10. Households use functional latrines
11. Households members wash their hands after using the toilet, before eating, and when giving food to children
12. Households register births with civil society
13. Households enroll school-age children in school

<sup>ix</sup> In many implicated villages in the HIDs, previous projects had selected and supported volunteer CHWs for health promotion activities and in some cases, distribution of condoms.

received locally initiated incentives outside of the ACSD program, such as selection to help with national vaccination and vitamin A campaigns (including the provision of a per diem) and the waiver of consultation fees at the community health facilities for their families. However, key informants and administrative reports noted that the retraining and motivation of CHWs was an on-going challenge. We were not able to find retention rates of CHWs in all areas; however, in the town of Koro, 15 CHWs remained active in 2007 out of the 60 CHWs initially trained in 2004. Additional difficulties in implementing the C-IMCI strategy cited by CHWs and other key informants included: 1) maintaining functioning bicycles—replacement parts were not available in local markets for the imported bicycles given to the CHWs; 2) carrying out communication activities, especially among some families with reticent heads of households; 3) assuring regular supervision and re-training.

Table 7 summarizes the information about ACSD contributions to facility and community IMCI that was available in administrative and summary reports. This information is not comprehensive because detailed information was not available for all districts. As in Table 6, selected indicators are presented as ratios per 1,000 children less than 5 years of age to provide a general idea of possible population coverage. Where information is available, we present the training of facility-based workers per number of facilities. Appendix C provides further description of IMCI+ activities and details on exact timing.

**Table 7:** Description of inputs related to the implementation of the IMCI+ intervention package in the ACSD “high-impact” districts of Mali.

DESCRIPTION OF ACTIVITY	TIMING	GEOGRAPHIC AREA	INTENSITY OF ACTIVITY	COVERAGE ESTIMATE
Modified (shortened to 5 days) facility IMCI training	2003	<u>Mopti:</u> Koro	7 head nurses trained	7 nurses trained for 15 functional community health centers
	2003	<u>Kolokani:</u> Banamba	16 health workers trained	16 health workers trained for 8 functional community health centers
	2003		4 doctors trained	
	2004	<u>Mopti:</u> Djenné	13 head nurses trained	13 nurses trained for 13 functional community health centers
3-5 day training of CHWs in promotion of key family practices <sup>x</sup>	2004	<u>Kolokani:</u> Banamba	337 CHWs trained	9.3 CHWs trained per 1000 children under 5*
	2005		65 CHWs trained	1.8 CHWs trained per 1000 children under 5*
	2002 -3	<u>Segou:</u> Bla	600 CHWs trained	13.5 CHWs trained per 1000 children under 5*
	2005		861 CHWs trained	19.3 CHWs trained per 1000 children under 5*
	2003	<u>Mopti:</u> Djenné	338 CHWs trained	11.1 CHWs trained per 1000 children under 5*
	2005		400 CHWs trained	13.1 CHWs trained per 1000 children under 5*
	2003		420 CHWs trained	7.7 CHWs trained per 1000 children under 5*
	2004	<u>Mopti:</u> Koro	420 CHWs trained	7.7 CHWs trained per 1000 children under 5*
	2005		213 CHWs trained	3.9 CHWs trained per 1000 children under 5*
	Provision of bicycles	2007	<u>Kolokani:</u> Banamba	337 functional bicycles reported in 2007
		<u>Mopti:</u> Koro	1053 functional bicycles reported in 2007	

*\*Number of children estimated from 2004 health statistics report, based on estimations from 1998 census*

<sup>x</sup> Available information does not allow us to discern if the CHWs trained in different years were the same CHWs or additional CHWs

## **ANC+.**

The ANC+ component of ACSD began in early 2002 and included ITN distribution at the first ANC visit (as described above), IPTp with sulfadoxine-pyrimethamine, iron and folic acid supplementation, tetanus toxoid immunization, and postnatal visits and vitamin A supplementation. According to key informants, maternal health was emphasized in ACSD in Mali in anticipation of an integrated continuum of care strategy. ANC interventions were delivered at fixed facilities and through community outreach, in association with EPI outreach (described above). Outreach teams included an auxiliary midwife (*matrone*) who performed ANC consultations in villages, including the provision of ITNs, SP for IPTp, and iron and folic acid supplementation for pregnant women. Key informants reported that in some cases, the auxiliary midwives also provided brief messages about HIV/AIDS and the importance of ANC to groups of women during these visits to villages. ACSD supported this outreach through the provision of: 1) vehicles (for outreach from district hospitals to remote areas without a community health center); 2) motorcycles (for outreach from community health centers); and 3) per diems for health agents, ranging from approximately two to six US dollars per day, depending on qualifications of the agent. According to key informants and summary reports, ACSD also supported the promotion of assisted deliveries and the post-partum provision of vitamin A supplements; however, we were unable to find evidence related to specific activities related to these interventions.

Various documents and key informants reported that the distribution of bednets at the first ANC consultation increased attendance. Difficulties noted in documents and by key informants included: 1) ANC consultations were often carried out on mats in huts or common buildings in the village; 2) heavy loads, including three different registers, ITNs and batteries; 3) lack of motivation (per diems for outreach visits) after 2003.

Table 8 summarizes the information about ACSD contributions to antenatal care interventions that was available in administrative and summary reports. This information is not comprehensive because detailed information was not available for all districts. Appendix C provides further description of ANC+ activities.

**Table 8:** Description of inputs related to the distribution, promotion and treatment of bednets in the ACSD “high-impact” districts of Mali.

DESCRIPTION OF ACTIVITY	TIMING	GEOGRAPHIC AREA	INTENSITY OF ACTIVITY
Provision of ambulances	Date of provision not available	<u>Koulikoro:</u> Kolokani Banamba	2 functional ambulances in 2007 1 functional ambulances in 2007
		<u>Segou:</u> Bla Niono	Quantitative data not available Quantitative data not available
		<u>Mopti:</u> Djenné Koro	1 functional ambulances in 2007 0 functional ambulances in 2007
Support for transportation and motivation for outreach	2002-2003	All HIDs	Quantitative data not available
Training of providers in IPTp	2006	Kolokani	Quantitative data not available
Provision of subsidized (free) ITNs	2002-2006	All districts	Quantitative data not available
Support for ANC commodities	2002-2004	All districts	Quantitative data not available



## 5. Coverage and family practices

This section of the report presents the results for priority coverage and family practices indicators and their interpretation. The methodology used for the analysis is described in section 2, and the priority indicators are defined in appendix D. Results are presented in graphical form for selected priority coverage indicators within each intervention package. Two graphs are presented for each package. The first shows time trends in indicator levels in the HIDs. Data from the survey conducted in 2003 are presented in shades of grey and without confidence limits because, as explained in the methods section, these estimates are of lesser quality and should be interpreted with caution.

The second graph for each intervention component presents indicator levels in 2001 (baseline) and 2006-7 (end-line) in HIDs and the comparison areas. The bars in these graphs represent the 95% confidence limits. Differences-in-differences statistical tests were carried out for these comparisons and are presented in the text. Appendices G and H present the full results for HIDs and comparison groups.

Here we present only selected results on differences in coverage by district, urban-rural residence and education of the mother; further results are presented in chapter 8 in the context of equity, and complete tables are available in Appendix I. For certain indicators and sub-populations, the results should be interpreted with caution due to the small sample sizes for some cells.

### 5.1 Results

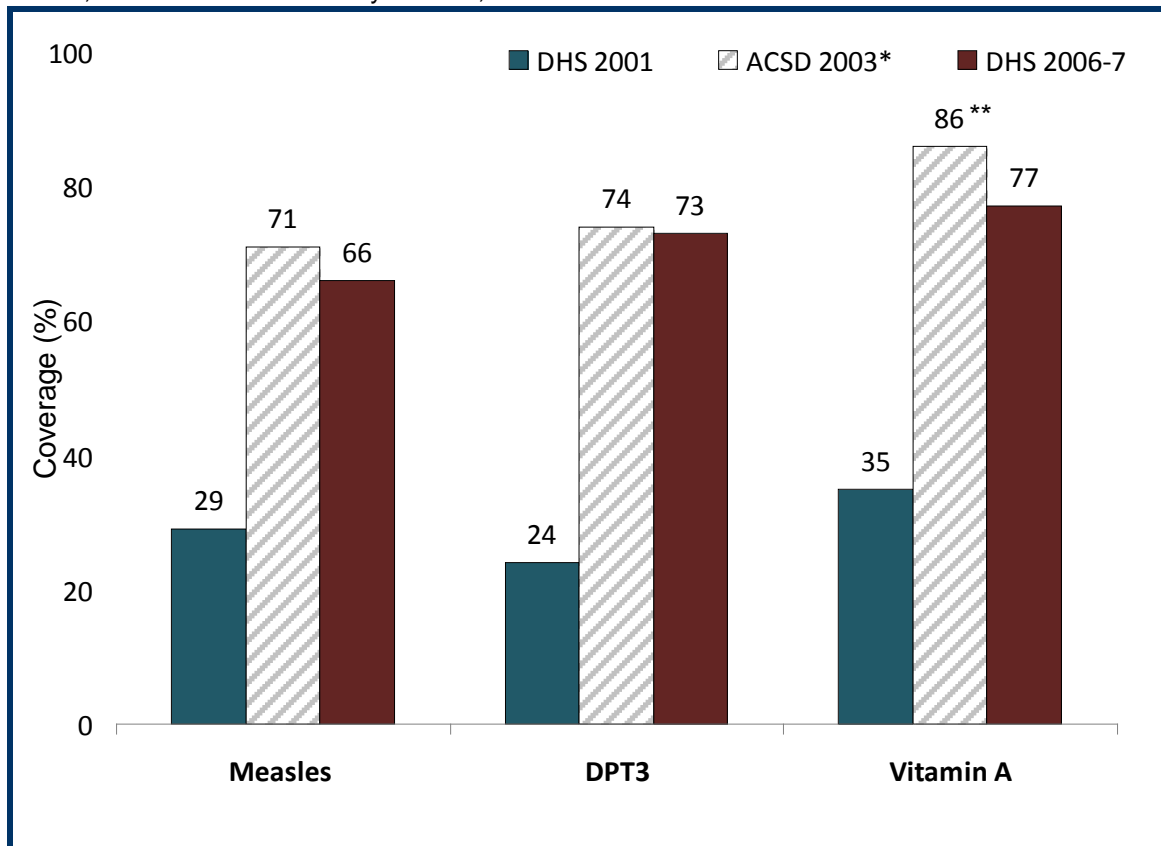
#### **EPI+.**

##### Vaccinations and vitamin A supplementation.

Figure 6 shows the time trends in measles and DPT vaccinations and in vitamin A supplementation in the ACSD HIDs in Mali, based on the two DHS with an additional point estimate drawn from the ACSD survey carried out in 2003. Coverage levels increased significantly between 2001 and 2006-7 ( $p < 0.001$ ). The ACSD coverage survey (2003) results suggest that the greatest part of this increase occurred between 2001 and 2003, with stabilization or even slight declines thereafter. Although still somewhat below the ACSD target of 80% vaccination coverage in 2006-7, the increases are substantial.

Appendix tables I2 and I3 provide further information on coverage levels for vaccinations and vitamin A supplementation in the HIDs in 2006-7. Vaccine coverage tended to be lowest in the Koulikoro region (Banamba and Kolokani) and higher in the Segou and Mopti regions, although these differences were not statistically significant. Vaccination coverage also tended to be higher among children of more educated mothers ( $p = 0.03$  both for measles and for DPT3) than for children of women with less education. A similar association was observed between vitamin A supplementation and region ( $p < 0.01$ ). Coverage with vitamin A did not differ significantly by the child's age, sex, urban/rural residence or maternal education.

**Figure 6:** Coverage levels for measles and DPT3 vaccination and receipt of one vitamin A supplement in the preceding six months in the ACSD HID as measured in DHS in 2001 and 2006-7, and in the ACSD survey in 2003, Mali.

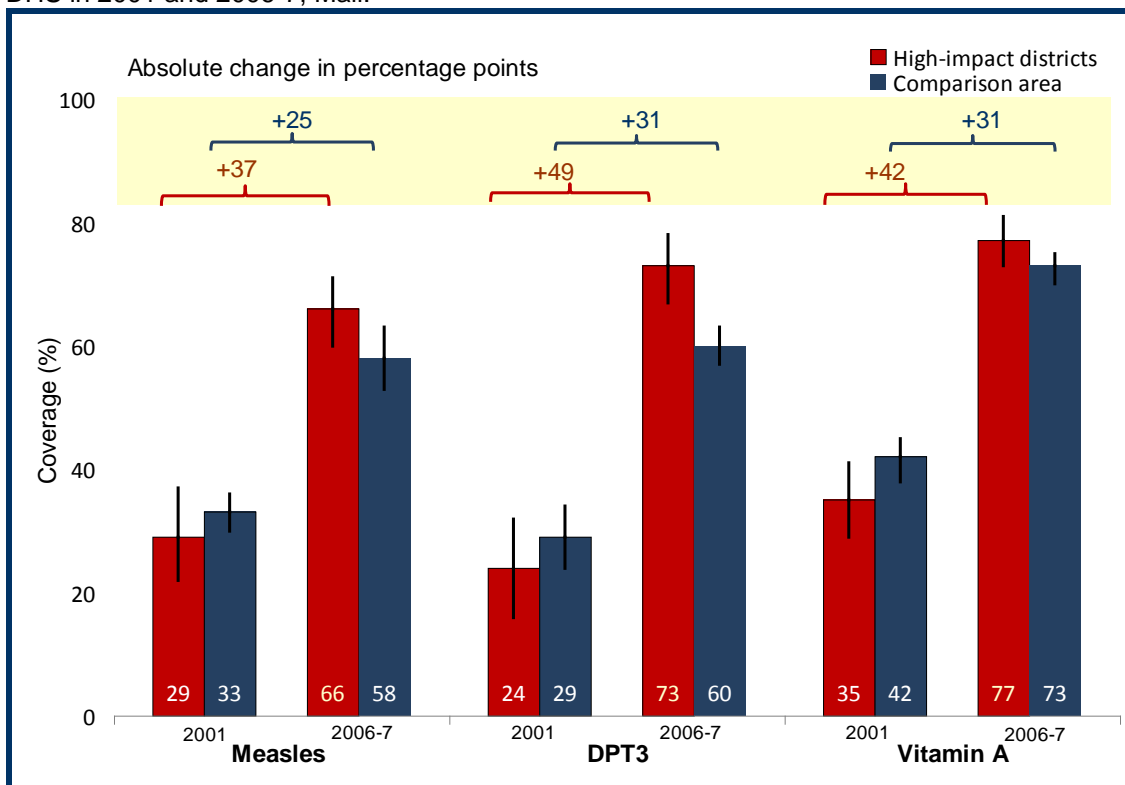


\*\*Vitamin A coverage data only available for children 6-32 months in 2003 ACSD survey

**Note:** Measles and DPT3 indicators are calculated based on MICS protocol, where the distribution of children reporting vaccination before 12m in vaccination card is applied to all other children reported as vaccinated.

Figure 7 shows coverage levels for vaccinations and vitamin A supplementation in the HID and the comparison area in 2001 and 2006-7. Measles vaccine coverage increased significantly between 2001 and 2006-7 in both the HID and comparison areas; however, the increase in the HID was significantly greater than in the comparison area ( $p=0.02$ ). DPT3 coverage also increased in both areas, with greater increases in the HID ( $p=0.06$ ). Vitamin A supplementation increased by 42 and 31 percentage points (pp) in the HID and comparison areas, respectively. Increases in vitamin A coverage over time in both the HID and comparison areas were statistically significant ( $p < 0.001$ ); the increase in coverage in the HID was significantly greater than in the comparison area ( $p < 0.01$ ).

**Figure 7:** Coverage levels for measles and DPT3 vaccination and receipt of one vitamin A supplement in the preceding six months in ACSD HID and the comparison area as measured in DHS in 2001 and 2006-7, Mali.

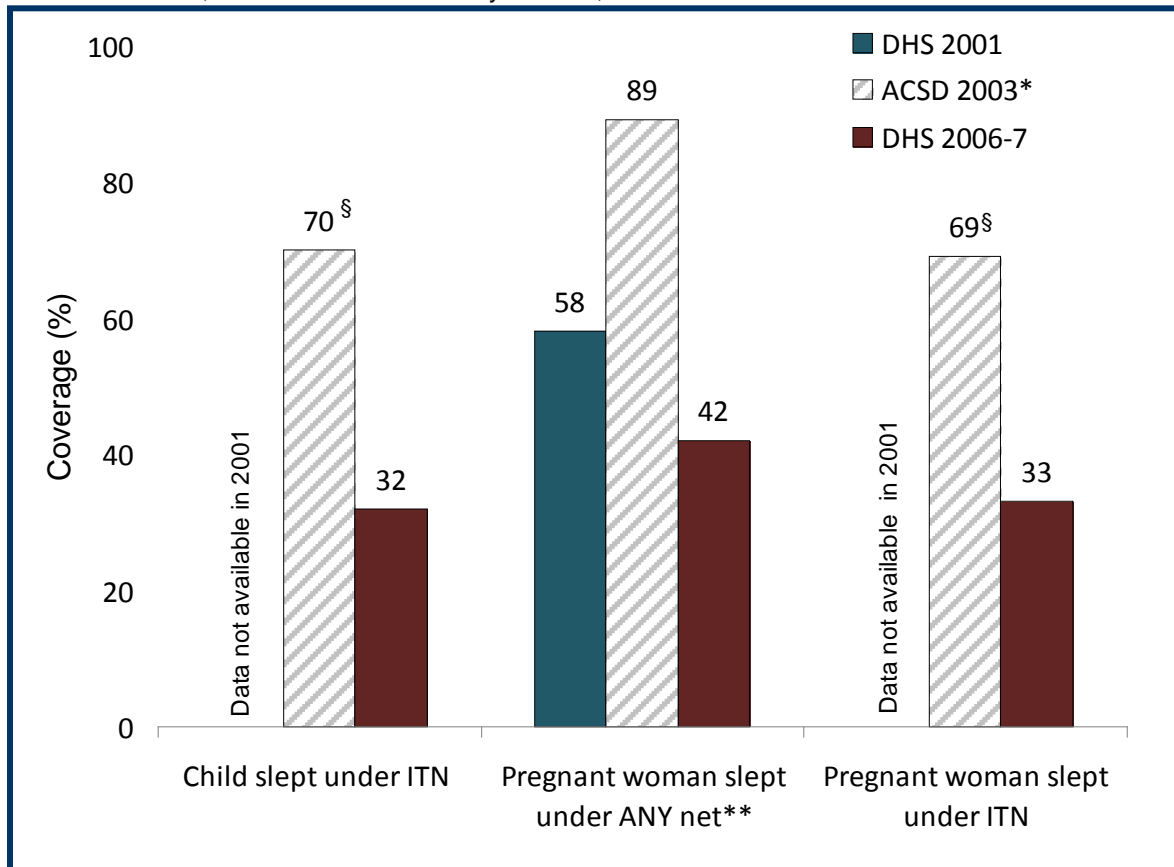


**Note:** Data from national vaccination campaigns not included in any estimate to be comparable to 2006-7 data; Measles and DPT3 indicators are calculated based on MICS protocol, where the distribution of children reporting vaccination before 12m in vaccination card is applied to all other children reported as vaccinated.

**Insecticide-treated bednets (ITNs).**

Figure 8 shows time trends in the use of ITNs in the ACSD HID in Mali, based on the two DHS with additional point estimates drawn from the ACSD survey carried out in 2003. The 2001 DHS collected limited information pertaining to bednet use or insecticide treatment; thus, no comparable indicators for ITN use among children or pregnant women were available at baseline. However, if ITN use among children and pregnant women can be assumed to be close to zero in 2001, there were substantial increases between 2001 and 2003. Despite this progress, only one in three children were reported to have slept under an ITN the previous night in the 2006-7 survey. A similar proportion of pregnant women reported sleeping under an ITN in 2006-7. As stated above, estimates from the 2003 ACSD survey should be interpreted with caution; however, available results suggest that ITN use among both children and pregnant women increased in 2003 to levels close to the 60% target, but declined sharply thereafter.

**Figure 8:** Coverage levels for insecticide-treated nets in the ACSD HID as measured in DHS in 2001 and 2006-7, and in the ACSD survey in 2003, Mali.



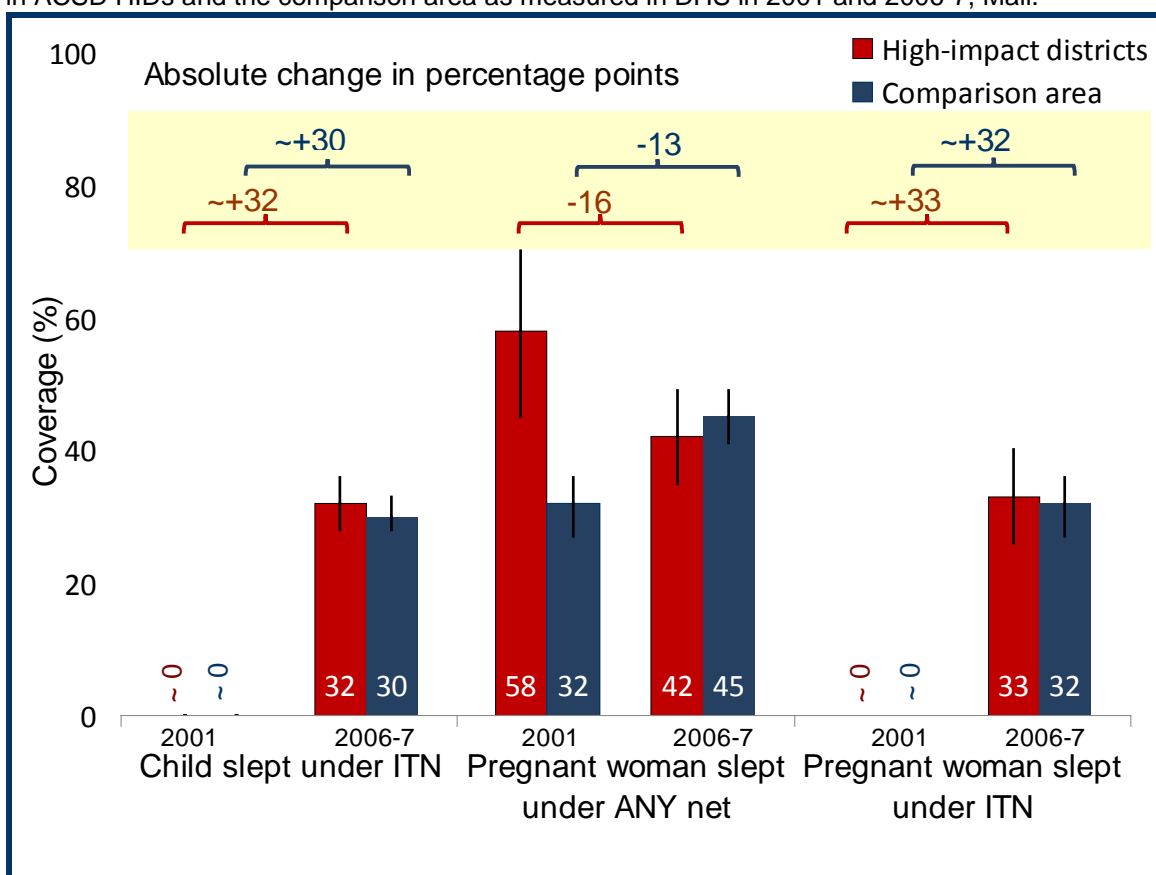
*\*\*Data concerning insecticide treatment for women's nets not collected in 2001*

*§ ITN defined as net treated within previous 6 months; all other ITN designations based on net treated with 12 months*

Appendix tables I4 and I5 provide further information on coverage levels for ITNs in 2006-7 by region, urban/rural residence, child's sex and age, and maternal education. ITN use among children was significantly higher in Segou than the other regions ( $p < 0.0001$ ) and in urban areas ( $p < 0.01$ ) than in rural areas. ITN use was the same for boys and girls and there was no strong association between child's age and ITN use. However, use of any net was more common among younger children ( $P < 0.0001$ ). In 2006-7 more pregnant women slept under an ITN the night preceding the survey in Segou ( $p < 0.0001$ ), than in the other regions.

Figure 9 shows trends in ITNs use in the HID and the comparison area in 2001 and 2006-7. The proportion of children sleeping under an ITN increased by approximately 32 pp in the HID and 30 pp in the comparison areas, if coverage in 2001 is assumed to have been zero (both trends  $p < 0.001$ ). The rates of increase over time did not differ significantly between areas. Women sleeping under any net—used as a proxy due to lack of data in 2001—decreased by 16 pp in the HID and increased by 13 points in the comparison areas; the difference in rates of change was significant ( $p < 0.01$ ). If we assume that ITN use was zero in 2001, coverage among pregnant women by 2006-7 increased 33 pp in the HID and 32 points in comparison areas, and the trends for HID and the comparison area were not significantly different.

**Figure 9:** Coverage levels and absolute change in percentage points for insecticide-treated nets in ACSD HID and the comparison area as measured in DHS in 2001 and 2006-7, Mali.



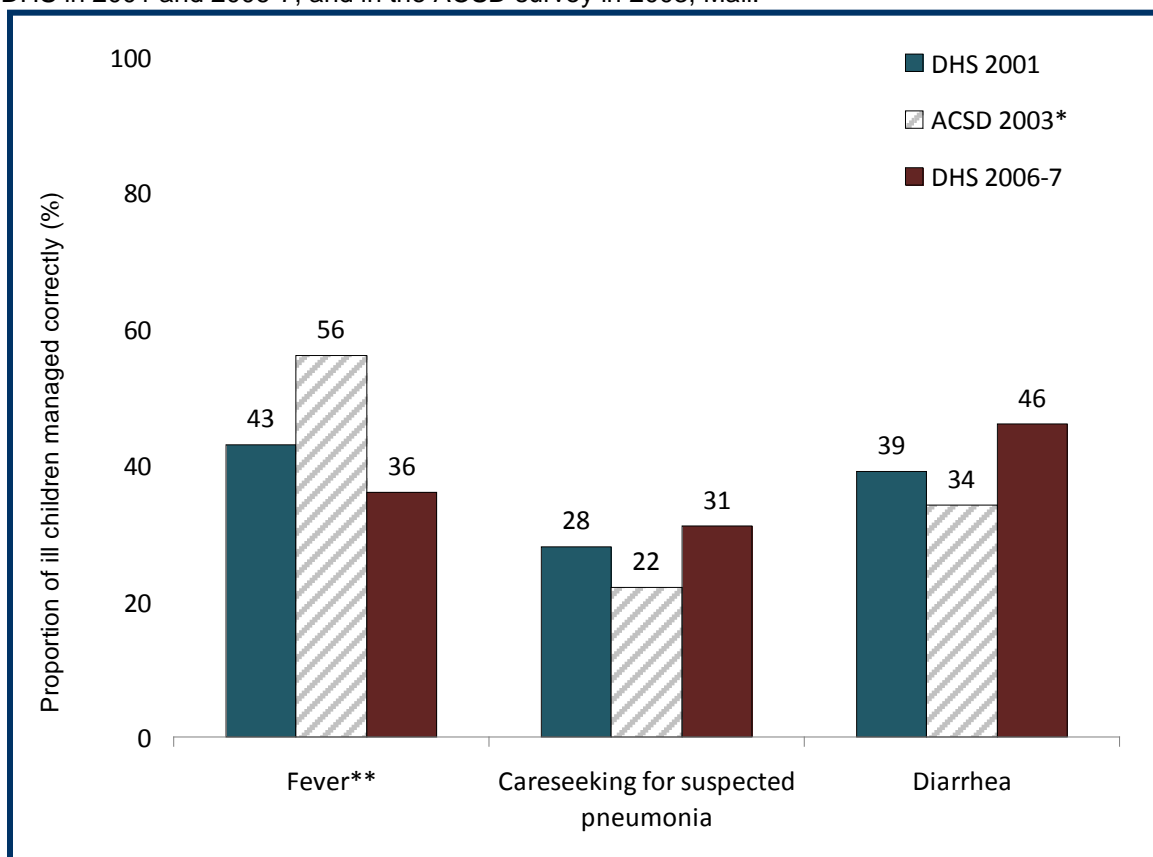
### **IMCI+.**

The ACSD IMCI+ package as implemented in Mali included the training of nurses in IMCI, which includes prevention, case management and nutrition assessment and counseling, and the provision of locally-adapted messages to improve family practices related to child survival. Here we focus on results related to the case management of childhood illness and child feeding practices.

#### Case management.

Figure 10 shows time trends in the correct case management of childhood fever (presumed to be malaria in this highly endemic country), appropriate care-seeking for suspected pneumonia and oral rehydration therapy and continued feeding for diarrhea, based on reports by mothers of children who reported these illness symptoms in the two weeks prior to the survey. Additional data are available in appendices G and I. About two-fifths of children with fever were reported by their mothers to have received an antimalarial at baseline, and this decreased slightly in 2006-7, although this change was not significant. However, for over 90% of children with fever the drug used was predominantly chloroquine and, for a few children, quinine or amodiaquine (appendix table 17). Chloroquine is no longer highly effective in Mali,<sup>24</sup> where the national policy now recommends artesunate-amodiaquine (an ACT) as the first line antimalarial. Approximately one-third of children with probable pneumonia were taken to a health facility in both 2001 and 2006-7, with no significant change during this period. The proportion of children with diarrhea receiving oral rehydration therapy or increased liquids to prevent dehydration, along with continued feeding, was slightly, but non-significantly, higher in 2006-7 than in 2001 ( $p=0.17$ ). Improvements over time in the case-management indicators were minimal, and most children in the HID remained inadequately managed in the endline survey. Further details on the management of diarrhea and careseeking for pneumonia are provided in appendix I.

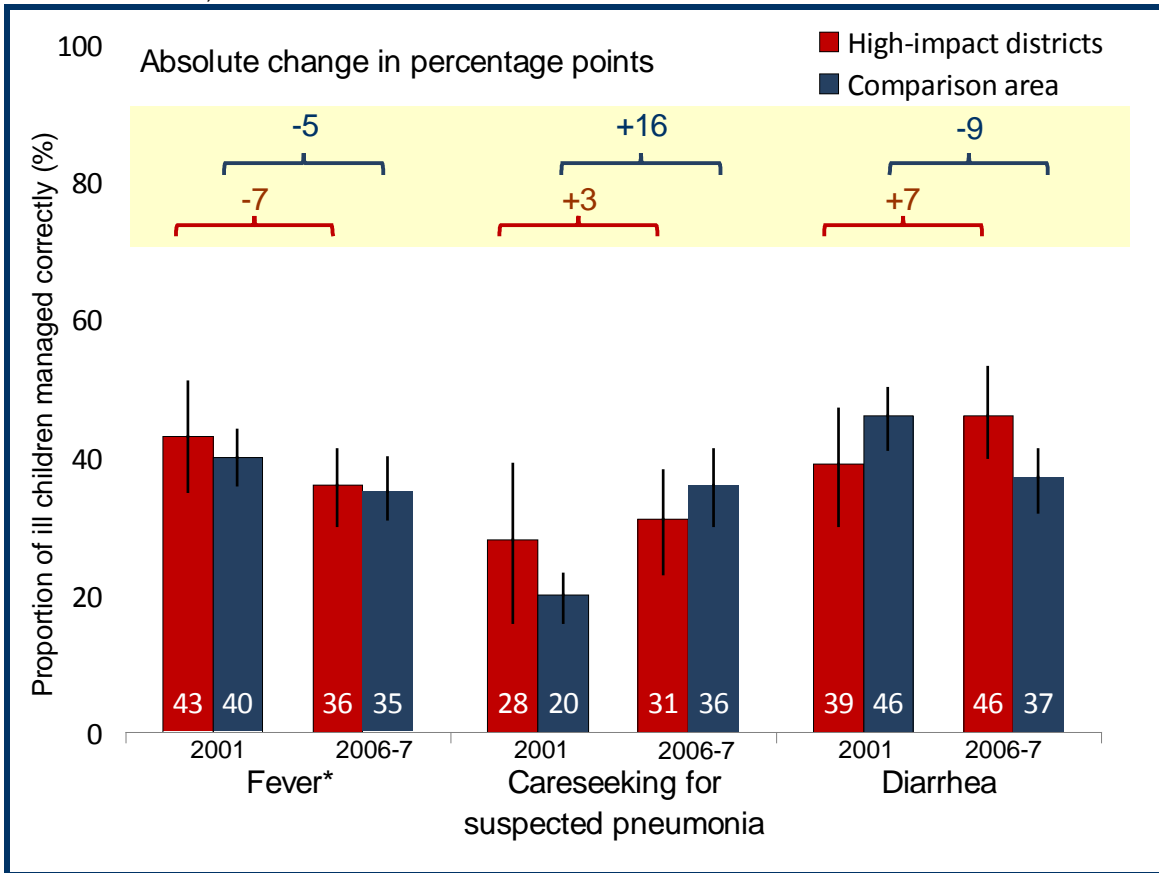
Figure 10: Coverage levels for case management indicators in the ACSD HIDs as measured in DHS in 2001 and 2006-7, and in the ACSD survey in 2003, Mali.



\*\*Fever management is with any antimalarial in previous 2 weeks, regardless of national policy

Appendix table I6 provides a breakdown of case-management indicator levels estimated from the 2006-7 survey by region, urban/rural residence, child's age and sex, and mother's education. A smaller proportion of children in the HIDs in the Mopti region (Djenné and Koro) received an antimalarial treatment for fever or appropriate management of diarrhea than in other regions, although these differences were not significant. Correct management of fever and suspected pneumonia was more frequent in urban than rural areas ( $p = 0.04$  for fever,  $P < 0.01$  for pneumonia). Fever and diarrhea were more frequently managed correctly among boys than among girls, although these differences were not significant. Associations between mother's education and case management are difficult to interpret due to the small sample sizes.

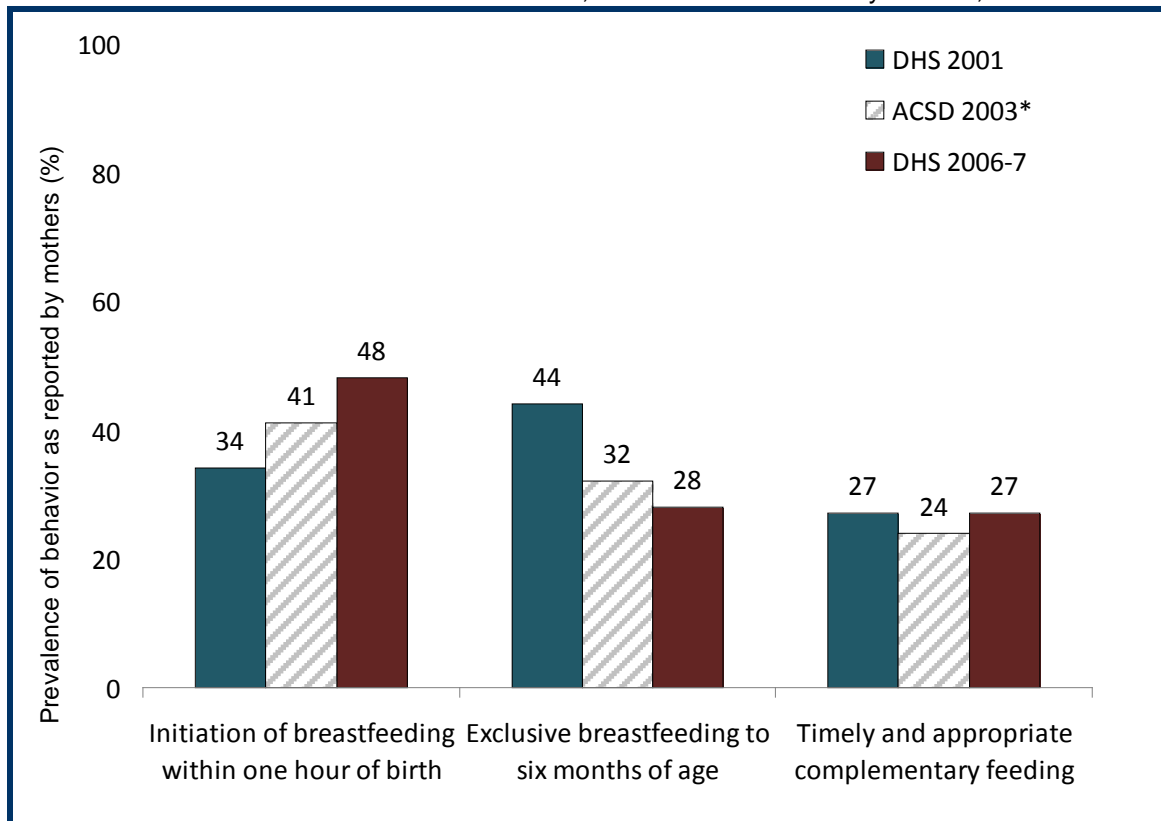
**Figure 11:** Coverage levels and absolute change in percentage points for the proportion of sick children correctly managed in ACSD HID and the comparison area as measured in DHS in 2001 and 2006-7, Mali.



\*Fever management is with any antimalarial in previous 2 weeks, regardless of national policy

Figure 11 shows levels of coverage for the case management of childhood illness in the HID and the comparison area in 2001 and 2006-7. Levels of treatment with **any** antimalarial for fever decreased slightly in both the HID and the comparison area; the difference-in-differences test was not statistically significant. However, if the indicator is defined as “treatment of fever with an **effective** and **nationally recommended** antimalarial” there was a precipitous drop in coverage in both the HID and the national comparison area, because chloroquine was no longer recommended at the end of the period, but use remained frequent (Appendix table I7). Care seeking for pneumonia remained relatively stable in the HID, while increasing 16 pp in the comparison areas ( $p=0.08$ ). Correct home management practices for diarrhea increased slightly in the HID, while declining 9 pp in the comparison areas; the difference between the trends in the HID and comparison areas was statistically significant ( $p<0.01$ ).

**Figure 12:** Prevalence of infant feeding behaviors as reported by mothers in the ACSD “high-impact” districts as measured in DHS in 2001 and 2006-7, and in the ACSD survey in 2003, Mali.



Feeding, including breastfeeding.

IMCI+ in the context of ACSD also included promotion of appropriate infant and young child feeding practices (Box 1). Figure 12 shows the prevalence of selected feeding behaviors as reported by mothers of children less than one year of age at the time of the survey. Breastfeeding behaviors tend to be relatively stable over time, so apparent fluctuations should be interpreted with caution as they may reflect differences in how the questions were posed or the answers recorded. The proportion of mothers reporting initiation of breastfeeding within one hour of birth increased significantly between 2001 and 2006-7 ( $p < 0.001$ ). The prevalence of exclusive breastfeeding of infants less than six months of age was observed to be decreasing over time, with only 28% of mothers reporting this practice in the 2006-7 survey, a value that is significantly lower than in 2001 ( $p < 0.01$ ). Complementary feeding among children 6-9 months of age remained stable between 2001 and 2006-7, with less than one-third of children in this age group were reported to have received complementary feeding and continued breastfeeding throughout the period. The mean level of continued breastfeeding among children aged 20-23 months (presented in appendix G) was 80% in 2001 and significantly decreased to 60% in 2006-7 ( $p = 0.01$ ).

Appendix table I9 shows the breakdown of breastfeeding practices by socio-demographic characteristics. Mothers in the Mopti region reported a lower proportion of exclusive breastfeeding ( $p = 0.01$ ), but higher proportions of early initiation of breastfeeding ( $p = 0.07$ ) than their counterparts in Koulikoro and Segou.

**Figure 13:** Coverage levels and absolute change in percentage points for infant feeding behaviors as reported by mothers in ACSD HIDs and the comparison area as measured in DHS in 2001 and 2006-7, Mali.

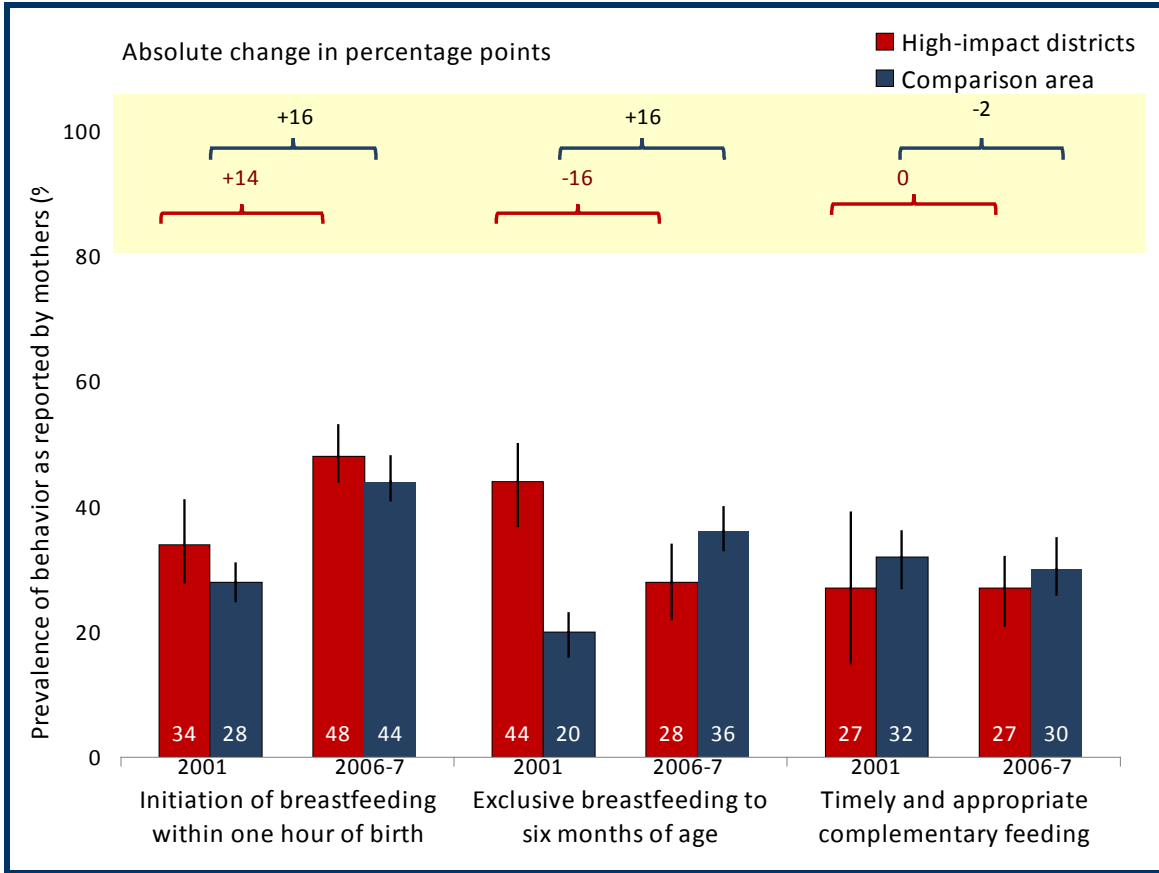
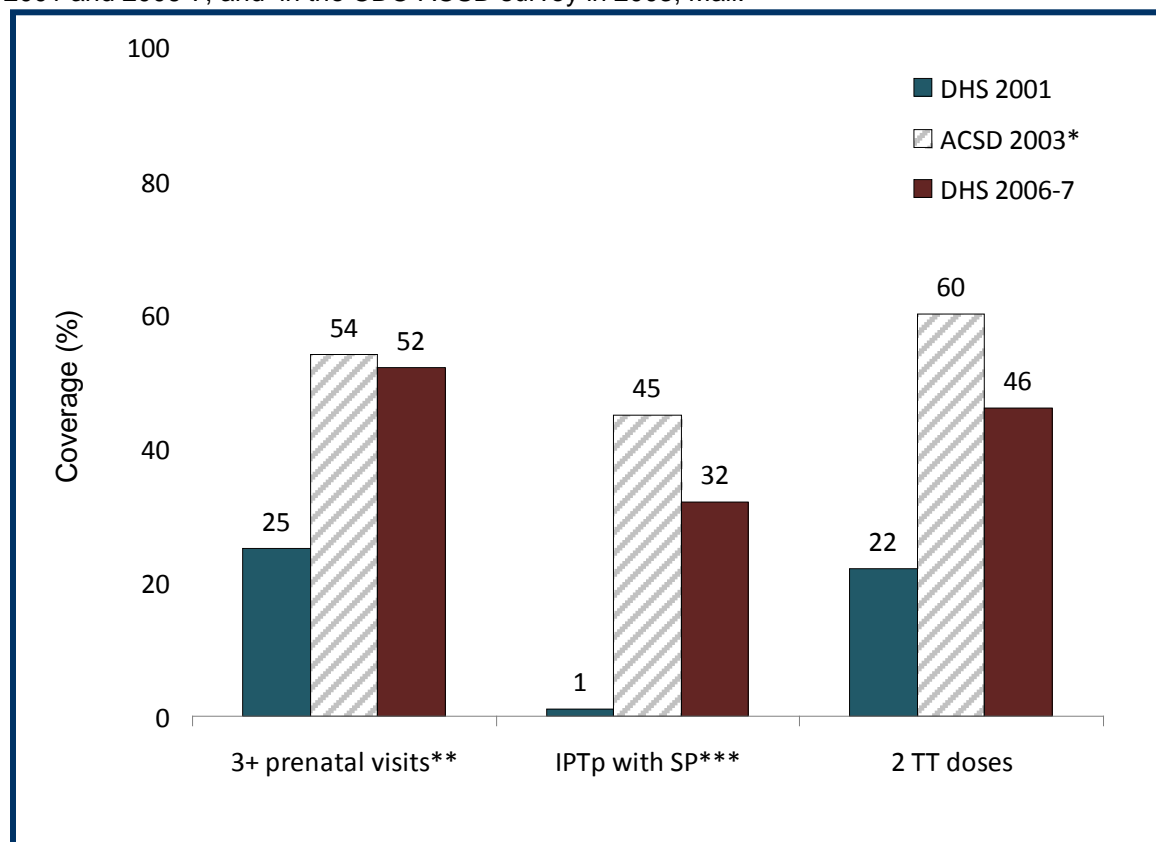


Figure 13 shows the prevalence of selected infant feeding behaviors in the HIDs and the comparison area in 2001 and 2006-7. Initiation of breastfeeding within one hour of birth significantly increased in the HIDs and the comparison area; the difference in the rates of change in the HIDs and comparison areas was not significant. Exclusive breastfeeding up to six months of age decreased 16 pp in the HIDs, while increasing significantly in the comparison area; the difference-in-differences was statistically significant ( $p < 0.001$ ). Complementary feeding from 6 to 9 months of age remained relatively stable in both HIDs and the comparison area, with no significant differences in the trends.

## ANC+.

The ACSD ANC+ package as implemented in Mali included interventions in both the antenatal and perinatal periods. Coverage levels for antenatal interventions and interventions designed to improve maternal and neonatal health during delivery and the post-natal period are addressed in this section

**Figure 14:** Coverage levels for antenatal indicators in the ACSD HIDAs as measured in DHS in 2001 and 2006-7, and in the CDC-ACSD survey in 2003, Mali.



\*\*Includes ANC visits to doctor, nurse, obstetrical nurse, midwife, matrone and nurse's assistant

\*\*\*Any dose of SP during pregnancy (not limited to 2 doses, due to data availability)

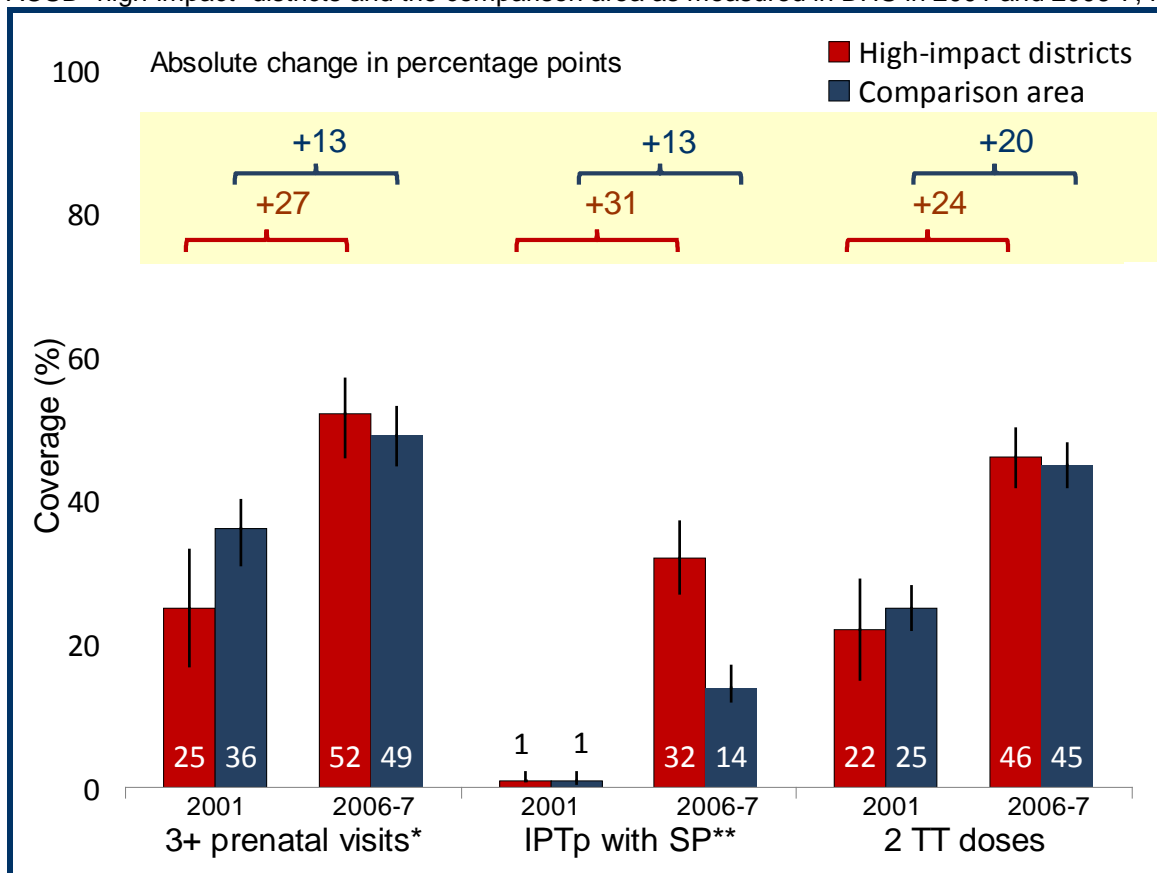
### Antenatal care.

Figure 14 shows the time trends in coverage of antenatal care in the HIDAs. Further details are presented in appendices G and I. All key indicators of antenatal care increased significantly between 2001 and 2006-7. The proportion of women reporting three or more ANC attendances more than doubled ( $p < 0.001$ ). Intermittent presumptive treatment (IPTp) with SP for malaria during pregnancy was almost zero in 2001, increasing to 32% in 2006-7 ( $p < 0.001$ ). Tetanus toxoid (TT) vaccination, consisting of two doses during pregnancy, also increased from 22% in 2001 to 46% in 2006-7 ( $p < 0.001$ ). The use of iron supplements during pregnancy (not shown in graph) increased from 6% to 16% during the study period ( $p = 0.001$ ) (appendix G). Although the increases were substantial, half or more of the women in the HIDAs remain unreached by these effective interventions.

Appendix I provides further information on coverage levels of antenatal care in the HIDAs in 2006-7. The proportion of antenatal care visits and IPT with SP during pregnancy were similar across the regions ( $p > 0.05$ ); however, women in the Mopti region reported higher levels of TT2 vaccination ( $p = 0.02$ ), and slightly lower levels of iron supplementation ( $P = 0.04$ ). Women residing in urban areas had higher levels of ANC visits ( $p = 0.09$ ), IPT with SP ( $p = 0.04$ ), TT2 ( $p = 0.01$ ), and supplementation with iron during pregnancy ( $p = 0.05$ ). Similar associations were observed between antenatal care and education, with

higher levels of prenatal visits ( $p < 0.001$ ), IPT with SP ( $p = 0.03$ ) and iron supplementation ( $p = 0.03$ ) reported among women with higher levels of education.

Figure 15: Coverage levels and absolute change in percentage points for antenatal indicators in ACSD “high-impact” districts and the comparison area as measured in DHS in 2001 and 2006-7, Mali.

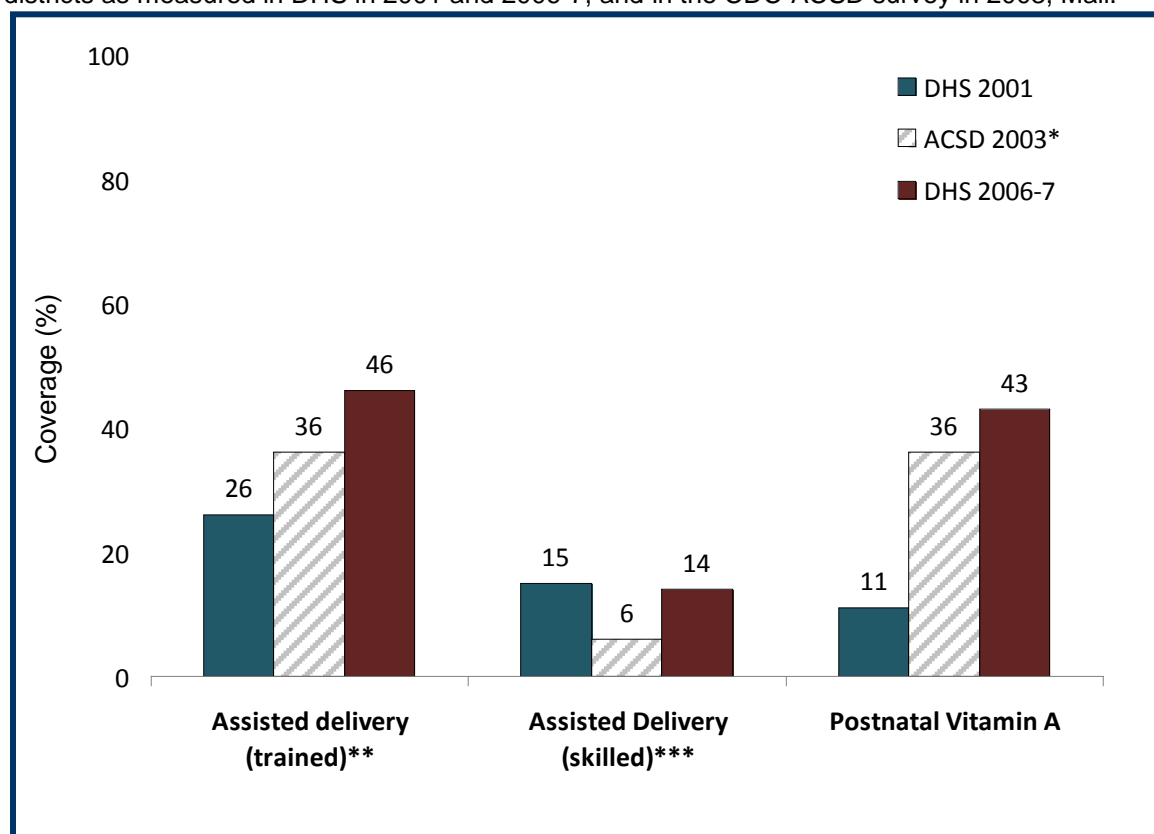


\*Includes ANC visits to doctor, nurse, obstetrical nurse, midwife, and/or auxiliary nurse/midwife

\*\*Any dose of SP during pregnancy (indicator not limited to 2 doses, due to data availability)

Figure 15 shows reported antenatal care in the HID and the comparison area in 2001 and 2006-7. The proportion of women reporting of three or more ANC attendances, IPTp with SP and two tetanus toxoid doses increased significantly in both the HID and comparison areas. Absolute pp increases were significantly greater in the HID for three ANC attendances ( $p = 0.02$ ), IPTp with one dose of SP ( $p = 0.05$ ) and iron and folic acid supplementation for 90 days ( $p = 0.06$ , data shown in appendices) than in the comparison areas. The difference in increases between the HID and the comparison area for receipt of tetanus toxoid was not statistically significant.

**Figure 16:** Coverage levels for assisted deliveries and postnatal care in the ACSD “high-impact” districts as measured in DHS in 2001 and 2006-7, and in the CDC-ACSD survey in 2003, Mali.



\*\*Includes deliveries assisted by trained personnel: doctor, nurse, midwife, obstetrical nurse, auxiliary nurse or midwife (*matrone*)

\*\*\*Includes deliveries assisted by skilled personnel: doctor, nurse, or midwife

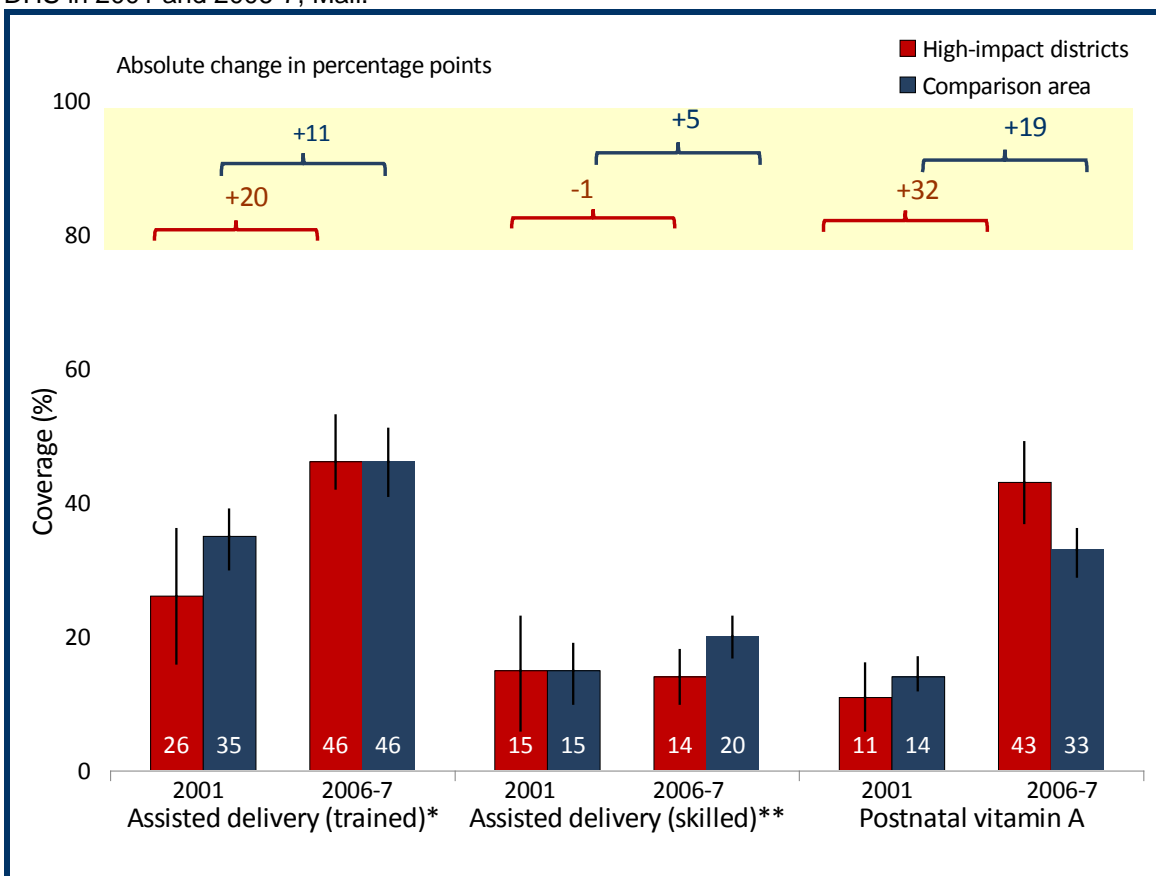
#### Assisted delivery and postnatal care.

Figure 16 shows trends in assisted deliveries and postnatal care as reported by women giving birth within the 12 months previous to the survey. Assisted deliveries by trained workers included those attended by a doctor, nurse, midwife, obstetrical nurse, assistant nurse or auxiliary midwife (*matrone* or *aide soignante*), while those assisted by a “skilled worker” were defined as deliveries assisted by a doctor, nurse, or midwife. Additional data concerning these indicators are available in appendix G, H and I. Assistance at delivery by a trained provider increased from 26% in 2001 to 46% in 2006-7 ( $p=0.001$ ); however, delivery by a skilled provider remained stable over time, suggesting that the overall increase was due to more deliveries being carried out by the lower cadres of workers (appendix table I11). Postnatal visits showed a trend similar to that of assisted deliveries by trained workers (appendix table G), because women delivering in a health facility were assumed in the survey protocols to have had a postnatal visit. Supplementation with vitamin A within 40 days after birth was low at baseline (11%) and improved significantly over the period from 2001 to 2006-7 ( $p<0.001$ ). In spite of the positive trends, over half of the women giving birth still fail to benefit from these interventions.

Appendix table I12 shows the breakdown of delivery and postnatal care in 2006-7 in the HIDs by socio-demographic characteristics. Women in the Koulikoro region had significantly higher proportions of skilled assistance during delivery, followed by Segou ( $p<0.01$ ). Postnatal visits exhibited a similar trend, with Mopti have the lowest coverage (31%) and Koulikoro the highest ( $p<0.01$ ). Urban dwellers had almost double the proportion of assisted deliveries ( $p<0.0001$ ) of their rural counterparts, and also reported higher levels of postnatal vitamin A supplementation ( $p<0.005$ ). Women with higher levels of

education were also significantly more likely to report assisted delivery ( $p < 0.001$ ), postnatal care ( $p < 0.0001$ ), and vitamin A supplementation ( $p = 0.01$ ) than women with less education.

**Figure 17:** Coverage levels and absolute change in percentage points for assisted delivery and postnatal care indicators in ACSD “high-impact” districts and the comparison area as measured in DHS in 2001 and 2006-7, Mali.



\*Includes deliveries assisted by trained personnel: doctor, nurse, midwife, obstetrical nurse, auxiliary nurse or midwife (matrone)

\*\*Includes deliveries assisted by skilled personnel: doctor, nurse, or midwife

Figure 17 shows reported coverage of assisted deliveries and postnatal care in the HIDs and the comparison area in 2006-7 among women giving birth in the 12 months preceding the survey. Assisted delivery by a trained health provider increased by 20 pp in the HIDs and by 11 pp comparison areas. However, assisted delivery by a skilled provider (doctor, nurse, or midwife) remained stable in the HIDs and increased 5 pp in the comparison areas. The differences in the rates of change in delivery indicators in the HIDs and comparison area were not statistically significant. Postnatal supplementation with vitamin A increased in both areas, with a significantly greater (32 pp) increase in the HIDs ( $p = 0.02$ ).

## 5.2 Summary and interpretation of results

Table 9 summarizes the main results of the adequacy analyses of time trends in coverage in the HIDs. Indicators showing significant improvement between 2001 and 2006-7 in the HIDs are presented in bold italics in table 9. These include vaccinations, vitamin A, ITNs, timely initiation of breastfeeding, antenatal care and interventions, assistance at delivery, and postnatal vitamin A supplementation. Indicators that were observed to stagnate or decline included case management of common childhood illnesses, infant feeding and breastfeeding practices, and ANC visits and deliveries with “skilled” health providers such as doctors, nurses and midwives. In column 4 of table 9, we present the stated ACSD objectives<sup>27</sup> in Mali in relation to the coverage levels measured in 2006-7. None of the stated objectives were met fully; however, vaccination, vitamin A, and trained assistance at delivery all showed positive gains and were within 15 percentage points of the stated ACSD objective for coverage.

**Table 9:** Summary of ACSD coverage results in ACSD HIDs as measured in DHS in 2001 and 2006-7, Mali, as compared to initial ACSD objectives.

COVERAGE INDICATOR	BASELINE LEVEL IN HIDs IN 2001 (%)	ENDLINE LEVEL IN HIDs IN 2006-7 (%)	ACSD OBJECTIVE <sup>27</sup> (%)	ABSOLUTE DIFFERENCE BETWEEN ENDLINE & OBJECTIVE
<b><i>Measles vaccine</i></b>	<b>29</b>	<b>66</b>	80	-14
<b><i>DPT3</i></b>	<b>24</b>	<b>73</b>	80	-7
<b><i>Vitamin A to child</i></b>	<b>35</b>	<b>77</b>	90	-13
<b><i>ITN for child</i></b>	<b>~0</b>	<b>32</b>	60	-28
Net for pregnant woman	58	42	n/a	n/a
<b><i>ITN for woman</i></b>	<b>~0</b>	<b>33</b>	60	-27
Any antimalarial for fever	43	36	50	-14
Careseeking for pneumonia	28	31	50	-19
Oral rehydration and continued feeding for diarrhea	39	46	50	-4
<b><i>Breastfeeding initiation</i></b>	<b>34</b>	<b>48</b>	n/a	n/a
Exclusive breastfeeding	44	28	50	-22
Complementary feeding	27	27	50	-23
<b><i>Antenatal care (3+ visits)</i></b>	<b>25</b>	<b>52</b>	80	-38
<b><i>IPTp with SP</i></b>	<b>1</b>	<b>32</b>	70	-38
<b><i>Tetanus toxoid in pregnancy</i></b>	<b>22</b>	<b>46</b>	80	-36
<b><i>Assisted delivery (trained)</i></b>	<b>26</b>	<b>46</b>	50	-4
Assisted delivery (skilled)	15	14	n/a	n/a
<b><i>Postnatal vitamin A</i></b>	<b>11</b>	<b>43</b>	80	-37

**NOTE:** Indicators in bold italics represent significant positive changes over time

Table 10: Summary of ACSD coverage results in ACSD “high-impact” districts and the comparison area as measured in DHS in 2001 and 2006-7, Mali.

COVERAGE INDICATOR	AREA	BASELINE VALUE IN 2001 (%)	ABSOLUTE CHANGE 2001-2006-7 (% POINTS)	DIFFERENCE IN DIFFERENCES TEST (p LEVEL)
<b>Measles vaccine</b>	<i>HIDs</i>	<b>29</b>	<b>+37</b>	<b>0.02*</b>
	<i>Comparison</i>	<b>33</b>	<b>+25</b>	
<b>DPT3</b>	<i>HIDs</i>	<b>24</b>	<b>+49</b>	<b>0.06*</b>
	<i>Comparison</i>	<b>29</b>	<b>+31</b>	
<b>Vitamin A to child</b>	<i>HIDs</i>	<b>35</b>	<b>+42</b>	<b>&lt;0.01</b>
	<i>Comparison</i>	<b>42</b>	<b>+31</b>	
ITN for child**	HIDs	~0	+32	>0.10
	Comparison	~0	+30	
Net for pregnant woman	HIDs	58	-16	< 0.01
	Comparison	32	+13	
ITN for woman**	HIDs	~0	+33	>0.10
	Comparison	~0	+32	
Any antimalarial for fever	HIDs	43	-7	>0.10
	Comparison	40	-5	
Careseeking for pneumonia	HIDs	28	+3	0.08
	Comparison	20	+16	
<b>Oral rehydration and continued for diarrhea</b>	<i>HIDs</i>	<b>39</b>	<b>+7</b>	<b>&lt;0.01</b>
	<i>Comparison</i>	<b>46</b>	<b>-9</b>	
Breastfeeding initiation	HIDs	34	+14	>0.10
	Comparison	28	+16	
Exclusive breastfeeding	HIDs	44	-16	<0.001
	Comparison	20	+16	
Complementary feeding	HIDs	27	0	>0.10
	Comparison	32	-2	
<b>Antenatal care (3+ visits)</b>	<i>HIDs</i>	<b>25</b>	<b>+27</b>	<b>0.02</b>
	<i>Comparison</i>	<b>36</b>	<b>+13</b>	
<b>IPTp with SP</b>	<i>HIDs</i>	<b>1</b>	<b>+31</b>	<b>0.05</b>
	<i>Comparison</i>	<b>1</b>	<b>+13</b>	
Tetanus toxoid in pregnancy	HIDs	22	+24	>0.10
	Comparison	25	+20	
Trained delivery***	HIDs	26	+20	>0.10
	Comparison	35	+11	
Skilled delivery (Dr/nurse/midwife)	HIDs	15	-1	>0.10
	Comparison	15	+5	
<b>Postnatal vitamin A</b>	<i>HIDs</i>	<b>11</b>	<b>+32</b>	<b>0.02</b>
	<i>Comparison</i>	<b>14</b>	<b>+19</b>	

\*P value based on children 12-13 months of age ever receiving measles or DPT3 vaccination \*\*Difference in end-line estimates only, assuming 0% coverage with ITNs at baseline in HIDs and comparison areas. \*\*\*Includes Aide soignant & matrone (auxiliary midwives) **NOTE: Indicators in bold italics represent positive changes over time in HID that were significantly greater than the comparison area at  $p \leq 0.05$**

Table 10 summarizes the main results of the plausibility analysis, comparing time trends in coverage for HIDs and the comparison area. Vaccination, vitamin A supplementation among children 6-59 months, ITN utilization among children and pregnant women, ANC interventions and delivery assisted by a trained worker all improved rapidly in both HIDs and comparison areas. Many of the EPI+ and ANC+ interventions increased more rapidly in the HIDs, with significantly greater increases for measles vaccination, vitamin A supplementation for mothers and children, ORT and three ANC visits. These results suggest that ACSD as implemented in the HIDs in Mali had a positive effect on coverage levels for the interventions targeted for accelerated implementation. It should be noted, however, that absolute levels of coverage remained under 50% in 2006-7 for all interventions other than EPI vaccines, vitamin A and postnatal care, and that for two key interventions with major potential mortality impact – exclusive breastfeeding and careseeking for suspected pneumonia – coverage improved more rapidly in the comparison districts than in the HIDs.

Preliminary results were reviewed and discussed with a technical team from Mali that included those directly involved in ACSD implementation and/or the collection and analysis of the data used in the evaluation. We have incorporated the interpretation of results based on presentations by the Mali technical team.

Many of the indicators that increased significantly in the HIDs between 2001 and 2006-7 were commodity-based or preventative services delivered through campaigns and outreach, such as vaccination, vitamin A, ITNs, and antenatal care. The technical team from Mali noted that these gains were likely to be attributable to the greater availability of inputs and resources for outreach through the ACSD. Trained assistance at delivery and antenatal care visits also improved significantly, because – unlike doctors, nurses or midwives – the lower cadres (*matrons and aide soignants*) of staff provide delivery care at through fixed and outreach services through community health centers, whose population coverage increased substantially over the period of evaluation (section 3). The Mali team also cited the following contributions of the ACSD approach to increases in coverage:

- Improved organization of services, such as through the performance contracts which specified the roles and responsibilities of each level of health services
- Improved availability of financial and human resources
- Engagement and empowerment of community actors
- Effective integration of activities, or “packaging”

Additionally, there was better follow-up of activities in the ACSD districts, possibly due to a Hawthorne effect,<sup>xi</sup> as ACSD in the HIDs in Mali was considered an operational research study.

Those indicators that did not improve tended to be behavioral in nature, such as home management of illness, care seeking, and infant feeding practices. Coverage levels for antenatal visits and assisted delivery with a “skilled provider” (doctor, nurse or midwife) also stagnated. The technical team in Mali cited the following barriers to improvements in intervention coverage and family practices:

- Lack of qualified health staff
- Follow-up and quality of outreach, supervision and monitoring activities
- Weak supply management of commodities and equipment at regional, district and local levels
- Stock-outs of ITNs in 2006
- Changes in the 1<sup>st</sup> line antimalarial from chloroquine to ACTs and associated challenges with the supply and availability of ACTs

Levels of coverage with interventions such as vaccination, vitamin A, ITNs, and ANC were observed to increase greatly between the period of 2001 to 2003, and then stabilize or decline between 2003 and 2006-7. Estimates from the 2003 ACSD-CDC survey should be interpreted with caution due to concerns about data quality and issues of comparability with 2001 and 2006-7 DHS. Nonetheless, the MOH and UNICEF program managers reported that the observed trends for these indicators, with spikes in 2003, were consistent (in their view) with patterns of program intensity. Early in the program, ACSD reinforced

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<sup>xi</sup> Phenomenon whereby people's or system's behavior changes due to the effect of knowing their actions are under study.

and strongly supported outreach activities for vaccination, ITNs and ANC. However, in some districts this support decreased and/or ceased in 2004 and 2005, affecting the ability and motivation of health workers to perform outreach. In 2004, the ACSD strategy also was greatly expanded beyond the HIDs, possibly diluting the efforts in the HIDs. If these patterns are indeed true and not due to survey comparability issues, they may have important implications for the sustainability of such interventions. Finally, the 2003 levels of ITN use were significantly higher than in 2006-7, likely reflective of the wide-spread stock-outs in nets starting in late 2005 and persisting until the end-line survey.

### ***Cross-cutting implementation and contextual factors.***

The contextual factors considered in the evaluation were based on those proposed as relevant for child survival programs.<sup>10</sup> Appendix J provides a more comprehensive description of contextual factors. Given that the adequacy findings on coverage suggest that ACSD had positive effect on some indicators but not on others, the analysis of contextual factors here examines two questions to better interpret the results:

1. Were there any major disruptions in the HIDs or nationally that could explain why ACSD did not lead to a more marked effect on coverage levels?
2. Were there other activities outside of ACSD in the HIDs or nationally that could have led to increases in coverage in the HIDs?

To our knowledge, there were no natural disasters or other emergencies in the HIDs from 2000 to present that would have influenced the effect of ACSD on coverage levels. However, there were a number of important macro-level factors, such as national policy changes, during this period that could have influenced levels of coverage in the HIDs and the national comparison area.

- *Expansion of health facilities.* The decentralization of the health system and financing, as well as the installation of new community health centers (see section 3), may have had a net positive effect on coverage of services. Child health services delivered through facilities did not increase; however, interventions linked to outreach activities from community health centers increased substantially
- *Selection criteria of HIDs.* The criteria for choosing districts where ACSD would be implemented included a “dynamic and complete district health team” and “a majority of existing community health centers functioning”, among other positive health systems characteristics (see section 3.3 for the full list). Although not a contextual factor, per se, these selection criteria may have given an initial advantage to implementation in the HIDs.
- *Changes in pricing policies.* The provision of many services through Mali’s public health system are based on the principles of cost recovery, as described in section 3. Provision of free ITNs to women and children, first in the HIDs and later nationally, is likely associated with increases in coverage with ITNs in both the HIDs and comparison area. Furthermore, national policy to provide cesarean sections free of charge in 2005 may have positively influenced on levels of assisted deliveries.
- *Changes in antimalarial policies.* Observed levels of antimalarial treatment of childhood fever declined between 2001 and 2006-7. Levels of effective management of fever may have declined even more rapidly, however, because of high and increasing rates of resistance to chloroquine in Mali.<sup>24</sup> Despite the first-line policy change in late 2005, ACTs were still unavailable in most of the country at the time of the endline survey, and less than 1% of children with fever were reported to have received an ACT in 2006-7 in the HIDs. The change in first-line antimalarial policy and low availability of the recommended antimalarial are likely to have had a negative influence on treatment of fever with **any** antimalarial, both in the HIDs and nationally. Parents may have been aware of the inefficacy of older antimalarial treatments, but the newer, more efficacious treatments were not yet available.
- *Other activities in the HIDs.* As described in section 3 and appendix J, a number of partners supported activities in selected HIDs. These activities were relatively local and likely contributed to gains in coverage of interventions in the districts where they were active. Taken as a whole, however, it is unlikely that these relatively small-scale projects would have greatly influenced the coverage

outcomes under evaluation in the total of the six HIDs. Many other local NGO projects focused on education and literacy, agriculture, poverty reduction through micro-credit, and water and sanitation. We would not expect these projects to have a large short-term influence on coverage of maternal and child health interventions, because they do not directly address these interventions.

- *Other activities in the comparison area.* A number of development partners in the national comparison area carried out child survival and related projects at the same time as ACSD (section 3). Of the 47 districts included in the comparison area for this evaluation, 38 had one or more of child survival projects. The remaining nine districts without externally supported child survival interventions were all located in the sparsely populated north of the country (Kidal, Tombouctou and Gao regions). Thus, a large number of districts in this evaluation's national comparison area experienced external inputs and intervention activities similar to or the same as the ACSD strategy.

Summarizing the presentation on contextual factors,

- there were no major humanitarian crises that might have affected the coverage results;
- the expansion in the number of health centers may have contributed to increases in coverage, to a similar extent in HID and comparison areas; nevertheless, the selection criteria used for identifying HIDs may have given districts these an initial advantage in terms of health systems strength;
- changes in antimalarial policy affected the coverage of effective treatment in both HID and comparison districts;
- programs that closely resembled ACSD were also implemented in 38 out of the 47 comparison districts.

### ***Methodological Challenges.***

Here we present a very brief overview of methodological challenges encountered in the retrospective evaluation of ACSD in Mali, noting how they may have affected the evaluation results related to coverage. Complementing this section, appendix K provides a more thorough review of methodological challenges, appendix F provides descriptions of surveys included in the evaluation, and appendix D and E provide indicator definitions and a list of the questionnaire items supporting the measurement of the priority indicators in each survey.

Many of the challenges encountered reflect the retrospective nature of the evaluation. The evaluation team was forced to rely existing data and information, even if imperfect.<sup>2</sup>The 2001 DHS had limited sample sizes for calculation of baseline coverage indicators in the HIDs, especially those indicators measured among small subgroups of the sample such as exclusive breastfeeding or careseeking for pneumonia. These small sample sizes affect the precision of point estimates and the statistical power to detect small differences over time. On the positive side, the 2001 and 2006-7 DHS used here for adequacy comparisons were very similar in methodology and in how they were conducted. Appendix F provides a review of differences between the surveys; however, these differences were minimal and we would not expect them to affect the findings.

The data available in the 2001 DHS did not allow for calculation of all priority indicators for the evaluation, which are identical to those used for monitoring progress toward the Millennium Development Goals (MDG).<sup>7,8</sup> In the 2001 DHS, several essential questions were not included: treatment status of bednets used by pregnant women, timing of antimalarial administration for febrile children, and number of doses of SP taken as part of IPT for pregnant women. In addition, women who reported a facility-based delivery were not asked about a postnatal visit.<sup>xii</sup> For the evaluation of time trends between 2001 and 2006-7, we used indicator definitions that could be calculated from the 2001 data to ensure comparability with indicator estimates in 2006-7 (see appendices D and E). These proxy indicator definitions were less

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<sup>xii</sup> It was assumed that women who delivered in a facility received a postnatal visit. In the 2006-7 DHS, **all** women were questioned about postnatal consultation, regardless of place of delivery.

stringent than the priority indicator in all cases; coverage estimates from 2006//7 using the more stringent, MDG priority coverage indicators are presented in appendices G, H and I.

In the 2006-7 DHS, the response categories for the type of mosquito net were not standard, making it difficult to assess the treatment status of the nets, and especially long-lasting nets. In order to follow the questionnaire logic and maintain comparability, we calculated ITN indicators using the same classifications as the 2006 national DHS. Because we suspect misclassification in both directions—i.e. untreated bednets mistakenly classified as ITNs, and ITNs mistakenly classified as untreated bed nets—it is difficult to know in which direction ITN results may be biased, if at all. Appendix K provides further details concerning this issue.

Differences in the conduct of the survey, the DHS questionnaires and interviewers' training and supervision may also have introduced some bias into the comparison of coverage levels between 2001 and 2006-7. However, these methodological challenges are not likely to change the main evaluation findings or conclusions in any substantial way, with the possible exception of ITN use as discussed above.



## 6. Nutrition

In this section, we describe the differences in nutritional status of young children between the ACSD high-impact districts (HIDs) and comparison areas, including the rest of the country with the exception of Bamako and the HIDs.

As described in section 2, data from the comparison areas were fully collected in 2006 during the main DHS, whereas results from the HIDs represent a combination of the 2006 DHS results and those from a supplemental survey carried out in 2007 using the same methodology, aimed at increasing the sample size in HIDs.

Three indicators of undernutrition prevalence were calculated from the baseline (2001) and endline (2006-7) surveys: prevalence of stunting (low length for age for children below 24 months; low height for children 24-59 months of age), wasting (low weight for length/height), and underweight (low weight for age). The  $-2$  z-scores cutoff was used, based on the 2006 WHO Growth Standards,<sup>11</sup> to identify children with moderate or severe undernutrition; for severe undernutrition the  $-3$  z-scores cutoff was used. Mean z scores of the three indices were also calculated. Appendix K presents the inclusion and exclusion criteria for the analysis.

Results are presented for all children under five years of age. For stunting, results are also presented for children aged 24-59 months, the age group with the highest prevalence of this condition<sup>28</sup>. Wasting results are described for children aged less than 24 months. The numbers of children included in the analyses are shown in Table 11.

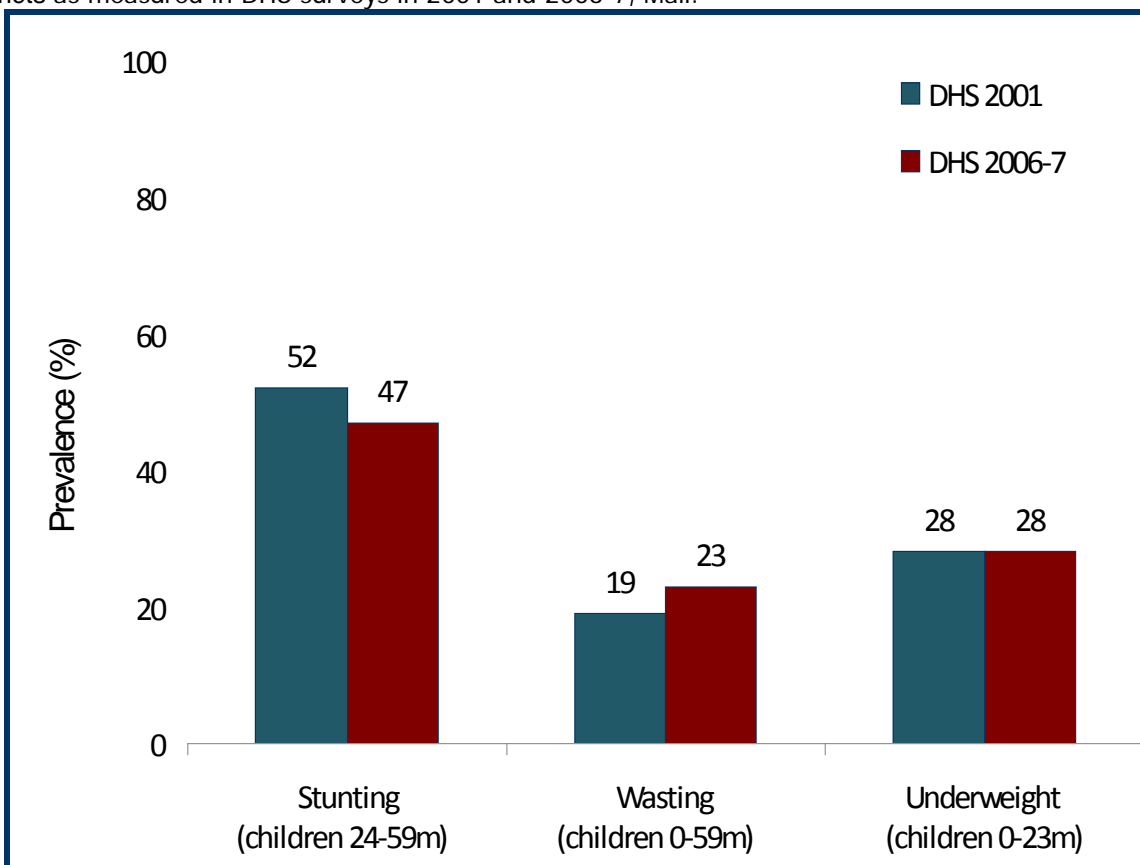
Presentation of the results follows the approach used in the section on coverage indicators. First, the adequacy findings are discussed (time trends in the HIDs), followed by the plausibility results (comparison between HIDs and the rest of the country). Appendix L presents full nutrition results for sub-groups in both areas.

### 6.1 Results

Figure 18 shows a decline in the prevalence of stunting over time in the HIDs from 52 to 47% ( $p=0.14$ ). The prevalence of underweight remained stable at around 28%, and wasting increased from 19 to 23% ( $p=0.12$ ).

Table 11 and Figure 19 show results for the HIDs as well as the comparison areas, in the baseline and endline surveys.

**Figure 18:** Time trends in prevalence of stunting, underweight and wasting in the ACSD high-impact districts as measured in DHS surveys in 2001 and 2006-7, Mali.



**Stunting.**

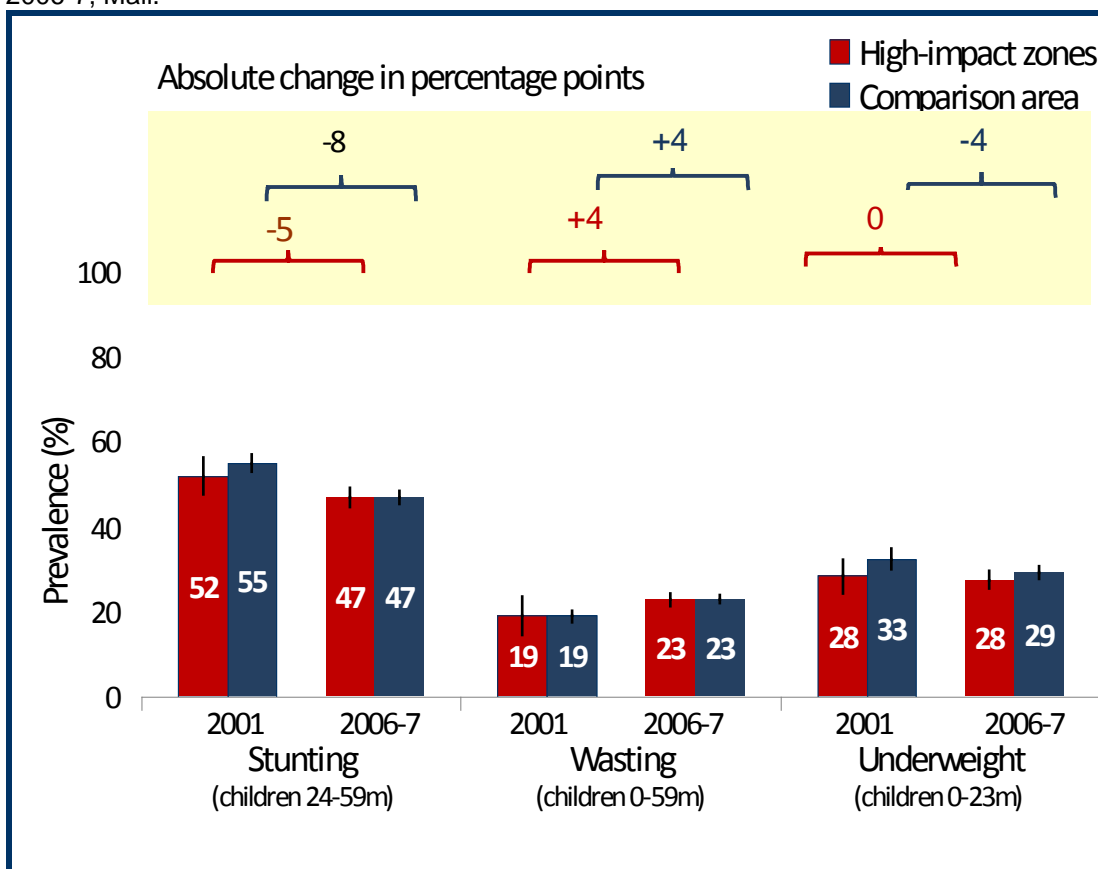
There was a reduction over time of 5.2 percentage points (pp) for children 24-59 months in the HID ( $p=0.14$ ), compared to an 8.5 pp decline in the comparison areas ( $p<0.001$ ). The decline in overall stunting (moderate or severe) in both areas was mostly due to the reduction in the prevalence of severe cases, which declined significantly in both areas. Mean height/length for age improved slightly in the HIDs and to a greater extent in the comparison area. Similar patterns are also observed when all under-five children were analyzed, but the magnitude of these reductions was less marked than for children aged 24-59 months. The difference in difference tests showed that there was no significant difference between trends in the HIDs versus the national comparison area.

Table 11: Summary of anthropometry results in ACSD “high-impact” districts and the comparison area as measured in DHS in 2001 and 2006-7, Mali.

NUTRITIONAL INDICATOR	2001 DHS				2006/7 DHS				P VALUE (BASELINE- ENDLINE)	P VALUE (BASELINE- ENDLINE)	P VA DIFFER IN DIFFER
	HIGH IMPACT DISTRICTS		GEOGRAPHIC COMPARISON**		HIGH IMPACT DISTRICTS		GEOGRAPHIC COMPARISON**				
	n	%	n	%	n	%	n	%	HID	NC	DIFFER
<b>Stunting (height for age)</b>											
<b>24-59 months</b>											
% stunted (< -2 SD)	568	52.4	3979	55.1	2085	47.2	4734	46.6	0.14	<0.001	0.4
% severely stunted (< -3 SD)		29.6		32.6		23.0		24.6	0.01	<0.001	0.7
mean (sd)		-2.0 (1.8)		-2.2 (1.6)		-1.9 (1.5)		-1.9 (1.6)			0.0
<b>0-59 months</b>											
% stunted (< -2 SD)	1025	41.4	7204	45.7	3794	39.2	8416	40.3	0.37	<0.001	0.2
% severely stunted (< -3 SD)		23.2		25.0		17.8		20.6	<0.01	<0.001	0.5
mean (sd)		-1.6 (1.8)		-1.8 (1.7)		-1.6 (1.6)		-1.6 (1.7)			0.0
<b>Wasting (weight for height)</b>											
<b>0-24 months</b>											
% wasted (< -2 SD)	488	18.6	3347	18.9	1755	23.1	3795	23.4	0.12	<0.001	0.5
% severely wasted (< -3 SD)		6.1		5.6		9.0		9.3	0.08	<0.001	0.6
mean (sd)		-0.8 (1.5)		-0.8 (1.4)		-1.0 (1.4)		-0.9 (1.5)			0.2
<b>0-59 months</b>											
% wasted (< -2 SD)	1074	15.9	7412	13.1	3855	14.7	8617	16.0	0.61	<0.001	0.1
% severely wasted (< -3 SD)		6.3		3.8		5.3		6.1	0.52	<0.001	0.0
mean (sd)		-0.6 (1.4)		-0.5 (1.3)		-0.6 (1.3)		-0.6 (1.4)			0.5
<b>Underweight (weight for age)</b>											
<b>0-59 months</b>											
% underweight (< -2 SD)	1104	28.4	7513	32.5	3915	27.6	8910	29.3	0.72	0.02	0.3
% severely underweight (< -3 SD)		11.7		12.4		9.9		11.9	0.17	0.56	0.3
mean (sd)		-1.3 (1.4)		-1.4 (1.4)		-1.3 (1.3)		-1.3 (1.4)			0.1



**Figure 19:** Prevalence of stunting, underweight and wasting and absolute change in percentage points in the ACSD “high-impact” districts and the comparison area as measured in DHS in 2001 and 2006-7, Mali.



### **Wasting.**

For children under 24 months, the prevalence of wasting at baseline was around 19% in both the HIDs and the comparison area, and increased in both areas by about 4 pp during the evaluation period. The prevalence of severe wasting also increased from 6 to 9% in both areas, and accordingly the mean values of weight for length declined. No significant differences were observed between the time trends in intervention and comparison areas. A slightly different pattern was observed when all under-five children were analyzed. There was a slight decline of about 1 pp in the HID but an increase of about 3 pp in the comparison areas, but the difference was not statistically significant ( $p=0.10$ ).

### **Underweight.**

The analyses of underweight include all under-five children. There was a slight decline of less than one pp in the HIDs, and a more marked 3 pp decline in the comparison areas, a non-significant difference in differences. Severe underweight accounts for about one third of all cases in both areas. There was no change in mean weight for age.

## 6.2 Summary and interpretation of results

In summary, the results suggest that there was no differential impact of ACSD on nutritional status. If anything, levels of stunting and underweight declined faster in the comparison areas than in the HIDs, although the differences were not significant.

### ***Stunting.***

National DHS<sup>15</sup> results suggest that stunting is declining in Mali as a whole, a finding that is reflected in the present data. This was particularly true for severe stunting. This decline is probably more strongly related to overall socioeconomic progress than to improvements in coverage of preventive or curative interventions, as described in section 3. Stunting is primarily influenced by dietary quality and quantity, and to a lesser extent by the incidence and severity of infections. There were few noted improvements in the measured infant feeding practices or case management interventions; any changes in quantity or quality of foods that may have taken place cannot be properly detected by the available indicators. Coverage of preventive interventions, such as ITNs and vitamin A, increased substantially in the HIDs and comparison areas. ITNs during pregnancy contribute to improving birthweight, and thus have an indirect effect on stunting. Vitamin A supplementation, on the other hand does not affect stunting prevalence.

The active process of stunting, or growth faltering, occurs up to the age of 24 months, after which children tend to grow parallel to the growth standards and prevalence remains constant up to five years of age. The most sensitive indicator, therefore, is the prevalence of stunting among children age 24-59 months. However, for an intervention such as ACSD to have an impact on stunting, children should be exposed to it during their first two years of life when active faltering is occurring. For this reason, analyses were repeated for children who were born in 2004 (when ACSD was fully implemented) and therefore spent their first two years under fully-implemented ACSD. Stunting prevalence at endline was 54.6% in the HIDs and 51.4% in the comparison areas, confirming the absence of a differential impact of ACSD.

### ***Wasting.***

The increase in wasting between the baseline and endline surveys, in both ACSD and comparison areas, may be related to seasonality. The 2001 DHS was carried out in the dry season (January to April) whereas the 2006 survey took place in the rainy season (May to December). Studies from West Africa consistently show higher prevalence of wasting in the rainy season, which has been associated both with food shortages and higher malaria incidence.<sup>29</sup> The decline in exclusive breastfeeding in the HIDs was suggested as a potential explanation for the increase in wasting, but a similar increase was observed in the comparison areas where exclusive breastfeeding rates improved over time.

### ***Underweight.***

The small reduction in underweight prevalence represents a combination of a marked decline in stunting with an increase in wasting prevalence, because underweight prevalence is affected by the frequency of both stunting and wasting.

### ***Cross-cutting implementation and contextual factors.***

Here we review implementation and contextual factors with potential to influence the nutritional indicators and confound the results discussed above:

- *Integration of nutritional interventions in ACSD and nationally.* Program managers in Mali reported that nutritional interventions were never a strong component of national plans or ACSD strategies, apart from vitamin A supplementation. A study conducted in the ACSD HIDs of Kolokani, Niono and Koro found that although health workers had the necessary materials to assess nutritional status, few providers performed nutritional assessments. Only providers in Kolokani had been trained in nutritional interventions and IMCI; these providers performed better than their counterparts in the other districts.<sup>30</sup>

- *Socio-economic status.* In the baseline survey, families with children in the HIDs were significantly poorer than those in the comparison areas (section 3). We used direct standardization techniques to estimate the prevalence of stunting among HID children, had their socioeconomic distribution been similar to that observed in the comparison areas. The standardized baseline stunting prevalence among all under-fives in HIDs was equal to 39.5%, compared to a crude prevalence of 41.4% in these areas, and to 45.6% in the comparison areas. At the endline survey, the wealth distribution was similar in ACSD and comparison areas, and standardization hardly affected the prevalence in the HIDs (from 39.2% to 39.0%). Therefore, accounting for socioeconomic differences led in fact to a lower decline in stunting in the HIDs than observed in the crude analyses.
- *Presence of other nutritional interventions or programs in the HIDs.* Our analyses of contextual factors (section 3 and annex J) showed that a number of smaller-scale nutritional and agricultural projects were active in both the HIDs and the comparison area. It is unlikely that presence of these programs could have affected the present findings.
- *Natural occurrences.* Our documentation of contextual factors at the national level showed that there was a food crisis in the Sahel between 2005 and 2006. The northeastern regions, which are included in our comparison area, were particularly affected. Appendix K presents anthropometric indicators for the national comparison area, stratified by region. The steep increase in prevalence of undernutrition in Kidal region is compatible with the reported food crisis. Due to the small population and thus small sample size of children in Kidal, exclusion of the Kidal region from the national comparison area showed trends similar to those presented above.

Summing up, after consideration of implementation contextual factors, there was still no evidence of a differential impact of ACSD on any of the three nutritional indicators studied. As will be discussed below (section 9 on conclusions), this is consistent with the finding on coverage of interventions with a potential impact on nutrition.

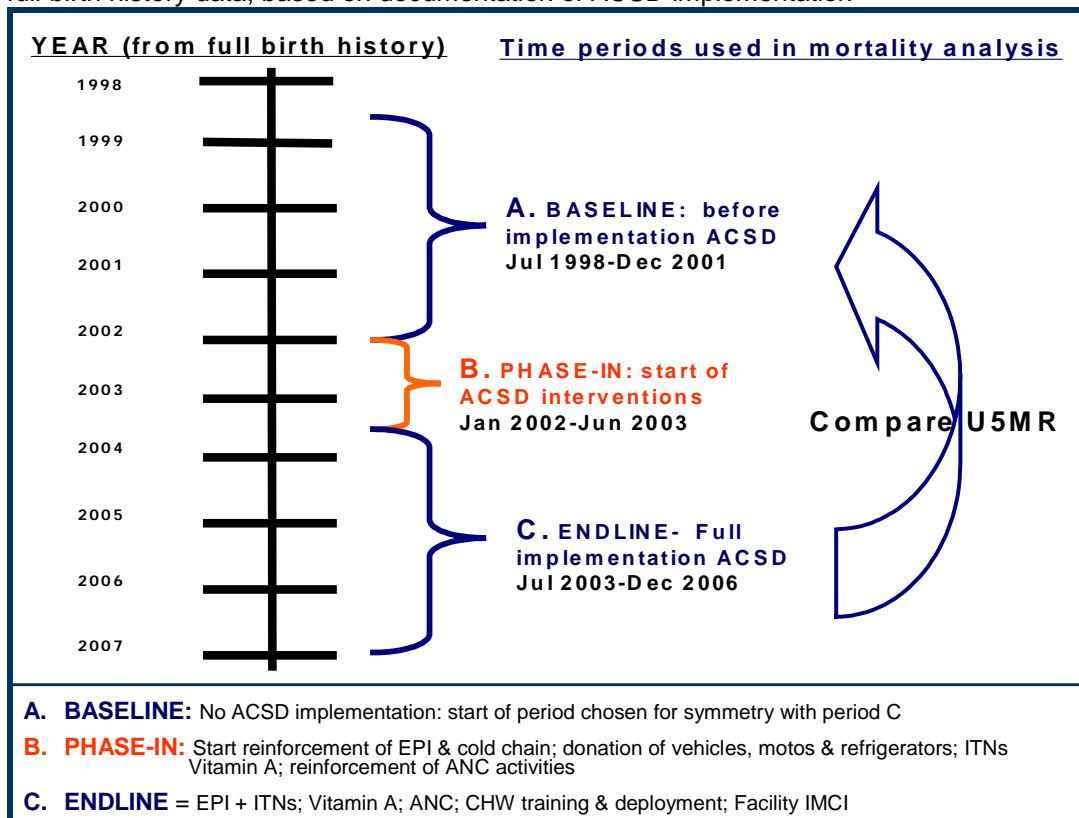
## 7. Mortality

This section reports on changes in child mortality in the ACSD “high-impact” districts (HIDs) and in the national comparison area, the latter having been defined earlier in this document. The comparisons in this section differ from those presented previously because the full birth history data collected in the 2006-7 DHS are used to estimate child mortality both before and after ACSD became operational.

There are two reasons why we elected to use the 2006/07 survey as the basis for estimating mortality throughout the evaluation period. First, the use of a full birth history allows the calculation of period estimates of mortality from the previous year to 10 or more years in the past. The use of the same survey greatly reduces non-sampling error, although use of this method for short periods may lead to large sampling errors. The second reason for using a single survey to estimate mortality for the two time periods – before and after ACSD implementation - is that both estimates are based on the same sample of households. This reduces the sampling error of the difference in mortality between the two periods, and hence enables smaller differences to be measured more precisely.

Our main comparison refers to two periods of about 3½ years each, before and after ACSD implementation in the HIDs. As shown in Figure 20, based on the documentation of ACSD implementation, we defined the baseline period as July 1998 to December 2001, and the full implementation period as July 2003 to December 2006, with a phase-in period in between baseline and full implementation.

Figure 20: ACSD implementation time periods in Mali for the retrospective mortality analysis using full-birth history data, based on documentation of ACSD implementation



The under-five mortality rate (U5MR) is our priority indicator for measuring changes in mortality, because the primary goal of the ACSD project was to reduce it by 25% by the end of 2006.<sup>31</sup> One benefit of using U5MR relative to other measures of child mortality (see Box 3) is that it provides the largest sample size, being less sensitive to errors in reporting age than infant or neonatal mortality. Although we present findings for specific age groups within 0 to 59 months, we have considered U5MR as the primary indicator of mortality impact.

<b>Box 3:</b>	
<b>Measures of child mortality</b> (expressed as deaths per 1,000 live births)	
<b>Neonatal mortality (NN)</b>	The probability of dying between birth and the first month of life
<b>Post-neonatal mortality</b>	The probability of dying between the exact age of one month and the exact age of one year
<b>Infant mortality (IMR)</b>	The probability of dying between birth and exact age one year
<b>Child mortality (CMR)</b>	The probability of dying between exact ages one and five years
<b>Under-five mortality (U5MR)</b>	The probability of dying between birth and exact age five years

### 7.1 Results

Figure 21 presents the annual estimates of U5MR in the HIDs and national comparison areas from 1997 to 2006. Mortality over the last 10 years is declining in both areas, with no statistically significant difference in the rate of decline between the HIDs and the comparison area given the large sampling error for the yearly estimates (95% confidence intervals shown in dashed lines).

Figure 21: Annual estimates of U5MR in the ACSD “high-impact” districts and the comparison area, 1997-2006, Mali.

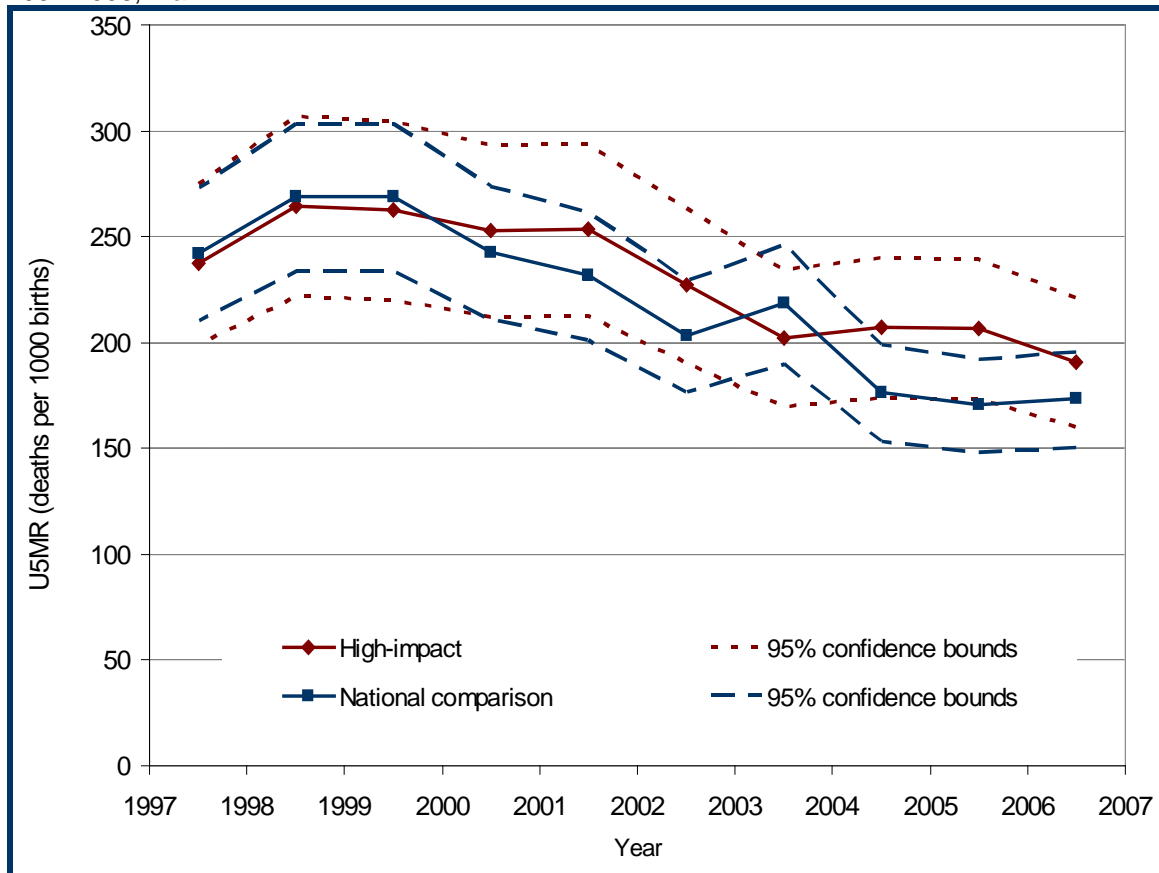
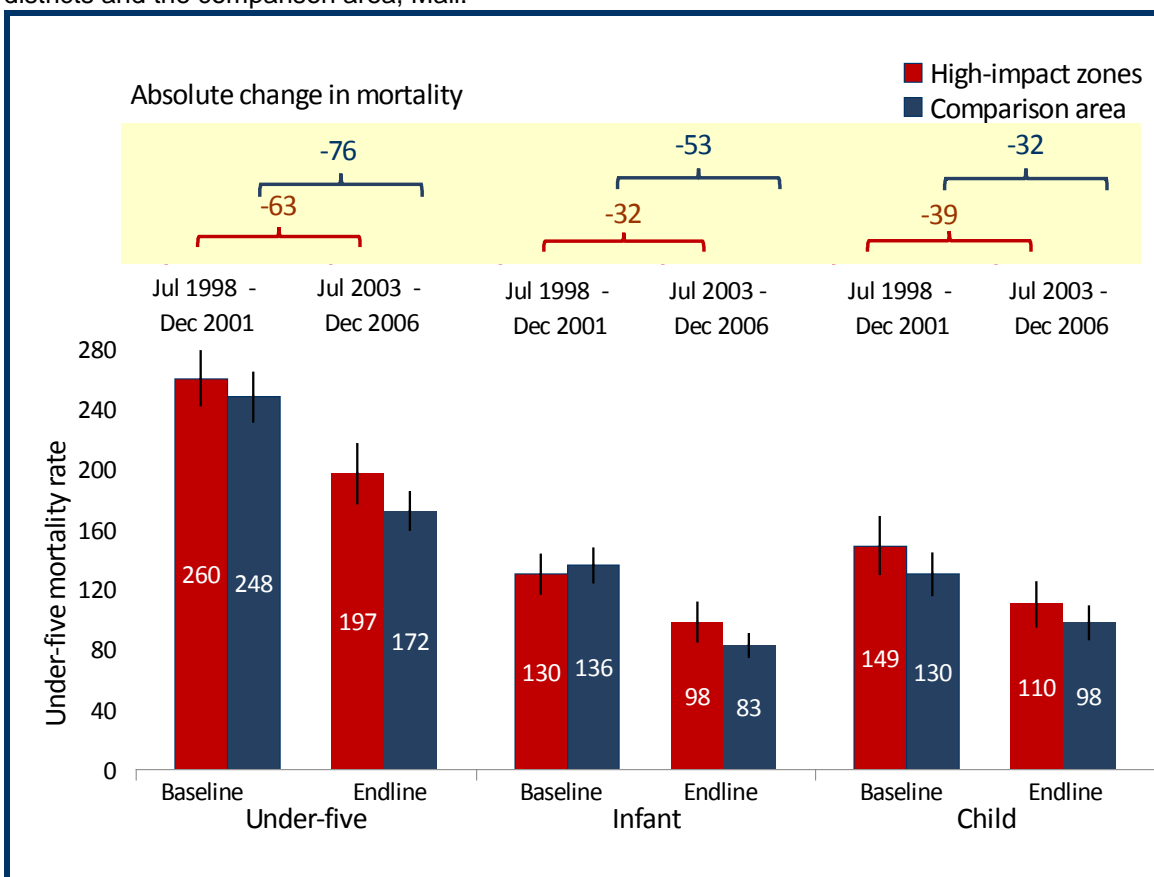


Figure 22 presents changes in under-five mortality, infant and child mortality rates for the HID and the comparison area in the periods before ACSD implementation and after full implementation. The numbers of births on which these estimates are based are 3254 in the HID at baseline and 3315 at endline; the corresponding numbers are 7757 and 7072 in the comparison area. Table 12 presents several age-specific mortality rates in the baseline and end line periods for both study areas, as well as the absolute reduction over time expressed as deaths per thousand births and 95% confidence limits for these estimates.

Figure 22: Under-five, infant and child mortality rates and absolute change in the ACSD “high-impact” districts and the comparison area, Mali.



Data on under-five mortality show very high baseline levels. There were substantial reductions between the baseline and endline periods: 24% in the ACSD HID and 31% in the comparison area. Neonatal mortality showed the fastest decline (35% and 47%, respectively). Postneonatal mortality fell 14% in ACSD HID and 30% in the comparison area, and infant mortality was reduced by 25 and 39%, respectively. Rates of decline in child mortality were virtually identical in both areas, 26 and 25% respectively. The difference in differences analyses showed that the rates of decline were not statistically different for under-five, neonatal, postneonatal, or child mortality. The decrease in infant mortality in the comparison area was marginally greater than in the ACSD HID ( $p=0.04$ ), although this finding must be interpreted with caution due to the influence of age heaping on infant mortality estimates.

Table 12: Priority and age-specific mortality rates in “high-impact” districts and the comparison area before and after ACSD implementation, Mali.

MORTALITY MEASURES	HIGH IMPACT DISTRICTS		COMPARISON AREA		HIGH IMPACT DISTRICTS	COMPARISON AREA
	JUL 1998 - DEC 2001	JUL 2003 - DEC 2006	JUL 1998 - DEC 2001	JUL 2003 - DEC 2006	Difference, Baseline (A) - Endline (C)	Difference, Baseline (A) - Endline (C)
<b>Priority Indicator</b>						
Under-five mortality (5q0)	259.5	197.2	248.3	172.3	62.3	76.0
95% CI	(241.4 - 277.6)	(177.9 - 216.5)	(232.1 - 264.6)	(159.9 - 184.7)	(42.5 - 82.0)	(58.3 - 93.8)
<b>Age-specific indicators</b>						
Neonatal mortality (NN)	65.2	42.2	74.8	39.6	23.1	35.2
95% CI	(54.9 - 75.5)	(34.3 - 50.0)	(65.9 - 83.7)	(33.4 - 45.7)	(9.5 - 36.7)	(24.2 - 46.2)
Postneonatal mortality (PNN)	65.2	56.2	61.2	42.9	8.9	18.2
95% CI	(56.3 - 74.0)	(46.2 - 66.3)	(52.6 - 69.7)	(36.9 - 49.0)	(-3.4 - 21.2)	(7.9 - 28.5)
Infant mortality (1q0)	130.4	98.4	135.9	82.5	32	53.5
95% CI	(117.5 - 143.3)	(85.4 - 111.4)	(124.6 - 147.3)	(75.2 - 89.8)	(14.0 - 50.1)	(42.4 - 64.5)
Child mortality (4q1)	148.5	109.6	130.1	97.9	38.8	32.2
95% CI	(129.8 - 167.1)	(95.0 - 124.2)	(116.4 - 143.8)	(87.1 - 108.7)	(20.2 - 57.5)	(17.3 - 47.1)

Further examination of mortality impact by sex of the child, place of residence (urban/rural) and socio-economic status is presented in the next section on equity.

## 7.2 Summary and interpretation of results

Based on these findings, the U5MR in Mali ACSD HIDs declined by 24% in the period from 1999 to 2006—from 260 to 197 per 1,000 live births - thus essentially achieving the ACSD goal of a 25% reduction in U5MR. However, the U5MR declined at a similar rate in the comparison area where ACSD was not implemented. This finding held true across all age subgroups with the exception of infant mortality, which declined at a significantly faster rate in the comparison area than in the ACSD HIDs.

### Contextual Factors.

We considered the contextual factors that might have offset the impact of ACSD, with special attention to factors which would have influenced the ACSD HIDs and comparison areas differentially.

- *Socio-economic status.* As presented in section 3, we observed that relative and overall socio-economic status of households in the HIDs improved over time, as measured wealth quintiles based on household assets and building materials, and household ownership of consumer items. We would expect that these changes in socio-economic status would have a positive influence on declines in child mortality. Standardizing the baseline and endline U5MR in the HIDs according to the wealth distribution of the comparison areas removes the effect of change in socioeconomic status. After standardization, the baseline and endline U5MRs were 258.9 and 196.6, compared to the unstandardized values of 260.1 and 197.1. The small effect of standardization reflects the fact that mortality did not show a strong social gradient in this sample (see next section).
- *Antimalarial resistance and changes to first-line drug policies.* The growing chloroquine resistance over the period of the evaluation may have had a negative influence on child survival gains. High levels of resistance to chloroquine were documented in 2003,<sup>24</sup> and the more effective ACTs were not available to the population until 2007. Mean resistance levels were roughly equivalent in both the

HIDs and the comparison area, although the southern part of the national comparison area reported higher levels of resistance than the HIDs and the northern part of the national comparison area reported lower levels of resistance than the HIDs.<sup>24</sup> Changes in first line drug policies were nationwide, with the same ramifications for HIDs and comparison areas.

- *Other programs.* As described in section 3, and previous sections, large programs driven by donors other than UNICEF were implemented in 38 of the 47 districts in the comparison areas, delivering basically the same set of interventions as ACSD.

### ***Methodological Challenges.***

Three important methodological issues may have affected the results of this retrospective estimation of the effect of ACSD on under-five mortality. The first is the potential effect of data quality issues on the estimates, and specifically whether differences in survey procedures might have affected the comparability of the data collected through the original DHS in 2006 and the supplemental survey conducted in 2007 in the HIDs. We attempted to document survey procedures independently for both parts of the survey, interviewing survey planners and surveyors and even participating in the training of surveyors and early period of data collection for the supplemental survey (appendix F). We documented differences in survey procedures that may have affected data quality and biased the reported estimates, but further comparisons of the 2006 and 2007 subsamples in the HIDs suggested that the overall trends and their interpretation were not affected. Appendix K presents a more detailed discussion of these issues and how they were addressed in analysis.

A second methodological challenge was the definition of the “before” and “after” periods of ACSD implementation. Documentation of implementation is difficult in a retrospective evaluation, and is based by necessity on records maintained for other purposes and the subjective recall of project implementers. The two periods defined for the purpose of this evaluation were discussed and agreed to with in-country teams composed of ACSD implementers and national counterparts, and we believe that they accurately distinguish between periods before ACSD was implemented and periods during which ACSD was “fully implemented” in the views of those responsible.

A third issue is the extent to which ACSD activities and policy influences may have affected mortality in the remainder of Mali, (excluding Bamako), either directly or indirectly. This is addressed in the conclusions of the report, which begin on page 67.

In summary, despite these methodological challenges there is sufficient evidence to conclude that that there was a significant reduction in child mortality in the HIDs from before to after ACSD was implemented. The 24% reduction in U5MR between the two periods comes close to the reduction goal for the ACSD project of 25% by the end of 2006. At the same time, the national comparison area has achieved a similar if not larger reduction in U5MR during the same time period. In our conclusions we discuss how these findings relate to the results on coverage and nutrition.



## 8. Equity in coverage, nutrition and mortality

In addition to evaluating the impact of ACSD implementation on indicators of coverage, undernutrition and mortality, it is also important to assess whether the strategy helped reduce inequities in health. In this chapter we describe within-population inequalities in the ACSD HIDs and the comparison area across socioeconomic levels, sex of the child, place of residence and ethnic group.

Socioeconomic level was analyzed by wealth quintiles, obtained from an index based on ownership of household assets and housing characteristics (see Appendix D). Separate wealth indices were calculated for the baseline (2001) and endline (2006-7) surveys. The definition of urban or rural residence was based on the sampling frame from the 1998 national census; this categorization was used as a basis for sampling for both DHS used in the analyses. Ethnic groups included Bambara, Peulh, Sarkole, and Dogon; all other groups were pooled as each comprised less than 8% of the study sample.

Our analyses document how inequalities evolved over time in the HIDs and the national comparison areas. We focus on six coverage indicators representing the three components of ACSD. For the EPI+ component we present coverage for measles vaccine and vitamin A supplementation for children. For the IMCI+ component we present coverage for correct treatment of child diarrhea (ORT) and the use of an insecticide-treated bednet by children less than five years of age. For the ANC+ component we analyze equity in coverage for three or more antenatal visits and the reported presence of a skilled attendant at delivery. We also assessed equity for the two primary indicators of impact in the evaluation: stunting among children aged 24-59 months and under-five mortality. Appendix I presents the breakdown of all coverage indicators in the 2006-7 survey in the HIDs by sex of the child, urban/rural residence, mother's education, and by wealth quintiles and appendix M presents complementary equity results for this section.

For the examination of inequities by socioeconomic status, we present measures of inequality using three summary methods. First, we examine levels of selected indicators by wealth quintile, and present the results in graphs. Second, we calculated two summary measures of inequality. The *slope index of inequality* shows the absolute difference between the top and bottom of the wealth scale, based on a regression approach that uses data from all quintiles rather than just the two extreme groups. *Concentration indices* show the extent to which the outcome is equitably distributed across all wealth groups, as reflected in a value between -1 and 1. A value of zero indicates that the outcome is equitably distributed across all wealth groups. A negative value indicates disproportionate concentration of the health variable among the poor, for example in the case of disease or malnutrition, where the poor are more likely to be affected. A positive value indicates that the poor are getting less than would be expected had the distribution been equitable, as often occurs for preventive and curative interventions.<sup>xiii</sup>

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<sup>xiii</sup> For more information see: ([http://siteresources.worldbank.org/INTPAH/Resources/Publications/Quantitative-Techniques/health\\_eq\\_tn07.pdf](http://siteresources.worldbank.org/INTPAH/Resources/Publications/Quantitative-Techniques/health_eq_tn07.pdf))

## 8.1 Results

### ***Socioeconomic inequalities.***

Figures 23a-h and table 13 summarize the equity results based on the selected indicators; appendix M presents the full results. Marked socioeconomic inequities were documented for most coverage indicators in both the HIDs and the comparison area in the baseline survey, with children in the poorest group having lower levels of coverage than their better-off peers. For example, a slope index of 37.8 for measles coverage in the HID at baseline indicates the difference in percentage points (pp) in coverage between the poorest and least poor children. In the endline survey this difference had declined substantially, to 16.0 pp; correspondingly the concentration index fell from 0.133 to 0.037, the latter indicating virtually no inequality.

Over time, inequalities within the HID were reduced for all coverage indicators. Progress within the comparison areas was mixed – some indicators showed marked improvements in equity (measles coverage), others showed small if any improvements (vitamin A supplementation, ORT), and others showed growing inequities (ANC and skilled delivery). We compared the differences between the concentration indices in the HIDs and the comparison area at baseline and endline. For vitamin A ( $p < 0.01$ ) and antenatal care ( $p < 0.01$ ), equity improved significantly more in the ACSD areas. Overall, our results suggest that ACSD implementation was associated with reduced inequities in coverage of essential interventions.

In terms of stunting and mortality (Figures 23 g-h) the slopes are in the opposite direction of those for coverage, indicating that levels among the poor are higher than among the rich. The summary indices (Table 13) take a negative sign under these conditions. Stunting prevalence showed considerably higher inequity in the HIDs than in the comparison area at baseline, but in the endline survey the difference disappeared. The difference in differences test for concentration indices, however, was not statistically significant.

In contrast with the marked disparities in coverage and nutrition, inequities in under-five mortality were small and did not change over time in either the HIDs or the national comparison area.

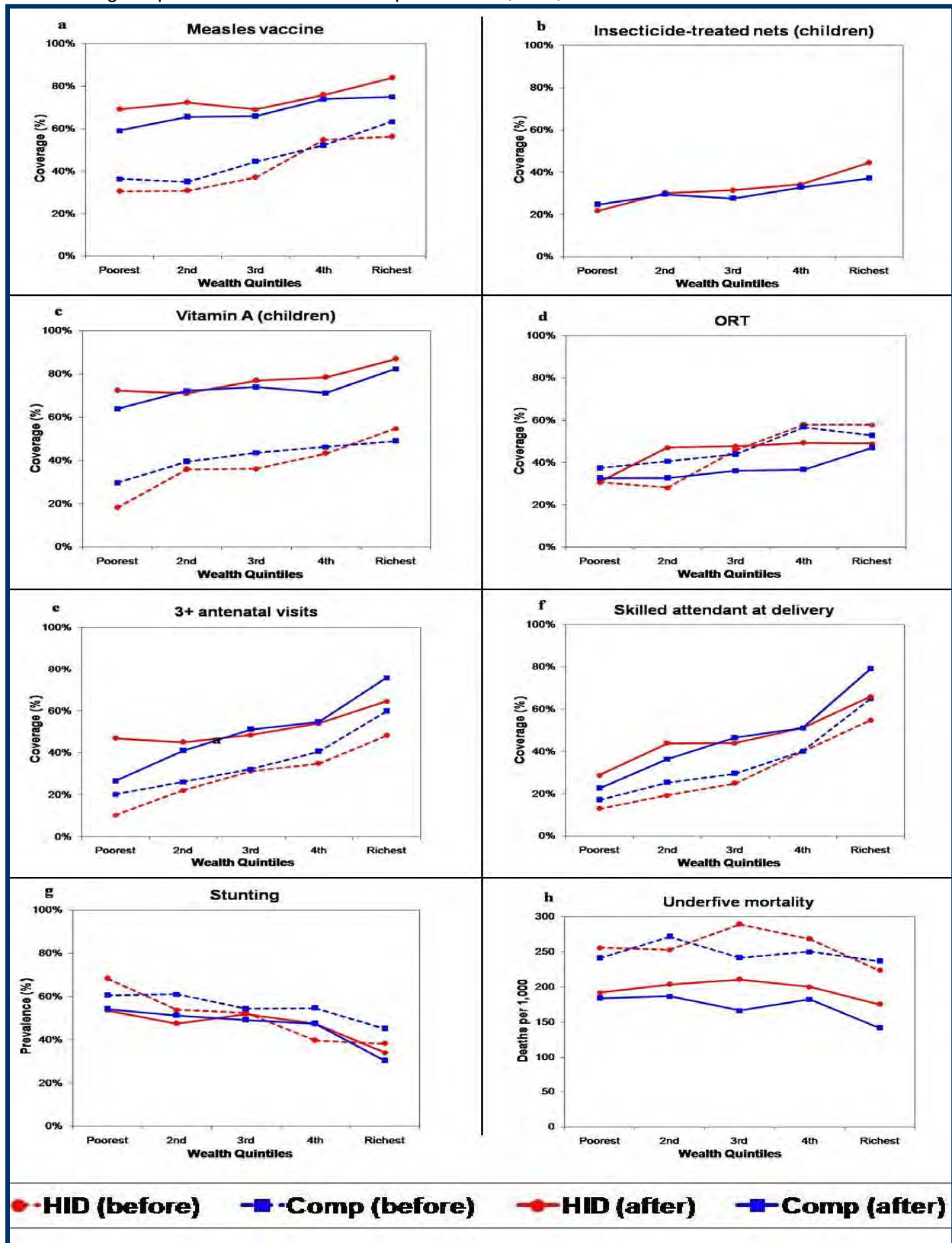
In summary, there is evidence that ACSD implementation helped reduce inequities in coverage and possibly in undernutrition, but not in mortality.

**Table 13:** Summary indices of socioeconomic inequalities for selected indicators in “high-impact” districts and the comparison area, Mali, 2001 and 2006-7.

INDICATOR	YEAR	SLOPE INDEX OF INEQUALITY*		CONCENTRATION INDEX			
		ACSD HIDs	COMPARISON	ACSD HIDs (SE)	COMPAR- ISON (SE)	P value (HID v. comp)	DIF- DIF P value
Measles coverage	2001	37.8	35.8	0.133 (0.05)	0.114 (0.015)	>0.10	>0.10
	2006-7	16.0	19.8	0.037 (0.012)	0.062 (0.008)	0.10	
ITNs (children)	2001	-	-	-	-	-	n/a
	2006-7	24.3	14.0	0.129 (0.012)	0.074 (0.009)	<0.01	
Vitamin A (children)	2001	42.3	22.9	0.168 (0.026)	0.104 (0.009)	0.02	0.002
	2006-7	17.8	17.7	0.043 (0.005)	0.069 (0.004)	<0.001	
ORT	2001	44.0	23.4	0.158 (0.050)	0.073 (0.016)	0.02	>0.10
	2006-7	17.6	15.3	0.072 (0.025)	0.044 (0.020)	>0.10	
ANC (3 visits)	2001	46.3	46.5	0.267 (0.050)	0.220 (0.015)	>0.10	0.004
	2006-7	21.6	54.8	0.062 (0.017)	0.185 (0.010)	<0.001	
Skilled delivery	2001	52.9	55.2	0.273 (0.070)	0.387 (0.029)	>0.10	>0.10
	2006-7	39.8	62.4	0.348 (0.047)	0.352 (0.023)	>0.10	
Stunting	2001	-39.9	-18.7	-0.049 (0.047)	-0.020 (0.014)	>0.10	>0.10
	2006-7	-19.1	-25.3	-0.066 (0.021)	-0.059 (0.013)	>0.10	
Under-five mortality	Jul 98 – Dec 01	-22.5	-14.0	-0.009 (0.025)	-0.009 (0.012)	>0.10	>0.10
	Jul 03 – Dec 06	-17.9	-43.5	-0.013 (0.020)	-0.040 (0.024)	>0.10	

**Note:** Concentration index estimates, standard errors and p-values based on individual analysis

Figure 23a-h: Socioeconomic inequalities, showing breakdown by wealth quintiles of selected indicators in ACSD “high-impact” districts and the comparison area, Mali, 2006-7.



### ***Inequalities by sex of the child.***

We found no evidence of preferential treatment for boys or girls in either in the HIDs or the comparison area before or after ACSD implementation (appendix M). Sex inequalities were not analyzed for antenatal or delivery care, when the sex of the baby was not yet known (assuming a low frequency of pregnancy ultrasound). For the impact indicators, boys were more likely to be stunted than girls ( $p=0.02$ ) in the endline survey in HIDs, but not in the comparison area nor in the baseline survey. This is likely to be a chance finding. Boy children experienced higher levels of mortality at baseline (table 14), while levels of mortality among boys and girls were similar at endline.

Table 14: Under-five mortality rate by child's sex in "high-impact" districts and the comparison area, Mali, 2001 and 2006-7.

Time period	AREA	Overall U5MR	Male		Female	
			U5MR	Births	U5MR	Births
July 1998 – December 2001	HIDs	259.5	278.2	1610	240.4	1644
	Comparison	248.3	265.2	4039	230.0	3718
July 2003 – December 2006	HIDs	197.2	196.5	1692	197.8	1623
	Comparison	172.3	169.9	3686	174.7	3386

### ***Urban/rural inequalities.***

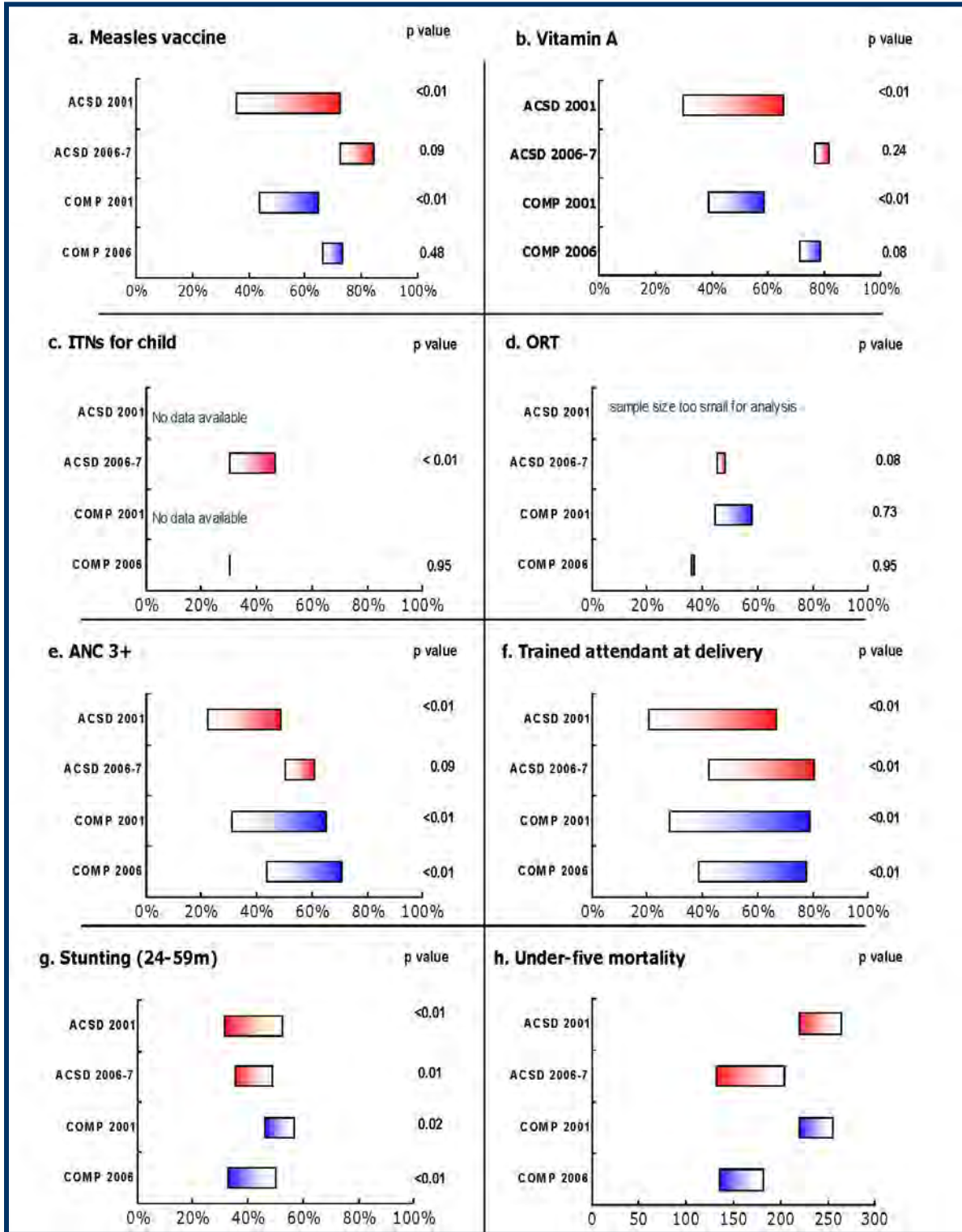
About 85% of the baseline sample was rural in both the HIDs and the national comparison area. Urban children showed higher coverage than rural children for nearly all interventions, in both areas, although not all differences were statistically significant. Appendix M presents full equity analysis results, including place of residence.

We examined time trends in urban-rural differentials in both areas (Figure 24a-h): antenatal and delivery care, measles vaccine and vitamin A supplementation. For all the urban-rural gap decreased more rapidly in the HIDs than in the comparison area.

Reliable baseline coverage data were not available for ITNs and for ORT. For the latter, comparison of endline coverage showed very small urban-rural gaps. For ITNs, there was a substantial gap of 16.4 pp in the HIDs, but no urban-rural difference in the national comparison area.

Unlike coverage gaps, where higher values are observed in urban than rural children, gaps in nutrition and mortality went in the opposite direction indicating fewer deaths and lower prevalence of stunting among urban relative to rural children. For stunting, the gap fell from 21 to 13 pp in the ACSD HIDs, but increased from 10 to 17 pp in the comparison area. The gap in under-five mortality increased in both areas, from 44 to 72 deaths per thousand in the HIDs and from 35 to 47 deaths per thousand in comparison areas. It is unclear why the urban-rural gap in mortality would be on the increase when coverage gaps are on the decrease.

Figure 24a-h: Coverage gap between rural (white end of the bars) and urban (colored end) residence of selected indicators in ACSD “high-impact” districts and the comparison area, Mali, 2006-7.



KEY: Colored ends of bars represent indicator levels among urban residents, while white ends of bars represent indicator among rural residents; red bars represent ACSD HIDs, blue bars represent comparison areas

### Ethnic group inequalities.

Appendix M presents the full results of ethnic group inequalities. Four main ethnic groups are present in Mali: the Bambara (39% of the children in the HIDs and 33% in the comparison areas); Peulh (11% and 14%, respectively); Sarakole (10 and 13%) and Dogon (21% and 6%).

The breakdown of the population into several subgroups, resulting in small sample sizes. The results from the HIDs should be interpreted with caution, as estimates other than those for the Bambara are often based on fewer than 50 children. To improve the precision of results, we calculated the average coverage of the five interventions addressed in this section for which baseline and endline data were available: measles vaccination, vitamin A supplementation for children, ORT, ANC 3+ visits and skilled attendant at delivery. Figure 25 shows these average values. The mean baseline coverage levels showed that the Dogon children had markedly lower coverage than all other ethnic groups. At endline, mean coverage increased substantially in ACSD HIDs and the comparison area for all ethnic groups, and differences between the groups became much smaller than at baseline. Within every group, mean coverage appears to have risen more quickly in HIDs than in the comparison area.

Figure 25: Ethnic group inequities for mean coverage of five key interventions ACSD “high-impact” districts and the comparison area, Mali, 2006-7.

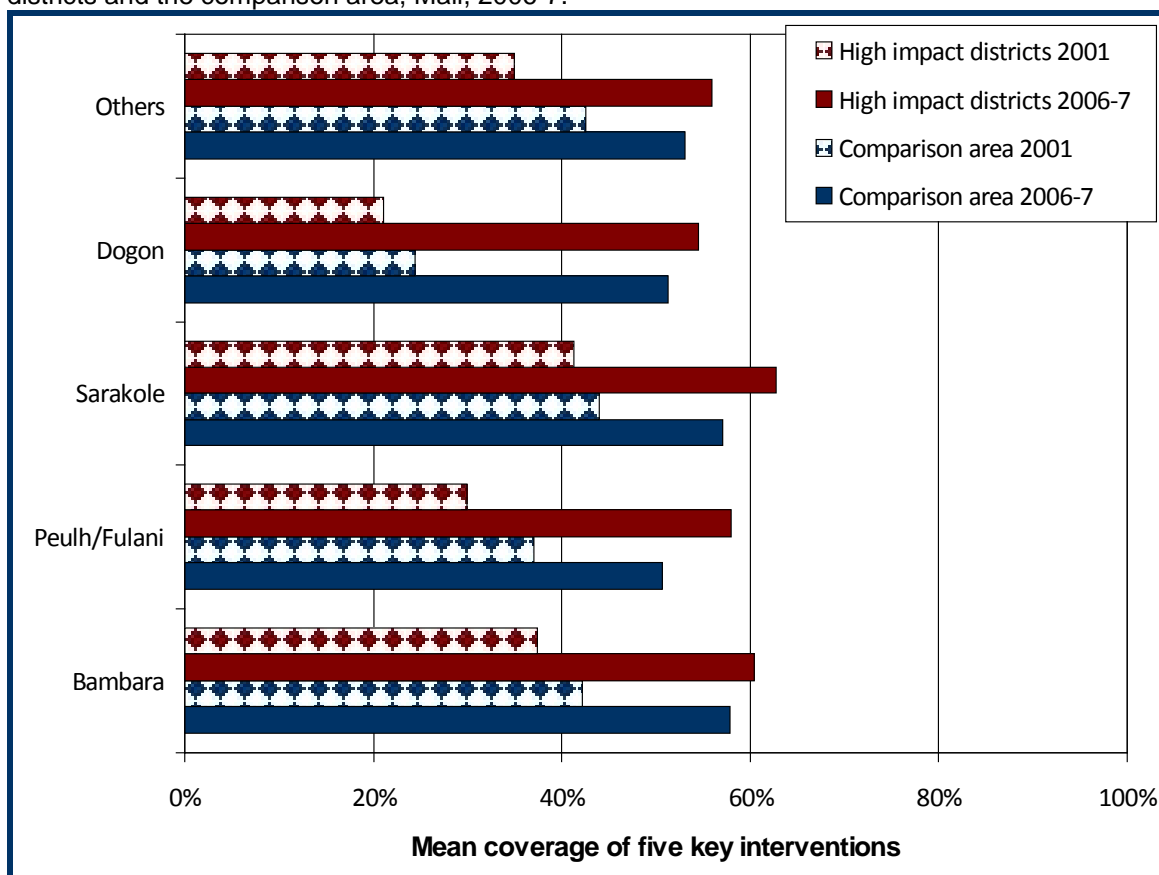
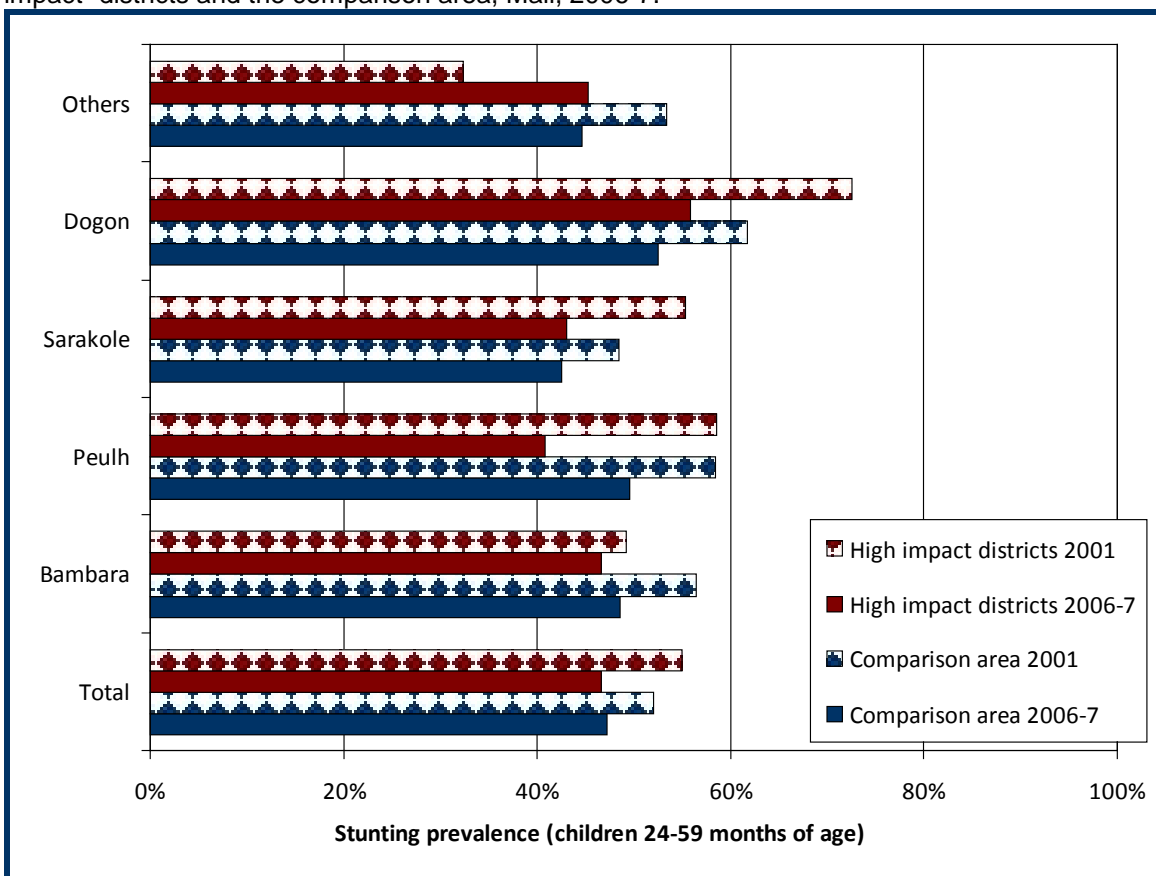


Figure 26 shows that stunting prevalence declined in every ethnic group, in both areas. The extremely high stunting prevalence in the Dogon in ACSD areas at baseline – 73%, based on 108 children – was markedly reduced by 2006-7.

Overall, ethnic group disparities in coverage and nutrition were reduced in both ACSD HID and the comparison area during the study period.

Figure 26: Prevalence of stunting in children 24-59 months of age by ethnic group in ACSD “high-impact” districts and the comparison area, Mali, 2006-7.



In summary, the equity analyses suggest a positive impact of ACSD implementation in reducing socioeconomic and urban/rural inequities in intervention coverage. Sex inequalities were virtually non-existent, and ethnic group disparities were reduced markedly over time in both HID and the comparison area.

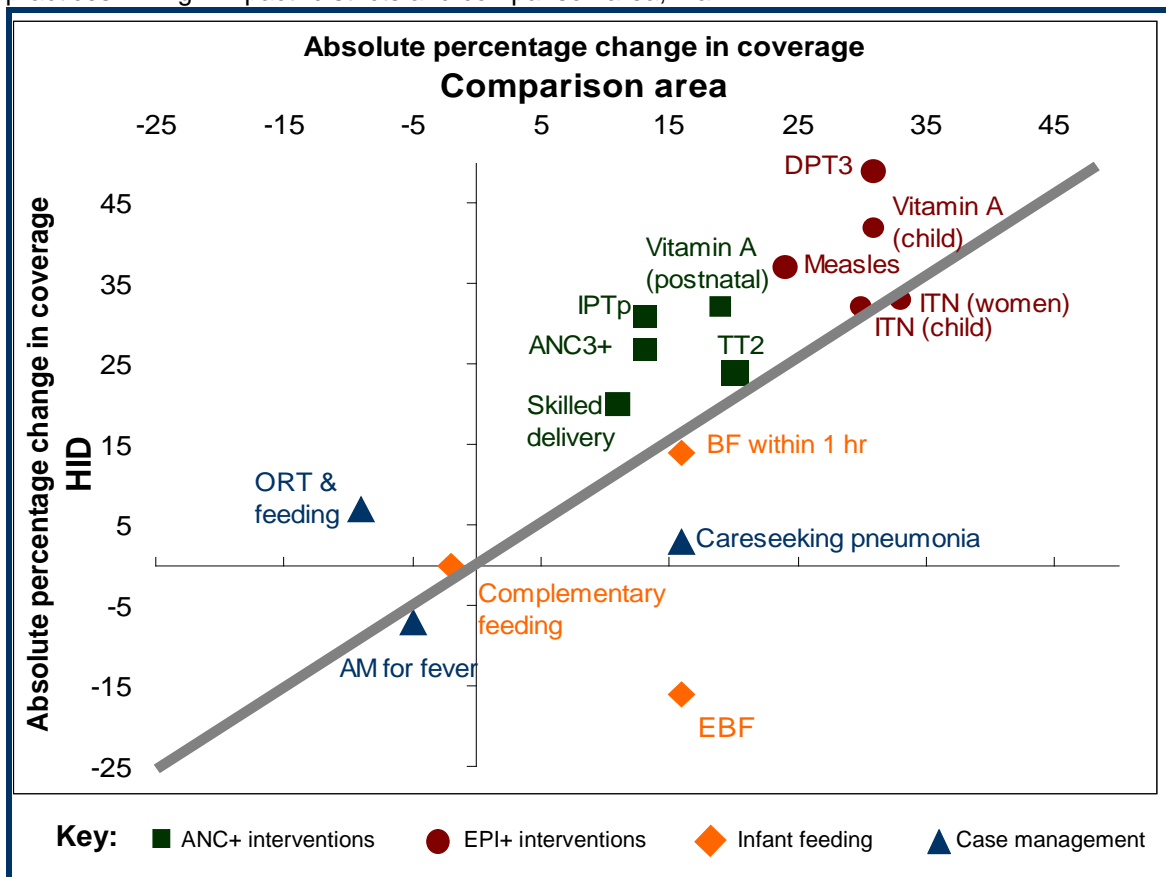
## 9. Conclusions

In this section, we summarize the findings of the evaluation, addressing two separate questions:

- Was ACSD implementation associated with improvements in coverage, nutrition and mortality over time?
- If so, was progress in the ACSD districts faster than that observed for the national comparison area?

Figure 27 summarizes trends in the HIDs and comparison area during the period from 2001 to 2006-7. The horizontal axis shows the change in coverage in the HIDs and the vertical axis the corresponding changes in the comparison area. For all dots above the x-axis, the indicators showed an increase in the HIDs (although not all of these increases were statistically significant). Coverage levels of most interventions in the HIDs improved over time, and dots are well above the x-axis. Coverage with interventions related to infant feeding and case management—shown in blue triangles and orange diamonds—stagnated or showed some degree of decline in the HIDs, thus these dots are near or below the x-axis. Indicators showing an increase in the comparison area are on the right side of the y-axis, and include all interventions except complementary feeding, ORT and feeding for diarrhea and antimalarial treatment for fever.

Figure 27: Summary of absolute changes between 2001 and 2006-7 in coverage and family practices in “high-impact” districts and comparison area, Mali.



When the indicator increased (or decreased) to a similar extent in both areas, the points are close to the diagonal. Indicators that are above the diagonal showed better performance in HIDs than in comparison area. The reverse is true for those below the diagonal. Indicators related to the EPI+ and ANC+ packages improved faster in the HIDs than in the comparison area, and for six of these interventions the positive change in the HIDs was significantly greater than that in the comparison area. Exclusive

breastfeeding, careseeking for pneumonia declines or stagnated, while increasing in the comparison area (dots indicated below the diagonal). A caveat of the results shown in Figure 27 is that they do not reflect baseline levels.

Returning to the research questions presented at the start of this section, these results indicate that:

- (a) ACSD implementation was associated with increases of 10 pp or more for 11 of the 18 interventions targeted by ACSD and implemented in Mali;
- (b) Coverage increased significantly more rapidly in the HIDs than in the comparison area for six interventions, but decreased more rapidly for three interventions.

Based on the cause of death profile for children under five in Mali (see section 3 and Appendix A), exclusive breastfeeding and careseeking for pneumonia are two of the interventions with the greatest potential impact. Coverage levels for both of these interventions improved in the comparison area but not in the HIDs.

Turning to nutrition again referring to our two basic questions, the conclusions are:

- (a) The HIDs showed a reduction over time in stunting, no change in underweight and an increase in wasting prevalence. None of these changes were statistically significant except for the decline in stunting, which was largely due to a decrease in the prevalence of severe stunting;
- (b) Changes in nutritional status over the course of the study period were similar in the HIDs and the comparison area. The reduction in stunting prevalence is consistent with the nationwide trend during the study period. The increase in wasting documented in both HID and comparison area is likely to be due to seasonal differences in the times the surveys were conducted.

Reducing under-five mortality by 25% by 2006 was the primary goal of the ACSD strategy. Our analyses showed that:

- (a) There was a significant reduction of 24% in under-five mortality in the HIDs, very close to the stated goal of 25%.
- (b) Under-five mortality fell at a similar rate (31%) in the national comparison area, and rates of decline were generally similar between the HIDs and the comparison area for all age subgroups.

Finally, we examined trends in inequities in coverage, nutrition and mortality indicators. Our conclusions are:

- (a) ACSD implementation led to reduced inequities in intervention coverage across socioeconomic, urban/rural and ethnic groups. No evidence was found of an association between ACSD and in nutritional status or mortality. Sex inequalities were virtually non-existent.
- (b) The HIDs were more successful than the comparison area in reducing socioeconomic and urban/rural inequities in intervention coverage. Ethnic group disparities declined similarly in both areas.

We examined the possible role of contextual factors as explanations for our results, and conducted secondary analyses where warranted. We were unable to identify any major changes in socioeconomic or environmental conditions, humanitarian crises or national policies affecting the HIDs and the national comparison area differentially that would have changed our major conclusions. The main factor affecting the interpretation of our results was the strong presence of other health programs in 38 of the 47 comparison districts. As discussed in section 3, these programs closely resembled those deployed in the HIDs, in particular the USAID-supported bilateral activities, several NGOs with large child survival components and the UNICEF supported “ACSD expansion” activities in 26 districts; the latter included a subset of the same interventions promoted in the HIDs. The remaining nine districts without externally supported child survival interventions were all located in the sparsely populated north of the country, which is poorly comparable to the HIDs due to ecological, socioeconomic and health care conditions.

Taken together, our results suggest that ACSD had a positive impact on coverage for several interventions, not only in terms of overall levels but also in improving coverage equity across socioeconomic groups. The Mali team noted key lessons learned from the ACSD experience and recommendations for future child health programming, shown in box 4. An important failure of ACSD is that two of the family practices most directly related to under-five mortality – exclusive breastfeeding and careseeking for pneumonia – did not increase at all in the HIDs, but did improve (albeit only slightly) in the comparison area. The HIDs also showed a reduction in stunting and a 24% decline in under-five mortality. The answer to our first question – “was ACSD implementation associated with improvements in coverage, nutrition and mortality over time?” – is therefore positive when judged in terms of the intervention areas alone.

However, due to overall socioeconomic improvement, increased availability of health facilities and the deployment of interventions which were similar to ACSD in most districts (see section 3), Mali as a whole showed substantial improvements in intervention coverage, stunting and mortality, that are of similar magnitude to those observed in the HIDs. The answer to the second question, “was progress in the ACSD districts faster than that observed in the national comparison area is therefore “no”. If ACSD was aimed at “accelerating” progress above and beyond that of the nation as a whole, this goal was not achieved in Mali.

Available information suggests that ACSD served as a catalyst for other partners to adopt similar strategies. In 2007, the Malian Ministry of Health approved a national child survival strategy that contained many elements based on the ACSD experience.

#### **Box 4:**

##### **The way forward: Lessons learned in ACSD Mali according to national counterparts**

1. Interventions to address important causes of death were not fully addressed through ACSD in Mali
  - Interventions targeting undernutrition need to be included in future efforts, including: a) behaviour change communication strategies to improve nutrition practices; and b) the identification and management of moderate and severe malnutrition in the community and facilities, respectively
  - Neonatal health should be incorporated into interventions packages by: a) supporting health facilities to provide neonatal care & management; and b) training community-based providers to offer neonatal care in the community
  - Community case management of pneumonia should be incorporated into community-based activities
2. Community mobilization and the value given to community actors were strengths of the ACSD approach in Mali; however, implementing and scaling up C-IMCI was a challenge:
  - Motivation and retention of CHWs to carry-out C-IMCI activities needs to be reinforced
  - Emphasis needs to be given to management and supervision of community-based workers
  - Treatments for managing malaria and diarrhea (ACTs, new ORS and zinc) should be available at the community and/or household level
3. Households in the ACSD areas were poor, with poor health indicators at baseline; these factors may have tempered the results
  - Efforts are needed to increase the financial access of poor households to health services, especially in facilities, which are based on cost-recovery and user fees in Mali
4. Availability of resources, especially for commodities and outreach activities were a strength of ACSD, but stock-outs of ITNs and other commodities hindered results
  - Commodity security and management need to be given priority in future efforts

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ACCELERATING CHILD SURVIVAL AND DEVELOPMENT (ACSD)

**Final Report**  
**The Retrospective Evaluation of ACSD:**  
**Mali**

**APPENDICES**

Submitted to UNICEF Headquarters on 7 October 2008

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  - H. Tables presenting comparisons of priority indicators over time in ACSD “high-impact” districts and the comparison area
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## APPENDIX A

### Description of Mali and “high-impact” districts

Mali is a land-locked country in West Africa, with a population of 10,278,250 and an annual rate of growth of 2.2%, according to the 1998 national census. It is one of the poorest countries of the World, ranked 153 out of 162 countries in the 2001 Human Development Index prepared by the United Nations Development Program (UNDP). Most of the population is rural (72.7%), and children less than 5 years of age comprise 19.34% of the population. The 2001 DHS survey (EDS-III)<sup>1</sup> found that the literacy rate is 14.8%, the Neonatal Mortality Rate (preceding five years) is 57.1 per 1000 live births, the Infant Mortality Rate is 113.4, the Child Mortality Rate is 130.5 and the Under-Five Mortality Rate is 229.1. Mortality, morbidity, vaccination, and intervention indicators are presented in table A1. The Total Fertility Rate (women 15-49) is 6.8, and contraceptive prevalence is under 5%<sup>1</sup>. The high mortality and fertility rates suggest that Mali is in the beginning of the demographic transition.

## Mali

### Countdown to 2015 Maternal, Newborn & Child Survival

#### DEMOGRAPHICS

**Total population (mill)**  
11,900 (2008)

**Total population (mill)**  
22.47 (2025)

**Birth rate (per 1,000 live births)**  
47 (2008)

**Under-5 mortality rate (per 1,000 live births)**  
217 (2008)

**Infant mortality rate (per 1,000 live births)**  
119 (2008)

**Neonatal mortality rate (per 1,000 live births)**  
56 (2008)

**Total under-5 deaths (1000)**  
970 (2008)

**Maternal mortality ratio (per 100,000 live births)**  
570 (2008)

**Total maternal deaths (1000)**  
6,400 (2008)

#### INTERVENTION COVERAGE FOR MOTHERS, NEWBORNS, AND CHILDREN

**Sharing prenatal care (maternal and neonatal)**  
43 (2009)

**Using iron-folate supplements (maternal)**  
13 (2009)

**Underweight prevalence (children < 5 years underweight > 10%)**  
31 (2001)

**Complementary feeding rate (6-23 months)**  
32 (2001)

**Low birthweight prevalence (children < 5 years underweight > 10%)**  
23 (2001)

**Exclusive breastfeeding (children < 6 months exclusive breastfeeding)**  
7 (1996-1998, 2001)

#### MATERIAL AND NEIGHBOUR HEALTH

**Unlimited or nearly unlimited access to electricity for daily lighting**  
25 (2007)

**At least 10% of women have access to a mobile phone**  
30 (2007)

**At least 10% of women have access to a radio**  
30 (2007)

**At least 10% of women have access to a television**  
30 (2007)

**At least 10% of women have access to a computer**  
30 (2007)

**At least 10% of women have access to a bicycle**  
30 (2007)

**At least 10% of women have access to a motorcycle**  
30 (2007)

**At least 10% of women have access to a car**  
30 (2007)

**At least 10% of women have access to a boat**  
30 (2007)

**At least 10% of women have access to a plane**  
30 (2007)

#### CHILD HEALTH

**Immunization (children < 5 years)**  
30 (2008)

**Prevalence of malnutrition (children < 5 years)**  
31 (2001)

**Prevalence of anemia (children < 5 years)**  
31 (2001)

**Prevalence of malaria (children < 5 years)**  
31 (2001)

**Prevalence of HIV (children < 5 years)**  
31 (2001)

**Prevalence of tuberculosis (children < 5 years)**  
31 (2001)

**Prevalence of syphilis (children < 5 years)**  
31 (2001)

**Prevalence of hepatitis B (children < 5 years)**  
31 (2001)

**Prevalence of hepatitis C (children < 5 years)**  
31 (2001)

**Prevalence of hepatitis D (children < 5 years)**  
31 (2001)

**Prevalence of hepatitis E (children < 5 years)**  
31 (2001)

#### WATER AND SANITATION

**Population using improved drinking water sources**  
90 (2001)

**Population using improved sanitation facilities**  
90 (2001)

**Population using improved handwashing facilities**  
90 (2001)

#### SYSTEMS

**Financial Flows and Human Resources**  
Per US\$ 100 (2008)

**Per capita health expenditure (current US\$)**  
56 (2008)

**Government health expenditure (% of GDP)**  
51 (2008)

**Out-of-pocket expenditure (% of GDP)**  
51 (2008)

**Health workforce (per 1,000 population)**  
7 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

#### POLICIES

**Health policy (national level)**  
Per US\$ 100 (2008)

**Health strategy (national level)**  
Per US\$ 100 (2008)

**Health financing (national level)**  
Per US\$ 100 (2008)

**Health service delivery (national level)**  
Per US\$ 100 (2008)

**Health information systems (national level)**  
Per US\$ 100 (2008)

**Health governance (national level)**  
Per US\$ 100 (2008)

#### EQUITY

**Coverage gap by wealth quintile**  
Per US\$ 100 (2008)

**Coverage gap by gender**  
Per US\$ 100 (2008)

**Coverage gap by age**  
Per US\$ 100 (2008)

#### COVERAGE ALONG THE CONTINUUM OF CARE

**Contraceptive prevalence rate**  
37 (2008)

**Unmet need for family planning**  
41 (2008)

**Skilled attendance at birth**  
25 (2008)

**Emergency obstetric care**  
25 (2008)

**Postnatal care**  
25 (2008)

**Immunization coverage**  
25 (2008)

**Access to essential medicines**  
25 (2008)

**Access to health services**  
25 (2008)

#### FINANCIAL PROTECTION AND RISK ADJUSTMENT

**Out-of-pocket expenditure (% of GDP)**  
51 (2008)

**Health expenditure (% of GDP)**  
51 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

**Health expenditure (per US\$ 100)**  
30 (2008)

## APPENDIX B

### Methodology for documentation of implementation and contextual factors

Various techniques were employed to collect information retrospectively about the implementation of ACSD activities and contextual factors in the “high-impact” districts. Information and documents were gathered from colleagues at the UNICEF-Mali field office, who have been collaborating on the retrospective evaluation throughout the process. Field visits, key informant interviews and working meetings to review of the preliminary coverage results all provided information pertaining to details of ACSD implementation and contextual factors. During these encounters, the JHU evaluation team requested any documents providing more details on ACSD and other partner’s activities. Over 150 documents pertaining to ACSD implementation, local and national child health activities and policies, and other project activities were reviewed; the types of documents reviewed are presented in the text of the report.

Much of the required data—documents and experiences of key informants—were not available at the national level. Thus, information had to be collected at the regional and district levels. A team from the University of Bamako carried out field visits to each of the HIDs between September and November 2007. Information about the implementation of ACSD from 2002 to 2006 was collected from key informants through individual, semi-structured interviews or group discussions. Questions pertained to the activities carried out, including geographical coverage and the strengths and weaknesses of the ACSD strategy. Information was collected at the district level and sub-district level; at least two sub-districts were visited in each district. In each district, the following individuals were interviewed:

- Staff and resource persons at the district health office/referral hospital, including
  - District medical officer or his representative
  - District coordinator of health information systems (monitoring)
  - Districts coordinator of EPI
  - Midwives
- Actors at the sub-district catchment areas / staff at community health facilities (CSComs), including:
  - Head nurse/doctor for CSCom
  - Auxiliary midwives
  - Vaccination agents
  - CHWs
  - Social workers

Available routine health information system data and administrative documents were collected at the district levels during these visits, as well.

In order to document other program activities taking place in the “high impact” districts, the representatives of international and local NGOs were interviewed in each of the six districts. Individuals within the public health system or affiliated with health activities (see above) were also queried about other project activities in their districts.

## APPENDIX C

### Documentation of ACSD implementation activities

**Table C1:** Timeline of implementation of EPI+ activities in Koulikoro, Segou and Mopti health districts 2001 to 2007, Mali

Year	Trimester	National Campaigns	EPI + Activities in Kolokani & Banamba (Koulikoro region)	EPI+ Activities in Niono & Bla (Segou region)	EPI+ Activities in Djenné & Koro (Mopti region)
2001	Jan-Mar				
	Apr-Jun				
	Jul-Sept		Kolokani District: EPI+/ACSD presentation to local authorities, health workers and partners <sup>2</sup>		
	Oct-Dec	Polio + Vit. A (1 <sup>st</sup> Passage)	Kolokani District: General NID supervision <sup>3</sup> Regional distribution of EPI+ materials (Polio, Vit. A, SP, Iron, FA) <sup>5</sup> Community financing meetings (authorities, comm. Representatives) <sup>5</sup> Kolokani District: ACSD presentations (objectives, goals) for 6 community health areas <sup>6-11</sup>		Djenne District: NID supervision in 5 health areas <sup>4</sup>
2002	Jan-Mar		Kolokani District: ACSD presentations (objectives, goals) for 6 community health areas <sup>6-11</sup>		
	Apr-Jun		Kolokani District: EPI + start up meeting (budget plan) w/ 82 participants <sup>12</sup> Regional distribution of EPI+ meds; stock out of iron, FA <sup>13</sup>		
	Jul-Sept				
	Oct-Dec	Polio (1 <sup>st</sup> Passage)	Banamba District: EPI+ training (36 participants – annual data) <sup>14</sup> Banamba District: Annual vaccination data – Vit. A = 12,146 (43%); VAR = 4,793 (77%); DTC3 = 5,108 (82%) <sup>14</sup>		Djenne District: NID supervision in 4 health areas <sup>15</sup> Koro District: Stock out of BCG <sup>16</sup>
2003	Jan-Mar				
	Apr-Jun				
	Jul-Sept				Djenne District: 3 motos for the advanced strategy vaccinations <sup>17</sup>
	Oct-Dec		Banamba District: Annual vaccination data – Vit. A = 16,343 (51%); VAR = 4,821 (76%); DTC3 = 5,777 (91%) <sup>14</sup>		Koro: Stock out of BCG, Vit. A <sup>18</sup>

Year	Trimester	National Campaigns	EPI + Activities in Kolokani & Banamba (Koulikoro region)	EPI+ Activities in Niono & Bla (Segou region)	EPI+ Activities in Djenné & Koro (Mopti region)
2004	Jan-Mar				
	Apr-Jun				
	Jul-Sept				4 day workshop on NID planning for Polio, Measles in 3 districts (42 participants) <sup>19</sup> Supervision of Measles campaign in 2 districts <sup>20</sup>
	Oct-Dec	Measles	Banamba District: Annual vaccination data – Vit. A = 18,449 (63%); VAR = 5,837 (90%); DTC3 = 6,557 (101%) <sup>14</sup>  Banamba District: Trimester vaccination data – Vit. A = 983 (12%); VAR = 2,264 (136%); DTC3 = 2,406 (144%) <sup>14</sup>		Djenne District: Annual vaccination data – Vit. A = 14,201; VAR = 6,346; DTC3 = 7,230 <sup>21</sup>
2005	Jan-Mar	Polio(2 <sup>nd</sup> Passage)	Banamba District: Trimester vaccination data – Vit. A = 983 (12%); VAR = 2,264 (136%); DTC3 = 2,406 (144%) <sup>14</sup>		540,556 (105.3%) kids vaccinated; 652 (93.3%) teams supervised <sup>22</sup> Djenne District: NID supervision of 3 districts (2 <sup>nd</sup> passage) <sup>24</sup>
	Apr-Jun	Polio (2 <sup>nd</sup> & 3 <sup>rd</sup> Passage)	Kolokani District: NID supervision of 6 community health centers; 102% kids vaccinated (2 <sup>nd</sup> passage) <sup>23</sup>		Djenne District: NID supervision (3 <sup>rd</sup> passage) <sup>25</sup>
	Jul-Sept		Stock outs ranging from 1 to 4 months in 5 districts of Polio, Vit. A, DTC, VAT, FAF <sup>26,27</sup>		3 <sup>rd</sup> passage of prevention of Neo-Natal Mortality (TMNN) in 6 health areas; VAT = 13,232 (99.75%) <sup>28</sup>
	Oct-Dec				
2006	Jan-Mar		Distribution of 23 motos, and equipment for 15 comm. health centers <sup>29</sup>  Supervision of SIAN; Vit. A 100,000 = 1,512 ; Vit. A 200,000 = 25,639 <sup>29</sup>  Trimestrial EPI data – Vit. A = 33,093 (27%) ; DTC3 = 16,813 (88%) ; Measles = 16,886 (88%) <sup>29</sup>		
	Apr-Jun	Vit. A and Albendazole (SIAN) ; 1 <sup>st</sup> passage)		Supervision of SIAN; Vit. A coverage at 97% for kids 6-11 months <sup>30</sup>  2 <sup>nd</sup> Trimester EPI data: Vit. A 100,000 = 24,231; Vit. A 200,000 = 14,447 <sup>31</sup>	Trimester vaccination data – Vit. A 100,000 = 38,029 ; Vit. A 200,000 = 289,223 <sup>32</sup>
	Jul-Sept				
	Oct-Dec				

**Table C2:** Timeline of implementation of ITN activities in Koulikoro, Segou and Mopti health districts 2002 to 2007, Mali

Year	Trimester	ITN Activities in Kolokani & Banamba (Koulikoro region)	ITN Activities in Niono & Bla (Segou region)	ITN Activities in Djenné & Koro (Mopti region)
2002	Jan-Sept			Koro District: Stock out of ITN <sup>33</sup>
	Oct-Dec			
	Jan-Mar			
2003	Apr-Jun			Djenne District: Stock out of ITN <sup>34</sup> Retreatment campaign: Djenne = 52,000 ITNs retreated, 69 volunteers trained; Koro = 46,700 ITNs retreated, 120 volunteers trained <sup>35</sup>
	Jul-Sept			Djenne District : Retreatment campaign - 43,343 ITNs retreated <sup>36</sup>
	Oct-Dec			Djenne District: ITN stock = 18,650 <sup>14</sup>
2004	Jan-Mar			
	Apr-Jun			
	Jul-Sept	Stock out of ITN <sup>37</sup>		
2005	Oct-Dec	Banamba District: ITN stock (UNICEF) of 14,825 <sup>14</sup>		Djenne District: ITN stock of 11,000 <sup>14</sup> Djenne District: Annual ITN data – children = 6,205; women = 7,056 <sup>21</sup>
	Jan-Mar			
	Apr-Jun			
2006	Jul-Sept			
	Oct-Dec	Banamba District: ITN stock (UNICEF) of 4,734 <sup>14</sup>		
	Jan-Mar			
2007	Apr-Jun	2 <sup>nd</sup> trimester: ITN and non-ITN with Kaotab distribution = 7,569 in Koulikoro; 0 in Banamba & Kolokani stock out in various areas <sup>29</sup>	2 <sup>nd</sup> trimester: ITN distribution = 12,389 in all of Segou; <sup>31</sup>	1 <sup>st</sup> semester: ITN distribution = 10,129 in all of Mopti: Djenne=2633 Koro=64 <sup>32</sup>
	Jul-Sept			
	Oct-Dec	Banamba District: ITN stock (MOH) = 5,800 <sup>14</sup> Kolokani District: Stock out of ITN <sup>36</sup>		Djenne District: Stock out of ITN <sup>14</sup>
2007	Jan-Mar			
	Apr-Jun			
	Jul-Sept			
Oct-Dec	Banamba District : ITN stock (MOH) = 5,100 <sup>14</sup>			

**Table C3:** Timeline of implementation of IMCI+ activities in Koulikoro, Segou and Mopti health districts 2001 to 2006, Mali

Year	Trimester	IMCI+ Activities in Kolokani & Banamba (Koulikoro region)		IMCI+ Activities in in Niono & Bla (Segou region)		IMCI+ Activities in Djenné & Koro (Mopti region)	
		F-IMCI	C-IMCI	F-IMCI	C-IMCI	F-IMCI	C-IMCI
2001	Jan-Mar						
	Apr-Jun						
	Jul-Sept						
	Oct-Dec		Kolokani and Koulikoro District: workshop on integrated malaria prevention and treatment (SP) <sup>3</sup>				Djenne District: 2 day training on monitoring and planning minimum activity packages <sup>39</sup>
2002	Jan-Mar		300 CHWs trained on ACSD activities and survey tech. in 3 districts <sup>40</sup>				
	Apr-Jun					Djenne District: 2 day workshop on microplans and monitoring; 22 participants from 13 health centers <sup>42</sup>	Djenne District: 3 day workshop on data collection and comparative analysis; Anti-tetanus program <sup>43</sup> Koro District: Mini-workshop on local ACSD partners <sup>44</sup>
	Jul-Sept		Training on IMCI <sup>13</sup>	Meeting of PRODESS tech. committee <sup>41</sup>			Koro District: Mini-workshop on contract negotiation and tasks for community representatives <sup>45</sup>
	Oct-Dec				Bla district: Training of 600 CHWs in C-IMCI (no months specified)		Djenne District: 13 village chiefs trained on planning behavioral change communication activities <sup>46</sup> Koro District: 11 day IMCI workshop on planning and data collection; 420 participants trained <sup>47,48</sup>
	Jan-Mar						
3 200							

Year	Trimester	IMCI+ Activities in Kolokani & Banamba (Koulikoro region)		IMCI+ Activities in in Niono & Bla (Segou region)		IMCI+ Activities in Djenné & Koro (Mopti region)	
		F-IMCI	C-IMCI	F-IMCI	C-IMCI	F-IMCI	C-IMCI
2004	Apr-Jun						Djenne District: 2 day supervision of door to door questionnaire administration by CHWs <sup>49</sup>  Koro District: supervision of 3 trained survey admins in door to door questionnaires <sup>50</sup>
	Jul-Sept						
	Oct-Dec	Banamba District: Annual data – clinical IMCI training <sup>14</sup> for 16 staff				Koro District: Annual data - Training of 7 head nurses <sup>14</sup>  Djenne District: Annual data – 4 doctors trained on clinical IMCI <sup>14</sup>	
	Jan-Mar						
	Apr-Jun						1 day training on ACSD startup activities in 2 expansion ACSD comm. health center <sup>51,52</sup>
	Jul-Sept	3 day meeting of PRODESS tech. committee (Bamako) <sup>47</sup>					
	Oct-Dec					Annual data – 13 head nurses trained on clinical IMCI <sup>14</sup>	Koro District: 1 day training on microplanning and bottleneck for essential family practices; health techs, local authorities & CHWs <sup>53</sup>  Koro District: Annual data – C-IMCI training for 420 CHWs <sup>14</sup>  Djenne District: Annual data – Essential medicine kits sold = 19,125; kits given away = 3,602 <sup>21</sup>
	Jan-Mar						
	Apr-Jun						
	50						

Year	Trimester	IMCI+ Activities in Kolokani & Banamba (Koulikoro region)		IMCI+ Activities in in Niono & Bla (Segou region)		IMCI+ Activities in Djenné & Koro (Mopti region)	
		F-IMCI	C-IMCI	F-IMCI	C-IMCI	F-IMCI	C-IMCI
2006	Jul-Sept	Training of 2 districts in clinical IMCI <sup>27</sup>		Meeting of PRODESS tech. committee (Bamako) <sup>54</sup>			1 day workshop (15 participants) on Natl. Households Friendly for our Children campaign <sup>28</sup> Koro District: Annual data – C-IMCI training of 213 CHWs <sup>14</sup> Djenne District: Annual data – C-IMCI training of 400 CHWs <sup>14</sup> Djenne District: Annual data - Monitoring of 24 survey administrators and 6 supervisors <sup>14</sup>
	Oct-Dec		Banamba District: Annual data – IMCI training of 65 CHWs <sup>14</sup>		Bla district: Training in C-IMCI for total of 861 CHWs (no months specified)		
	Jan-Mar	Meeting of PRODESS tech. committee (Bamako) <sup>55</sup>					
	Apr-Jun		Kangaba Area: Workshop & training on IMCI and follow up <sup>29</sup> Training of all health agents in each district on Guinea Worm prevention <sup>29</sup> 2 <sup>nd</sup> Trimester IMCI data: essential medicine kits = 2,641; iodized salt = 154,918 (of 274,357) <sup>29</sup>	Macina Area: Training of district team on monitoring essential family practices; supervision in 10 areas of Bla and 3 areas in Niono <sup>31</sup>	Macina Area: Workshop & training of trainers for IMCI <sup>31</sup> Provision of short wave radios (RAC); Markala area = 8; Segou area = 3 <sup>31</sup> Hygiene training of school teachers and disposition of hand washing materials <sup>31</sup>		
	Jul-Sept		8 day exchange visit from UNICEF Chad to review ACSD activities in Mali <sup>56</sup>				Bankass Area: Workshop on IMCI start up activities; 35 community participants (politicians, village administrators, tech. staff) <sup>57</sup>
	Oct-Dec		1 day field visit and meeting with 66 CHWs <sup>58</sup> Mali Annual data: 2,847 CHWs trained on IMCI nationwide <sup>59</sup>				



**Table C4:** Timeline of implementation of ANC+ activities in Koulikoro, Segou and Mopti health districts 2002 to 2006, Mali

Year	Trimester	ANC+ Activities in Kolokani & Banamba (Koulikoro region)	ANC+ Activities in Niono & Bia (Segou region)	ANC+ Activities in Djenné & Koro (Mopti region)
2002	Jan-Mar	Kolokani District: Provision of essential medicines kits <sup>60</sup>		Djenne District: Provision of essential medicines kits <sup>60</sup>
	Apr-Jun			
	Jul-Sept	Nationwide: purchase of PMTCT materials <sup>60</sup>		
	Oct-Dec			Djenne District: Evaluation of 6 health areas on pilot Neo-Natal mortality activities; at least 54 participants from the district and 8 villages <sup>61</sup>
2003	Jan-Mar	Regional trainings on GYN activities (SOU) <sup>60</sup>	Regional trainings on GYN activities (SOU) <sup>60</sup>	Regional trainings on GYN activities (SOU) <sup>60</sup>
	Apr-Jun			
	Jul-Sept		Training of hospital staff and 10 lab techs. on HIV counseling <sup>60</sup>	
	Oct-Dec	1 <sup>st</sup> passage of Neo-Natal Mortality Campaign <sup>60</sup>	1 <sup>st</sup> passage of Neo-Natal Mortality Campaign <sup>60</sup>	Djenne Referral Hospital - Annual data: Maternal mortality = 4 of 347 (4%) <sup>62</sup> 1 <sup>st</sup> passage of NeoNatal Mortality Campaign <sup>60</sup>
2004	Jan-Mar			Djenne District: 1 day training in 1 health area on UNIJECT injection use <sup>63</sup>
	Apr-Jun	Banamba: Training of staff in PTMTC <sup>60</sup> 2 sessions of training in SOU; training of trainers in PMTCT; training on recentered ANC visits <sup>60</sup>		
	Jul-Sept	Purchase of SP for ANC <sup>60</sup> Mali A Kolokani: Training on exclusive breastfeeding for midwives <sup>60</sup> Banamba: Training on breastfeeding for health agents <sup>60</sup> Annual PMTCT: 9,751 of 32,355 women received pre-test counseling; of them 8,340 got tested for HIV <sup>64</sup> Koulikoro supervision of SOU activities <sup>60</sup>	Purchase of SP for ANC <sup>60</sup>	2 sessions of training in SOU <sup>60</sup> Purchase of SP for ANC <sup>60</sup>
	Oct-Dec		Training of heads of comm. health centers on monitoring and micro-planning <sup>60</sup>	Bandiagara Referral Hospital – Annual data: Neo-natal mortality / still births = 15/103 (14.6%) <sup>65</sup> Koro Referral Hospital – Annual data: Neo-natal mortality/ still births = 30/693 (4.3%) <sup>66</sup> Djenne District: Annual data – ANC 3+ visits = 5,797; 5,755 received SP <sup>21</sup>
2005	Jan-Mar			
	Apr-Jun			
	Jul-Sept	Banamba District: Training of trad. Birth attendants <sup>67</sup> Koulikoro Region: Annual data (denominators	Segou Region: Annual data (denominators from 05 Annual statistics report) – ANC 3+ visits = 45,340 of 98,565 (46%) <sup>68</sup>	Mopti Region: Annual data (denominators from 05 Annual statistics report) – ANC 3+ visits = 42,124 of 81,007 (52%) <sup>68</sup>
	Oct-Dec			

Year	Trimester	ANC+ Activities in Kolokani & Banamba (Koulikoro region)	ANC+ Activities in Niono & Bla (Segou region)	ANC+ Activities in Djenné & Koro (Mopti region)
2006		from 05 Annual statistics report) – ANC 3+ visits = 13,099 of 81,007 (52%) <sup>68</sup>		
	Jan-Mar	<p>Koulikoro: Provision of ambulance in 3 health areas<sup>29</sup></p> <p>Koulikoro &amp; Banamba: Stock out of HIV testing kits<sup>23</sup></p> <p>Regional data for the 2<sup>nd</sup> trimester: VAT2 = 11,930 (50%); Iron/FA = 10,329 (43%); SP2 = 11,744 (45%); Vit. A = 10,747 (45%); ITNs = 3,876 (16%); 486 tested for HIV of 579 counseled<sup>23</sup></p> <p>Provision of kits for free cesarean sections<sup>29</sup></p>	<p>Segou Region: Distribution of SP to 25,407 pregnant women<sup>31</sup></p> <p>Workshop on free cesarean sections<sup>31</sup></p>	<p>Mopti Region: Distribution of SP to 98,390 women in the 1<sup>st</sup> semester<sup>32</sup></p>
	Apr-Jun			
	Jul-Sept			
	Oct-Dec			

## APPENDIX D

### Definition of priority indicators in the ACSD evaluation

Table D1: Definition of priority indicators and protocols for missing data

NO.	ACSD TARGET EPI+	INDICATORS	DATAFILE	DOMINATOR <sup>1 2</sup>	Numerator	Definition of missing/unknown data for exclusion
1	Measles immunization coverage	Percentage of children aged 12-23 months who received measles vaccine before first birthday	Child	All children 12-23m, still alive, include MB	Eligible children received measles inoculation before 12 months of age; according to immunization card or mother's report <sup>3</sup>	IMPUTE TIMING (1) Missing card or vaccination on card: use mother's report; IMPUTE TIMING (2) Missing/invalid date on card: impute with distribution of known vaccination dates; EXCLUDE CASES (3)Missing mother's report/unknown and no card data
2	DPT3 immunization coverage	Percentage of children aged 12-23 months who received 3 doses of DPT vaccine before first birthday.	Child	All children 12-23m, still alive, include MB	Eligible children received DPT3 before 12 months of age; according to immunization card or mother's report <sup>3</sup>	
4	Coverage of vitamin A in last 6 months	Percentage of children 6 - 59m who received at least one high dose vitamin A supplement within the last 6 months	Child	All children 6-59m, still alive, include MB. <b>Include data on vaccination card</b>	Eligible children receiving vitamin A in previous 6m according to mother's report or immunization card	Missing mother's report and no entry on vaccination card

#### § International Consensus Coverage Indicator

<sup>1</sup> MB=Multiple birth: include all multiple birth children

<sup>2</sup> CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included

<sup>3</sup> To estimate the children without a card to have rec'd vaccine before 12m of age, the proportion of vaccinations given in the first year is assumed to be the same as the proportion of children with an immunization card who rec'd the vaccine before 12m of age (MICS manual)

NO.	ACSD TARGET	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR 1 2	PROTOCOL FOR MISSING/UNKNOWN DATA
	<b>IMCI+</b>					
<b>5</b>	Case management malaria (effective)	Percentage of children aged 0-59 months with fever receiving appropriate antimalarial drugs	Child	Eligible children received appropriate antimalarial medication according to national policy in previous two weeks	Children (0-59) with reported fever in previous two weeks, include MB, exclude deceased	EXCLUDE CASES: Reported treatment of child but missing for specific medications used
<b>6</b>	Case management malaria-programmatic (programmatic)	Percentage of children aged 0-59 months with fever receiving any antimalarial drugs	Child	Eligible children received any antimalarial medication during illness in previous two weeks	Children (0-59) with reported fever in previous two weeks, include MB, exclude deceased	EXCLUDE CASES: Reported treatment of child but missing for specific medications used
<b>7</b>	Care seeking pneumonia §	Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health care facility.	Child	Eligible children were seen at appropriate health care facility: excluding pharmacy and other drug vendors	Children (0-59) with cough AND labored breathing in previous two weeks, include MB, exclude deceased	EXCLUDE CASES: Reported treatment of child but missing for specific location of treatment
<b>8</b>	ORS/RHF/increased fluids for children with diarrhoea + continued feeding §	Percentage of children aged 0-59 months with diarrhoea receiving ORS OR RHF OR increased fluids AND continued feeding	Child	Eligible children received ORS, RHF or increased fluids AND continued feeding	Children (0-59) with reported diarrhoea in previous two weeks, include MB, exclude deceased	EXCLUDE CASES 1: Reported treatment of child but missing for ORS, RHF and IF and positive/missing for continued feeding  EXCLUDE CASES 2: Reported treatment of child but positive/missing for ORS, RHF or IF and missing for continued feeding
	ORS	ORS packets				
	ORT/RHF	recommended home fluids				
	Increased fluids (IF)	Rec'd more (MICS)				
	Continued feeding	Rec'd somewhat less, about the same or more (MICS)				
<p><b>§ International Consensus Coverage Indicator</b></p> <p><sup>1</sup> MB=Multiple birth: include all multiple birth children</p> <p><sup>2</sup> CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included</p>						
NO.	ACSD	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR 1 2	PROTOCOL FOR MISSING/UNKNOWN DATA

TARGET						MISSING/UNKNOWN DATA	
IMCI+							
<b>9</b>	Timely initiation of breastfeeding §	Percentage of newborns put to the breast within one hour of birth; most recent live birth previous 12m	Women	Women initiated breastfeeding within the first hour after delivery	Women with a birth in previous 12m	EXCLUDE CASES: Reported ever breastfeeding, but missing timing of initiation	
<b>10</b>	Exclusive breastfeeding through 6 months (0-5m) §	Percentage of infants aged 0-5 months who are exclusively breastfed	Child	Eligible children still breastfeeding and did not receive any liquids or foods in previous 24h	Children (0-5): most recently born (include only one MB) still alive & living with mom.	EXCLUDE CASES 1: Missing for all feeding variables AND positive/missing for still breastfeeding EXCLUDE CASES 2: Negative/ missing for all feeding variables AND missing for still breastfeeding	
<b>11</b>	Breastfeeding and complementary feeding (6-9 months) §	Percentage of infants aged 6-9 months who are breastfed and receive complementary food (solid or semisolid foods)	Child	Eligible children still breastfeeding and received solid/semisolid foods in the previous 24hr	Children (6-9): most recently born (include only one MB) still alive & living with mom.	EXCLUDE CASES 1: Missing for all feeding variables AND positive/missing for still breastfeeding EXCLUDE CASES 2: Positive/missing for all feeding variables AND missing for still breastfeeding	
<b>12</b>	Continued breastfeeding (20-23 months) §	Percentage of children aged 20-23 months who are currently breastfeeding	Child	Eligible children still breastfeeding	Children (20-23): most recently born (include only one MB) still alive & living with mom.	EXCLUDE CASES: Missing for still breastfeeding	
<b>13</b>	Consumption of iodized salt	Percentage of households consuming iodized salt: <b>exclude</b> HH with no salt	HH	Eligible HH has iodized salt: 2001 (25ppm), 2003 (50ppm) and 2006/07 (15ppm)	All HH with completed surveys and salt available for testing	EXCLUDE CASES: Missing salt test and HH with no salt	
<b>14</b>	Consumption of iodized salt	Percentage of households consuming iodized salt: <b>include</b> HH with no salt	HH		All HH with completed surveys	EXCLUDE CASES: Missing salt test	

**§ International Consensus Coverage Indicator**

<sup>1</sup> MB=Multiple birth: include all multiple birth children

<sup>2</sup> CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included

NO.	ACSD TARGET	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR 1 2	PROTOCOL FOR
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		ITNs		MISSING/UNKNOWN DATA		
<b>15</b>	Use of bednets by pregnant women	Percentage of pregnant women sleeping under any mosquito net last night	HH/Woman	Eligible pregnant woman slept under a mosquito net last night	All eligible pregnant women	EXCLUDE CASES: Unknown/missing for slept under a bed net last night
<b>16</b>	Effective use of bednets by children < 5yr	Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (Use trt'd <=12 months due to heaping at 12m)	HH/Woman	Eligible child slept under an ITN mosquito net last night	All children under five, still living	EXCLUDE CASES 1: Missing ITN data (a) Net obtained <=12m prior AND missing if treated when obtained (b) Treated net obtained AND missing months ago obtained (c) Treated the net after obtaining but missing months ago treated
<b>17</b>	Effective use of bednets by pregnant women	Percentage of pregnant women sleeping under an insecticide treated mosquito net last night (Use trt'd <=12 months due to heaping at 12m)	HH/Woman	Eligible pregnant woman slept under an ITN mosquito net last night	All eligible pregnant women	EXCLUDE CASES 2: Unknown/missing for a, b & c and positive/missing/unknown for slept under a net last night EXCLUDE CASES 3: Positive/missing for a, b & c AND unknown/missing for slept under a bed net last night

**§ International Consensus Coverage Indicator**

<sup>1</sup> MB=Multiple birth: include all multiple birth children

<sup>2</sup> CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included

NO.	ACSD TARGET	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR 1 2	PROTOCOL FOR MISSING/UNKNOWN DATA
	<b>ANC+</b>	<b>Most recent live birth within previous 12m</b>				
<b>18</b>	3+ prenatal visits, skilled HCW*	Percentage of pregnant women who report at least 3 prenatal visits to a trained worker	Women	Eligible women received 3+ prenatal care visits with a trained health care worker		EXCLUDE CASES: Unknown/missing for number prenatal visits AND positive/missing for skilled HCW
<b>19</b>	Intermittent malaria treatments in pregnancy	Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy**	Women	Eligible women received at least one dose of SP during the pregnancy		EXCLUDE CASES: Received medicine during pregnancy for malaria but unknown/missing type of medicine
<b>20</b>	TT2 coverage during pregnancy §	Percentage of newborns protected against tetanus: Mother rec'd at least 2 doses of TT during pregnancy	Women	Eligible women received at least two doses of tetanus toxoid during the pregnancy		EXCLUDE CASES: Unknown/missing if received TT or received TT but unknown dosage
<b>21</b>	Pregnant women take 3 months iron supplements	Percentage of pregnant women receiving 3 months of iron supplementation.	Women	Eligible women received iron supplementation daily for at least 90 days	All eligible women with a pregnancy resulting in a live birth in the previous 12m	EXCLUDE CASES: Unknown/missing if received iron or received iron but for unknown time period
<b>22</b>	Skilled attendant at delivery* §	Percentage of births attended by skilled health personnel	Women	Eligible women delivered with a trained health care worker.		EXCLUDE CASES: Unknown/missing data for birth attendant
<b>23</b>	Postnatal visit within 3 days of delivery, skilled HCW*	Percentage of newborns receiving a postnatal visit by a trained worker within 3 days of delivery. (<3 days)	Women	(a) Eligible women delivered at an institutional facility (non-domestic) (b) Eligible women who delivered domestically received at least one postnatal checkup within 3 days of delivery with a trained health care worker		EXCLUDE CASES 1: Unknown/missing place of delivery and no data for postnatal care  EXCLUDE CASES 2: Non-institutional delivery and positive/missing skilled HCW and positive/missing received postnatal care
<b>24</b>	Postnatal supplementation with Vitamin A §	Percentage of women receiving vitamin A supplementation within 2 months of birth	Women	Eligible women received vitamin A supplementation within 2 months of delivery		EXCLUDE CASES: Unknown/missing if received vitamin A

### § International Consensus Coverage Indicator

<sup>1</sup> MB=Multiple birth: include all multiple birth children

<sup>2</sup> CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included

\* Skilled Health Care Worker (a) Doctor or Nurse/Midwife

(b) Doctor, Nurse/Midwife or Aux. midwife

\*\* IPT for pregnant women: at least one dose of SP during pregnancy

**Table D2:** Definition of priority impact indicators

NO.	INDICATORS	DATAFILE	NUMERATOR	DOMINATORS	PROTOCOL FOR EXCLUSION OF CASES
1	Stunting (low height for age) among children 24-59 months of age*	Household	<p><b>Moderate and Severe:</b> Children with &lt;-2 z scores for height for age based on the 2006 WHO growth curves<sup>69</sup></p> <p><b>Severe:</b> Children with &lt;-3 z scores for height for age based on the 2006 WHO growth curves<sup>69</sup></p>	<p>Children aged 24-59 months who:</p> <ol style="list-style-type: none"> <li>Have a reported (non-missing) birth month &amp; year</li> <li>Have a valid (non-missing) anthropometric measure</li> <li>Slept in the house the night before the survey</li> </ol>	Cases with improbable values for height-for-age are excluded from analysis; improbable defined as +/- 4 standard deviations of Z score relative to the overall median Z score value from the crude datafile
2	Wasting (weight for height) among children 0-23 months of age*	Household	<p><b>Moderate and Severe:</b> Children with &lt;-2 z scores for weight for height based on the 2006 WHO growth curves<sup>69</sup></p> <p><b>Severe:</b> Children with &lt;-3 z scores for weight for height based on the 2006 WHO growth curves<sup>69</sup></p>	<p>Children aged 0-23 months who:</p> <ol style="list-style-type: none"> <li>Have a valid (non-missing) anthropometric measure</li> <li>Slept in the house the night before the survey</li> </ol>	Cases with improbable values for weight-for-height are excluded from analysis; improbable defined as +/- 4 standard deviations of Z score relative to the overall median Z score value from the crude datafile
3	Underweight (weight for age) for children 0-59 months of age*	Household	<p><b>Moderate and Severe:</b> Children with &lt;-2 z scores for weight for age based on the 2006 WHO growth curves<sup>69</sup></p> <p><b>Severe:</b> Children with &lt;-3 z scores for weight for age based on the 2006 WHO growth curves<sup>69</sup></p>	<p>Children aged 0-59 months who:</p> <ol style="list-style-type: none"> <li>Have a reported (non-missing) birth month &amp; year</li> <li>Have a valid (non-missing) anthropometric measure</li> <li>Slept in the house the night before the survey</li> </ol>	Cases with improbable values for weight-for-age are excluded from analysis; improbable defined as +/- 4 standard deviations of Z score relative to the overall median Z score value from the crude datafile
4	Under-five mortality rate	Birth history extracted from women's file	The probability of dying between birth and exact age five years	Expressed as 1000 live births	N/A

**Table D3:** Definition of contextual variables used in the ACSD evaluation

CONTEXTUAL VARIABLE	SOURCE OF DEFINITION	DESCRIPTION OF DEFINITION
Wealth quintiles	DHS standard calculation of wealth quintiles ( <a href="http://www.childinfo.org/mics/mics3/docs/DHS%20Wealth%20Index%20(DHS%20Comparative%20Reports).pdf">http://www.childinfo.org/mics/mics3/docs/DHS%20Wealth%20Index%20(DHS%20Comparative%20Reports).pdf</a> )	<p>All household assets and utilities are dichotomized into indicator variables. Principle components analysis is performed using all the indicator variables to standardize the weights of the variables using the first principle factor. Each household is then assigned a weighted index value, based on its reported assets and utilities. Households are then divided into quintiles based on their index value.</p> <p>For the calculation of wealth quintiles for the ACSD evaluation, the urban areas of Ashanti and Great Accra region are removed and the indices calculated for households in the HIDs and comparison area only.</p>
Improved Water Source	MDG water and sanitation definitions ( <a href="http://www.unicef.org/wes/mdgreport/definition.php">http://www.unicef.org/wes/mdgreport/definition.php</a> )	<p><b>Unimproved drinking water sources include:</b> 1) Unprotected well, 2) Unprotected spring, 3) Rivers or ponds, 4) vendor provided water, 5) Bottled water, 6) Tanker truck water</p>
Improved Sanitation Facilities	MDG water and sanitation definitions ( <a href="http://www.unicef.org/wes/mdgreport/definition.php">http://www.unicef.org/wes/mdgreport/definition.php</a> )	<p><b>Improved sanitation facilities include:</b></p> <ol style="list-style-type: none"> <li>1) Connection to a public sewer,</li> <li>2) Connection to a septic system,</li> <li>3) Pour-flush latrine,</li> <li>4) Simple pit latrine,</li> <li>5) Ventilated improved pit latrine.</li> </ol> <p><b>Unimproved sanitation facilities include:</b></p> <ol style="list-style-type: none"> <li>1) Public or shared latrine,</li> <li>2) Open pit latrine,</li> <li>3) Bucket latrine.</li> </ol>

## APPENDIX E

### Comparison of survey questions utilized for calculation of priority indicators

NO.	ACSD TARGET	Questionnaire 2001	Questionnaire 2003	Questionnaire 2006/2007
<b>EPI+</b>				
1	Measles immunization coverage	Have vaccination card (q458); Measles innoc. on card (q460); Rec'd other vaccines (q462); Mom report of measles innoc (q463G)	Have vaccination card (q404); Measles innoc. on card (q405); Rec'd other vaccines (q407); Mom report of measles innoc (q414)	Have vaccination card (q458); Measles innoc. on card (q460); Rec'd other vaccines (q462); Mom report of measles innoc (q463G); rec'd vaccine during campaign (q465)
2	DPT3 immunization coverage	Have vaccination card (q458); DPT3 on card (q460); Rec'd other vaccines (q462); Mom report of DPT(q463E); number of doses(q463F)	Have vaccination card (q404); DPT3 on card (q405); Rec'd other vaccines (q407); Mom report of DPT(q412); number of doses(q413)	Have vaccination card (q458); DPT3 on card (q460); Rec'd other vaccines (q462); Mom report of DPT(q463E); number of doses(q463F)
3	Coverage of vitamin A in last 6 months	Have vaccination card (q458); VitA on card (q460); Mother's report (q457)	Have vaccination card (q404); VitA on card (q405); Mother's report (q403)	Have vaccination card (q458); VitA on card (q460); Mother's report (q457)
<b>IMCI+</b>				
4	Case management malaria (effective)	Had fever(q466); gave meds (q473); what meds (q474)	Had fever(q515); gave meds (q517); what meds (q518); prescribed meds (q523); what meds prescribed(q524)	Had fever(q466); gave meds (q473); what meds (q474)
5	Case management malaria-programmatic (programmatic)	Had fever(q466); gave meds (q473); what meds (q474)	Had fever(q515); gave meds (q517); what meds (q518); prescribed meds (q523); what meds prescribed(q524)	Had fever(q466); gave meds (q473); what meds (q474)
6	Care seeking pneumonia	Suspected pneum. (q467 & q468); consulted for treatment (q470); where consulted (q471)	Suspected pneum. (q511 & q512); consulted for treatment (q513); where consulted (q514)	Suspected pneum. (q467 & q468); consulted for treatment (q470); where consulted (q471)
7	ORS/RHF/increased fluids for children with diarrhoea + continued feeding	Had diarrhea (q475)	Had diarrhea (q501)	Had diarrhea (q475)
	<i>ORS</i>	ORS (q478a)	ORS (q506a)	ORS (q478a)
	<i>ORT/RHF</i>	RHF (q478b)	RHF (q506b)	RHF (q478b)
	<i>Increased fluids (IF)</i>	Increased fluids (q476)	Increased fluids (q504)	Increased fluids (q476)
<i>Continued feeding</i>	Continued feeding (q477)	Continued feeding (q505)	Continued feeding (q477)	

NO.	ACSD TARGET	Questionnaire 2001	Questionnaire 2003	Questionnaire 2006/2007
<b>IMCI+</b>				
8	Timely initiation of breastfeeding	Ever breastfed (q440); Timing of BF initiation (q441)	Ever breastfed (q323); Timing of BF initiation (q324)	Ever breastfed (q440); Timing of BF initiation (q441)
9	Exclusive breastfeeding through 6 months (0-5m)	Still breastfeeding (q445); liquids in last 24h (q492a-e); food in last 24h (q493a-j)	Still breastfeeding (q326); liquids/food in last 24h (q331b-g)	Still breastfeeding (q445); liquids in last 24h (q492a-e); food in last 24h (q493a-j)
10	Breastfeeding and complementary feeding (6-9 months)	Still breastfeeding (q445); food in last 24h (q493a-j)	Still breastfeeding (q326); food in last 24h (q331g)	Still breastfeeding (q445); food in last 24h (q493a-j)
11	Continued breastfeeding (20-23 months)	Still breastfeeding (q445)	Still breastfeeding (q326)	Still breastfeeding (q445)
12	Consumption of iodized salt	Iodized salt (q35)	Iodized salt (q29)	Iodized salt (q35)
13	Consumption of iodized salt			
<b>ITNs</b>				
14	Use of bednets by pregnant women	Women's questionnaire: Pregnant (q226); Slept under net last night (q494)	Women's questionnaire: Pregnant (q221); Slept under net last night (q601)	HH questionnaire: Pregnant (q226) (from women's datafile); Slept in HH last night (q6); Slept under net last night (q32E)
15	Effective use of bednets by children < 5yr	N/A	Women's questionnaire: Child slept under net last night (q526); Was the net ever treated(q527); How long ago treated (q528)	HH questionnaire: Age (from women's datafile); Slept in HH last night (q6); Slept under net last night (q32E); ITN net (q31 - 32c)
16	Effective use of bednets by pregnant women	N/A	Women's questionnaire: Pregnant (q221); slept under net last night (q601); Was the net ever treated(q602); How long ago treated (q603)	HH questionnaire: Pregnant (q226) (from women's datafile); Slept in HH last night (q6); Slept under net last night (q32E); ITN net (q31 - 32c)

NO.	ACSD TARGET	Questionnaire 2001	Questionnaire 2003	Questionnaire 2006/2007
<b>ANC+</b>				
17	3+ prenatal visits, skilled HCW*	Prenatal care and who did you consult (q407); Number of visits (q409)	Prenatal care (q303); who did you consult (q304); Number of visits (q306)	Prenatal care and who did you consult (q407); Number of visits (q409)
18	Intermittent malaria treatments in pregnancy	Took meds for malaria (q421); Which meds (q422)	Took meds for malaria (q223); Which meds (q224)	Took meds for malaria (q421); Which meds (q422)
19	TT2 coverage during pregnancy	Rec'd TT (q415); number of doses (q416)	Rec'd TT (q308); number of doses (q309)	Rec'd TT (q415); number of doses (q416)
20	Pregnant women take 3 months iron supplements	Rec'd iron (q417); Number of days took iron (q418)	Rec'd iron (q313); Number of days took iron (q314)	Rec'd iron (q417); Number of days took iron (q418)
21	Skilled attendant at delivery*	Assisted with birth (q426)	Assisted with birth (q320)	Assisted with birth (q426)
22	Postnatal visit within 3 days of delivery, skilled HCW*	Location of delivery (q427); Rec'd postnatal care if non-institutional delivery (q429)  Days after delivery rec'd care (q430); who performed care (q431)	N/A	Location of delivery (q427); Rec'd postnatal care if non-institutional delivery (q429)  Days after delivery rec'd care (q430); who performed care (q431)
23	Postnatal supplementation with Vitamin A	Rec'd vitamin A (q433)	Rec'd vitamin A (q322)	Rec'd vitamin A (q433)

## APPENDIX F

### Methodology and implementation of household surveys in Mali 2001 to 2007

The methodologies and implementation of households surveys re-analyzed for the ACSD retrospective evaluation are presented in table E1. Less documentation of the methods and implementation was available for the ACSD 2003 survey. This survey is presented in the body of the report, but should be interpreted with caution due to questions about the data quality and the exact methodologies utilized. A full report describing data quality issues in the ACSD 2003 survey is available on request from the JHU evaluation team.

**Table E1:** Methodology and implementation of household surveys in Mali: 2001 to 2007 presented in the ACSD evaluation report

Survey Component		Mali			
		DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007
General	Geographic Coverage	National	Kolokani, Banamba, Bla, Niono, Djenne, Koro	National	Kolokani, Banamba, Bla, Niono, Djenne, Koro
	Implementing Agency (& TA)	Direction National de la Statistique et Informatique (DNSI) & Cellule de Planification de Sante (CPS) with TA from Macor	RESADE (CDC Atlanta & UNICEF)	Direction National de la Statistique et Informatique (DNSI) & Cellule de Planification de Sante (CPS) with TA from Macor	Direction National de la Statistique et Informatique (DNSI) & Cellule de Planification de Sante (CPS) with TA from Macor
	Datafile available for reanalysis	Yes	Yes	Yes	Yes
	Survey documentation available	Sampling methods / size; Sampling frame/ selection/weights; Revised questionnaire; Training manual; Interviewer manual; Supervisor manual; Datafile for analysis; Report of data analyses	Sampling methods / size; Sampling frame; Datafile for analysis; National report of data analyses	Sampling methods / size; Sampling frame/ selection/weights; Revised questionnaire; Training manual; Interviewer manual; Supervisor manual; Datafile for analysis; Report of data analyses	Sampling methods / size; Sampling frame/ selection/weights; Revised questionnaire; Training manual; Interviewer manual; Supervisor manual; Supervisory field report; Datafile for analysis; Report of data analyses

Mali				
Survey Component	DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007
	Sampling & enumeration	<p><b>Stratification &amp; sampling of clusters</b></p> <p>2 stage sampling stratified by region &amp; urban/rural (with Gao, Timuctou &amp; Kidal as 1 region)</p>	<p>2 stage sampling, clusters selection stratified by district; clusters chosen from census 1998</p>	<p>2 stage sampling stratified by district (52) &amp; urban/rural</p>
<p><b>Number of clusters</b></p>		<p><b>HID:</b> 84 clusters</p>	<p><b>National:</b> 410 clusters selected - 407 completed (3 dropped for insecurity) <b>HID:</b> 35 clusters total</p>	<p><b>HID:</b> 80 clusters total</p>
<p><b>Number of households per cluster (total HH in HIDs)</b></p>		<p>30</p>	<p>30 in urban areas 36 in rural areas</p>	<p>36</p>
<p><b>Mapping/ listing</b></p>		<p>Unclear - listing of households was used for selection, but unclear if from 1998 census or done in field by survey teams</p>	<p>Household listing &amp; mapping done in selected clusters by the team leaders before survey start</p>	<p>Similar to DHS 2006, although somewhat stronger supervision; technical team accompanied listers to the field</p>
<p><b>Household selection</b></p>		<p>Done by Macro from household listing before survey field work</p>	<p><b>Mali Report:</b> Households systematically selected from listed households <b>Standard CDC Protocol:</b> 30 contiguous HHs selected (using random starting point)</p>	<p>Done by Macro from household listing before survey field work</p>

Mali				
Survey Component	DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007
Language of questionnaire	French, Bambara, Sonrai, Peulh	French	French	French
Questionnaires used	Household, women's [Men's & community services]	Household, women's	Household, women's [Men's]	Household, women's
<b>Modules included in women's/child questionnaire</b>	Sociodemographic Info; Reproduction; Contraception; Pregnancies, ANC, Breastfeeding, Vaccination, child health and nutrition; Marriage and sexual activity; Fertility preferences; Work of women and partner; HIV/AIDS and STIs; Female Genital Cutting; Maternal mortality'	Sociodemographic Info; Reproduction; Contraception; Pregnancies, ANC, & breastfeeding; Vaccination; Child health & illness; Hygiene, marital status, work of women; health expenditures	Sociodemographic Info; Reproduction; Contraception; Pregnancies, ANC, Breastfeeding, Vaccination, child health and nutrition; Marriage and sexual activity; Fertility preferences; Work of women and partner; HIV/AIDS and STIs; Female Genital Cutting;Fistulas; Household relationships; Maternal mortality'	Sociodemographic Info; Reproduction; Pregnancies, ANC, Breastfeeding, Vaccination, child health and nutrition [much shorter than 2006 DHS]
<b>Pre-test / pilot</b>	Done 10 days in September 2000 by 20 interviewers after 12 days training in 4 zones not covered by principle survey	1 day during interviewer training	1 month pilot /pre-test done near Bamako by 20 interviewers	Same DHS 2006 questionnaire modules - no pre-test for supplemental survey

Mali						
Survey Component		DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007	
<b>Training</b>		<b>Manuals</b>	Unknown - standard DHS guides likely	Yes - interviewer manual & supervisor's guide	Interviewer manual for women's questionnaire; also manual for team leader & controller	Same - but shortened to reflect shortened questionnaires
		<b>Logistics &amp; timing</b>	4 weeks in Bamako (sometime btw. Nov-Dec 2000)	Training took place 4-8 Aug 2003 in Bamako with TA from CDC & RESADE with 30 interviewers, 9 supervisors, 8 data entry agents	Training took place in March/April 2006 for 1 month & 11 days in Bamako	Training took place in late May/June for 8 days in Bamako - much of the training done by Libite
		<b>Training content</b>	theory & practice at questionnaire completion, with specialists in each domain for training	5 days - 2 days questionnaire practice days and 1 day for pre-test	Based on standard DHS manuals	Training calendar, supervisor manual and interviewer manuals for survey available [Same interviewers and controllers as DHS 2006 so training was shortened]
		<b>Practice survey admin in field</b>	3 days in local languages	1 day of training for pre-test done in Moribabougou, Sala & Binguebougou	Carried-out as part of the training sessions in outskirts of Bamako in non-selected clusters	NO [interviewers were the same as DHS 2006 and were experienced with questionnaire]

Mali					
Survey Component		DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007
<b>Field organization / work</b>	<b>Survey team composition</b>	3 interviewers 1 controller (woman) 1 chef d'equipe (man) Driver	3 interviewers, 1 supervisor & 1 driver	3 interviewers (women - 1 was trained health agent to take blood samples) 1 controller (woman) 1 chef d'equipe (man) Driver	3 interviewers (women) 1 controller (woman) Driver [Same team composition as DHS 2006 - BUT chef are now in charge of logistics and no interview (HIV/man questionnaire responsibilities)]
	<b>Number of teams</b>	25 survey teams	7 survey teams (1 per district, except 2 in Niono)	25 survey teams	10 survey teams
	<b>Survey start-up</b>	January 2001	After training in August 2003	<ol style="list-style-type: none"> <li>1. There was a 2 week pause between training and data collection due to administrative problems</li> <li>2. 25 clusters done in Bamako 1st to have more extension supervision in 1st phase (April/May 2006)</li> <li>3. Rest of survey started 31st May</li> </ol>	<ol style="list-style-type: none"> <li>1. There was a 10 day pause between training and data collection due to administrative problems (started 6/14/07)</li> </ol>
	<b>Period of field work</b>	Jan-May 2001	August 2003	Apr/May 2006 in BKO; rest of country Jun to Dec 2006	15 June 2007 to mid-July 2007

Mali				
Survey Component	DHS 2001	ACSD 2003	DHS 2006	DHS supplementary 2007
	<p><b>Observation of interviews (by superv. / controller)</b></p>	Unknown	Unknown	Specified in Manuals and done by controllers
<p><b>Verification interviews (done by supervisors for ages, etc)</b></p>	Unknown	Unknown	Specified in manuals; not done at first, Libite sent messages to the field to insist on this and that the control questionnaires were sent to BKO - no large discrepancies were found	Specified in manuals & discussed in training - Unknown if done regularly in field
<p><b>Technical team supervision</b></p>	On-going supervision done by technical steering committee	1 supervisor per region (2 districts); supervisors also responsible for editing questions	1st supervision by technical team done 28/29 June (1 month after survey start in field) 2nd survey supervision done later	Start-up supervision done by KG & Libite (Macro) for 2 teams in Kikoro.; all teams visited from 21-26 June by tech team; 2nd full supervision 4 July [Higher level supervision occurred at beginning of survey, rather than 1 month after entering field (done in DHS due to admin problems)]

**Supervision**

<b>Mali</b>				
<b>Survey Component</b>	<b>DHS 2001</b>	<b>ACSD 2003</b>	<b>DHS 2006</b>	<b>DHS supplementary 2007</b>
<b>Editing of questionnaires</b>	4 editors/verifiers	Not specified	2 agents edited/verified questionnaires before data entry	Similar
<b>Data entry procedures</b>	1. Data entry in ISSA done by 14 data entry agents (trained with interviewers), under supervision of 2 data managers at DNSI 2. 1/3 of clusters double-entered	1. 9 trained Data entry agents in August 2003 concomitant with survey 2. Entry in CSPro adapted from standard CDC base	1. Double data entry in CSPro done by 20 data entry agents, under supervision of 2 data managers 2. H Koche (Macro) set up data entry procedures & supervised data entry start-up	Same
<b>Quality control loop</b>	Unknown	Unknown	Data completeness and errors detected after data entry sent back to each team & interviewer through the supervision	None [Supplementary survey too short to have feedback loop]
<b>Data editing</b>	Data edited/cleaned for internal consistency by 4 agents	Unknown	Data edited/cleaned for internal consistency by 2 agents	Same as DHS 2006
<b>Finalization of data</b>	Cleaning (apurement) cluster-by-cluster before final tabulation	Files transferred to SPSS & Stata for analysis	Done by technical committee and Macro consultants	Same
<b>Imputation of birth dates</b>	Done according to DHS standard	Not in final datafile	Done according to standard DHS	Done according to standard DHS
<b>Sources:</b>	DHS 2001 report <sup>70</sup>	Mali ACSD report	Mali DHS 2006 preliminary report <sup>71</sup>	Field visits; key informants

## Tables presenting priority indicators over time for ACSD high impact districts

**Table G1.** EPI+ and ITN coverage indicators over time in “high-impact” districts, Mali

Indicators**	2001 DHS				ACSD-CDC 2003			2006/7 DHS and Supplemental survey				Significance between 2001 & 2006/7 (p-value)	
	n*	%	missing	95% CI	n*	%	missing	n*	%	missing	95% CI		
<b>EPI+</b>													
Percentage of children aged 12-23 months who are immunized against measles	205	29	4	22 - 37	627	71	13	779	66	2	60 - 71	p<0.001±	
Percentage of children aged 12-23 months who received 3 doses of DPT vaccine	210	24	2	16 - 32	666	74	3	779	73	2	67 - 78	p<0.001±	
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	1044	35	5	29 - 41	1387	86§	8	3539	77	4	73 - 81	p<0.001±	
<b>ITNs***</b>													
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN) (2003- women quest / 2006/7 - HH quest.)					3102	70	3	4336	32	1	28 - 36	-	
Percentage of pregnant women sleeping under any mosquito net (2001 & 2003 - woman quest / 2006/7 - HH quest)	169	58	0	45 - 70	465	89	0.2	661	42	0	35 - 49	-	
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN) (2003 - women quest. / 2006/7 - HH quest.)					457	69	2	656	33	1	26 - 40	-	

\*\*All vaccination indicators calculated based on MICS protocols (where distribution of children reported vaccination before 12m in card s applied to all children reported as vaccinated)

\*weighted & with known responses for indicator

\*\*\* ITN = Insecticide treated net defined as treated within 12 months before the survey or long-lasting net

§Only available for children 6-32 months of age

‡Includes bednets treated in previous 6 months only (previous 12 m not available in data)

± Comparing percentage of children receiving vaccination according to any source

**Table G2.** Illness case management indicators from 2001 to 2006/7 “high-impact” districts, Mali

Indicators	2001 DHS				ACSD-CDC 2003			2006/7 DHS & DHS supplemental				Significance between 2001 & 2006/7 (p-value)
	n*	%	missing	95% CI	n*	%	missing	n*	%	missing	95% CI	
Percentage of children aged 0-59 months with fever receiving antimalarial drugs**	302	43	5	35 - 51	735	56	1	615	36	11	30 - 41	p=0.17
Children 0-59m with fever in previous 2 weeks, rec'd appropriate antimalarial treatment (no timing)	302	40	5	32 - 48	735	50	1	615	0.3	11	0 - 0.8	p<0.001
<b>Country policy</b>	Chloroquine				Chloroquine			ACT				
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	123	28	0	16 - 39	246	22	2	248	31	1	23 - 38	NS
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	225	39	4	30 - 47	772	34	3	557	46	4	40 - 52	p=0.17
Percentage of households consuming iodized salt***	1571	45	1	38 - 51	245	92	2	1087	71	1	63 - 79	-
Percentage of households consuming iodized salt*** (exclude HH with no salt)	1437	49	9	42 - 56	2405	93	4	1027	75	7	66 - 84	-

\*weighted & with known response for indicator calculation

\*\*Any antimalarial medication

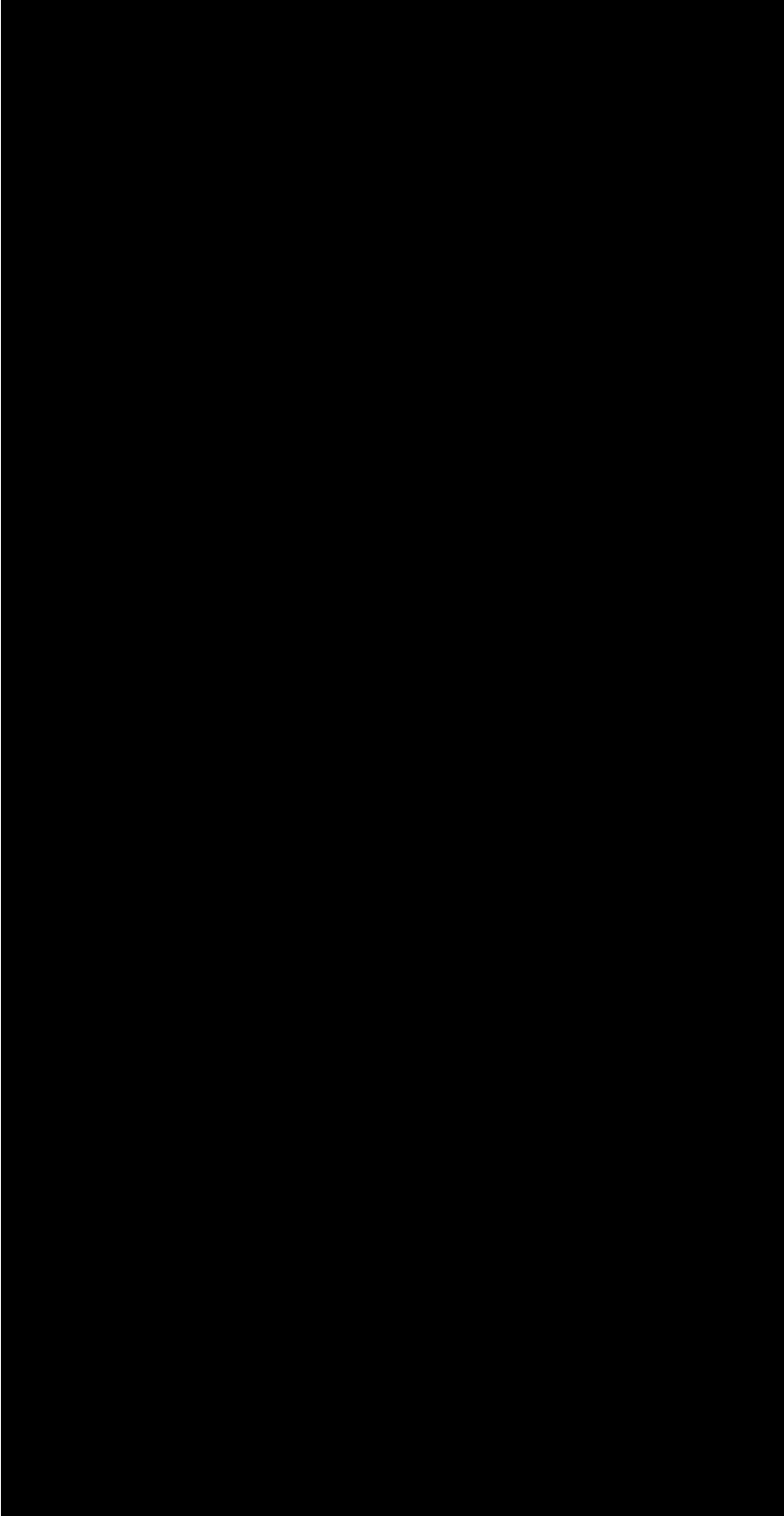
\*\*\*2001 - Iodized salt (>25ppm) versus 2006/07 - Iodized salt (>=15ppm)

**Table G3.** Feeding behaviour indicators from 2001 to 2006/7 in “high-impact” districts, Mali

Indicators	2001 DHS				ACSD-CDC 2003			2006/7 DHS and Suppl. survey				Significance between 2001 & 2006/7 (p-value)
	n*	%	missing	95% CI	n*	%	missing	n*	%	missing	95% CI	
Percentage of infants aged 0-5 months who are exclusively breastfed	180	44	1	37 - 50	362	32	1	501	28	4	22 - 34	p=0.002
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	121	27	0	15 - 39	262	24	0	361	27	0.4	21 - 32	NS
Percentage of children aged 20-23 months who are currently breast feeding	60	80	0	68 - 92	151	54	3	215	60	3	51 - 68	p=0.01
Percentage of newborns put to the breast within one hour of birth	379	34	0.3	28 - 41	788	41	3	1104	48	<1	44 - 53	p<0.001

\*weighted & with known response for indicator calculation

**Table G4.** Antenatal care from 2001 to 2006/7 in “high impact” districts, Mali



*\*weighted & with known response for indicator calculation  
\*\*among women with a live birth within 12 months previous to the survey*

**Table G5.** Assisted deliveries and postnatal care from 2001 to 2006/7 in “high-impact” districts, Mali

Indicators**	2001 DHS				ACSD-CDC 2003			2006/7 DHS and Suppl. survey				Significance between 2001 & 2006/7 (p-value)
	n*	%	missing	95% CI	n*	%	missing	n*	%	missing	95% CI	
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	381	15	0	6 - 23	804	6	1	1104	14	<1	10-18	NS
Percentage of births attended by skilled health personnel (doctor, nurse, midwife, <i>matrone</i> or <i>aide soignate</i> )	381	26	0	16 - 36	806	36	1	1104	46	<1	42 - 53	p=0.001
Percentage of newborns receiving a postnatal visit by a trained worker (doctor, nurse or midwife) within 3 days of delivery. (women with institutional deliveries assumed to have appropriate postnatal care)	381	25	0	16 - 35				1097	45	<1	40 - 50	p=0.001
Percentage of women receiving vitamin A supplementation within 2 months of birth	380	11	0.3	6 - 16	804	36	1	1095	43	1	37 - 49	p<0.001

\*weighted & with known response for indicator calculation

\*\*among women with a live birth within 12 months previous to the survey

## APPENDIX H

### Tables presenting comparisons of priority indicators over time in ACSD high-impact districts and the comparison area

**Table H1:** EPI+ and ITN coverage indicators 2001 to 2006-7 in “high-impact” districts and comparison areas, Mali

Indicators	2001 DHS				2006/7 DHS & Supplemental survey			
	High impact zones		Comparison zones‡		High impact zones		Comparison zones‡	
	n*	%	n*	Missing (%)	n*	%	n*	Missing (%)
<b>EPI+**</b>								
Percentage of children aged 12-23 months who are immunized against measles	205	29	1670	33	779	66	1984	58
Percentage of children aged 12-23 months who received 3 doses of DPT vaccine	210	24	1682	29	779	73	1995	60
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	1044	35	7111	42	3539	77	8232	73
<b>ITNs***</b>								
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN) (HH quest.)								
Percentage of pregnant women sleeping under a mosquito net (woman quest)	169	58	1310	32	661	42	1498	45
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN) (HH quest.)					656	33	1493	32

\*weighted & with known response for indicator calculation

\*\*All vaccination indicators calculated based on MICS protocols (where distribution of children reported vaccination before 12m in card s applied to all children reported as vaccinated)

\*\*\* ITN = Insecticide treated net defined as treated within 12 months before the survey or long-lasting net

‡ Comparison areas are include the rest of Mali, excluding the HIDs and Bamako

**Table H2:** Case management indicators 2001 to 2006-7 in “high-impact” districts and comparison areas, Mali

IMCI case management indicators	2001 DHS				2006/7 DHS & Supplemental survey				
	High impact zones		Comparison zones‡		High impact zones		Comparison zones‡		
	n*	%	n*	%	n*	%	n*	%	
Percentage of children aged 0-59 months with fever receiving antimalarial drugs (program)**	302	43	2262	40	615	36	1621	35	9
Children 0-59m with fever in previous 2 weeks, rec'd appropriate antimalarial treatment (effective)***	302	40	2262	38	615	0.3	1621	0.3	9
<b>Mali antimalarial policy</b>	<b>Chloroquine</b>		<b>Chloroquine</b>		<b>ACT</b>		<b>ACT</b>		
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	123	28	829	20	248	31	530	36	0.4
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	225	39	1638	46	557	46	1296	37	4

\*weighted & with known response for indicator calculation

\*\*Includes treatment with **any** antimalarial

\*\*\*Includes treatment with first-line antimalarial recommended by national policy, no timing

‡ Comparison areas include the rest of Mali, excluding the HIDs and Bamako

**Table H3:** Feeding behaviour indicators 2001 to 2006-7 in “high-impact” districts and comparison areas, Mali

Feeding behaviors	2001 DHS				2006/7 DHS & Supplemental survey				
	High impact zones		Comparison zones‡		High impact zones		Comparison zones‡		
	n*	%	n*	%	n*	%	n*	%	
Percentage of newborns put to the breast within one hour of birth	379	34	2247	28	1104	48	2266	44	0.1
Percentage of infants aged 0-5 months who are exclusively breastfed	180	44	1071	20	501	28	1108	36	4
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	121	27	701	32	361	27	680	30	0.6
Percentage of children aged 20-23 months who are currently breastfeeding	60	80	358	72	215	60	523	58	0
Percentage of households consuming iodized salt*	1571	45	9282	45	1087	71	9755	73	3
Percentage of households consuming iodized salt* (exclude HH with no salt)	1437	49	8598	48	1027	75	9254	77	8

\*weighted & with known response for indicator calculation

‡ Comparison areas include the rest of Mali, excluding HIDs and Bamako

NOTE: 2001 - Iodized salt (>25ppm) versus 2006/07 - Iodized salt (>=15ppm)

**Table H4:** Antenatal, delivery and postnatal care indicators 2001 to 2006-7 in “high-impact” districts and comparison areas, Mali

	2001 DHS						2006/7 DHS and Supplemental survey					
	High impact districts			Comparison zones‡			High impact districts			Comparison zones‡		
	n*	%	Missing (%)	n*	%	Missing (%)	n*	%	Missing (%)	n*	%	Missing (%)
<b>ANC, assisted delivery and postnatal care indicators**</b>												
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse or midwife)	376	14	1	2226	16	1	1106	15		2236	22	1
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse/midwife, <i>matrone</i> or <i>aide soignate</i> )	373	25	3	2181	36	3	1093	52		2236	49	0.1
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (any SP)	379	1	0.3	2242	1	0.3	1105	32		2249	14	1
Percentage of newborns protected against tetanus (2+ doses TT during pregnancy)	379	22	1	2239	25	1	1098	46		2259	45	0.4
Percentage of pregnant women receiving 3 months of iron supplementation.	360	6	13	1956	3	13	1027	16		2107	18	7
Percentage of births attended by skilled health personnel (doctor, nurse, midwife, <i>matrone</i> or <i>aide soignate</i> )	381	26	0.1	2256	35	0.1	1104	46		2264	46	0.1
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	381	15	0.1	2255	15	0.1	1104	14		2264	20	0.1
Percentage of newborns receiving a postnatal visit by a trained worker (doctor, nurse/midwife, <i>matrone</i> of <i>aide soignate</i> ) within 3 days of delivery**	381	25	0.2	2252	34	0.2	1097	45		2251	45	0.7
Percentage of women receiving vitamin A supplementation within 2 months of birth	380	11	1	2245	14	1	1095	43		2245	33	1

\*weighted & with known response for indicator calculation ‡ Comparison areas are include the rest of Mali, excluding the HIDs and Bamako  
 \*\*Women with institutional deliveries assumed to have appropriate postnatal care

## APPENDIX I

Tables presenting 2006-7 results for key indicators in the ACSD high-impact districts by socio-demographic characteristics of the population (from DHS 2006 & ACSD supplemental survey 2007)

**Table I1:** Description of households, eligible women and children under five DHS 2006 and Supplemental DHS survey 2007 in “high-impact” districts, Mali 2006-2007

Table I1a: Households interviewed			Table I1b: Eligible women with complete interviews			Table I1c: Under five Children: from Individual interview		
	Percent	Total Households		Percent	Total Women		Percent	Total Children
<b>High Impact regions</b>								
Koulikoro	28	1070	Koulikoro	29.8	1356	Koulikoro	29.1	1436
Segou	37	1426	Segou	39.7	1808	Segou	41.5	2050
Mopti	36	1388	Mopti	30.5	1388	Mopti	29.4	1449
<b>Residence</b>								
Urban	12	467	Urban	13.5	616	Urban	10.2	503
Rural	88	3417	Rural	86.5	3936	Rural	89.8	4433
<b>Months since last birth</b>								
			<12	24.0	1106	None		
			<60	64.2	2954	Fondamental 1		
<b>Currently pregnant</b>								
			Yes	14.6	667	Secondaire +		
			Not sure	0.7	32			
<b>Education</b>								
			None	84.3	3837			
			Fondamental 1	10	451			
			Secondaire +	5.8	264			
Total		2943	Total		4602	Total		4936

**Table 12:** Vaccination by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

<b>Children 12-23 months of age vaccinated against measles and DPT</b>											
	% with EPI card - Seen	Innoculated against measles				Innoculated against DPT					
		Rec'd vaccine (%)	Rec'd vaccine before 12m (%)	Number with valid date on card	ACSD indicator (%)	Number of children 12-23m*	Rec'd vaccine (%)	Rec'd vaccine before 12m (%)	Number with valid date on card	ACSD indicator (%)	
<b>High Impact zones</b>											
Koulikoro	68	67	91	97	60	207	72	95	115	69	207
Segou	64	74	86	175	64	342	78	95	192	73	340
Mopti	66	79	92	129	73	231	77	97	142	75	232
<b>Residence</b>											
Urban	56	84	94	42	79	88	83	99	44	82	88
Rural	67	72	89	359	64	691	75	95	404	71	690
<b>Sex</b>											
Male	67	75	88	197	66	383	76	95	221	73	382
Female	65	73	91	204	66	396	76	96	228	72	397
<b>Mother's education level</b>											
None	65	72	89	349	64	694	74	97	390	72	693
Any formal education	74	87	89	52	78	86	89	87	58	77	86
<b>Wealth index quintiles</b>											
Poorest	65	69	85	74	59	149	67	93	79	62	150
2	65	72	90	80	65	160	75	96	97	73	160
3	64	69	87	86	60	169	70	96	93	67	168
4	70	76	93	92	71	166	82	97	105	79	165
Least Poor	64	84	92	70	77	135	86	95	74	81	135
<b>Total</b>	66	74	89	401	66	779	76	96	449	73	779

\*n=Children 12-23 months of age, still alive with non-missing data for indicator calculation: weighted

ACSD indicator: multiply the percent of children that received vaccination before first birthday, according to immunization card, by the total percentage of children

**Table I3:** Vitamin A supplementation (one dose) in previous 6 months by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

<b>Children 6-59 months of age receiving vitamin A supplementation in the previous 6 months</b>		
	<b>Vitamin A supplementation (%)</b>	<b>Number of children 6-59 months of age*</b>
<b>High Impact zones</b>		
Koulikoro	<b>67</b>	971
Segou	<b>83</b>	1467
Mopti	<b>78</b>	1101
<b>Residence</b>		
Urban	<b>81</b>	389
Rural	<b>76</b>	3150
<b>Sex</b>		
Male	<b>76</b>	1804
Female	<b>78</b>	1735
<b>Age in months</b>		
6-11	<b>72</b>	542
12-23	<b>78</b>	773
24-35	<b>77</b>	778
36-47	<b>79</b>	744
48-59	<b>77</b>	702
<b>Mother's education level</b>		
None	<b>77</b>	3150
Any formal education	<b>80</b>	389
<b>Wealth index quintiles</b>		
Poorest	<b>72</b>	700
2	<b>71</b>	681
3	<b>77</b>	764
4	<b>78</b>	763
Least Poor	<b>90</b>	631
Total	<b>77</b>	3539
<i>*n=Children 6-59 months of age, still alive with non-missing data for indicator calculation: weighted</i>		

**Table I4:** Utilization of bednets by children aged 0-59 months by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

<b>Children aged 0-59 months sleeping under a mosquito net, a treated net or an ITN* the night preceding the survey</b>				
	<b>Percentage of children who:</b>			Number of children 0-59 months of age**
	Slept under mosquito net last night (%)	Slept under an ever-treated mosquito net last night (%)	<b>Slept under an ITN* last night (%)</b>	
<b>High Impact zones</b>				
Koulikoro	18	18	<b>14</b>	1250
Segou	60	57	<b>52</b>	1736
Mopti	33	31	<b>23</b>	1349
<b>Residence</b>				
Urban	54	53	<b>47</b>	450
Rural	38	36	<b>30</b>	3886
<b>Sex</b>				
Male	39	37	<b>32</b>	2211
Female	40	38	<b>32</b>	2124
<b>Mother's education level</b>				
None				
Any formal education				
<b>Age in months</b>				
0-11	45	43	<b>37</b>	1076
12-23	44	42	<b>35</b>	797
24-35	40	38	<b>32</b>	835
36-47	32	30	<b>25</b>	831
48-59	35	33	<b>29</b>	797
<b>Wealth index quintiles</b>				
Poorest	30	27	<b>22</b>	894
2	37	35	<b>30</b>	840
3	39	38	<b>31</b>	909
4	43	40	<b>34</b>	934
Least poor	50	49	<b>44</b>	759
Total	39	37	<b>32</b>	4335
*ITN=Mosquito net treated with insecticide in the previous 12 months, or a long-lasting net				
**n=Total children under five who slept in HH last night, with non-missing data for indicator calculation: weighted				

**Table I5:** Utilization of bednets by pregnant women by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

<b>Currently pregnant women sleeping under a mosquito net, a treated net or an ITN* the night preceding the survey</b>				
<b>Percentage of pregnant women who:</b>				
	Slept under mosquito net last night (%)	Slept under an ever-treated mosquito net last night (%)	<b><i>Slept under an ITN*last night (%)</i></b>	Number of pregnant women 15-49 years of age**
<b>High Impact zones</b>				
Koulikoro	15	15	<b>12</b>	183
Segou	63	60	<b>53</b>	273
Mopti	39	33	<b>25</b>	200
<b>Residence</b>				
Urban	49	48	<b>43</b>	64
Rural	42	39	<b>32</b>	592
<b>Mother's education level</b>				
None	41	38	<b>32</b>	586
Any formal education	52	52	<b>48</b>	70
<b>Wealth index quintiles</b>				
Poorest	24	22	<b>14</b>	127
2	40	40	<b>34</b>	146
3	47	42	<b>37</b>	139
4	47	44	<b>38</b>	153
Least poor	56	52	<b>44</b>	92
Total	42	39	<b>33</b>	656
*ITN=Mosquito net treated in the previous 12 months				
**n=Total pregnant women who slept in HH last night, with non-missing data for indicator calculation: weighted				

**Table 16: Illness case management by socio-demographic characteristics in “high-impact” districts, Mali 2006-7**

	Children 0-59 with fever in previous 2 weeks				Children 0-59 with suspected pneumonia in previous 2 weeks				Children 0-59 with diarrhoea in previous 2 weeks						
	% with fever	Number of children 0-59m* with fever	% given any anti-malarial	Number of children 0-59m with fever*	% with suspected pneumonia	Number of children 0-59m* with suspected pneumonia	% taken to health facility	Number of children 0-59m with pneumonia*	% with diarrhoea	Number of children 0-59m*	ORS (%)	ORS + RHF (%)	ORS/RHF/ increased fluids (%)	ORS/RHF/ increased fluids with continued feeding (%)	Number of children 0-59m with diarrhoea*
<b>High Impact regions</b>															
Koulikoro	21	1186	38	212	8	1166	25	93	17	1192	13	20	60	46	196
Segou	17	1686	37	249	7	1652	33	112	15	1690	14	26	62	49	246
Mopti	14	1261	30	154	4	1248	36	43	10	1254	12	28	49	37	115
Urban	17	435	50	67	5	431	62	23	11	437	19	27	57	48	49
Rural	17	3698	34	548	6	3636	27	225	14	3700	12	24	59	45	509
Age in months															
0-5	14	525	25	71	9	515	28	47	7	524	4	8	35	28	38
6-11	23	547	47	119	9	533	41	46	20	546	15	27	67	39	111
12-23	25	790	35	177	6	772	34	49	22	791	14	25	59	51	169
24-59	13	2271	34	248	5	2247	25	105	11	2276	12	24	58	47	240
Gender															
male	18	2117	38	344	6	2088	29	119	14	2119	16	25	61	49	282
female	15	2016	34	271	7	1978	32	129	14	2018	10	23	56	42	275
Mother's education level															
None	16	3688	34	539	6	3631	29	224	14	3692	12	23	58	45	490
Any formal education	19	445	48	76	5	435	42	23	16	445	19	31	66	51	67
Wealth index quintiles															
Poorest	16	838	29	124	6	829	19	48	11	838	8	15	41	31	85
2	18	792	30	129	9	785	33	69	16	794	15	24	60	47	126
3	17	883	38	134	5	870	29	44	16	884	15	28	63	48	137
4	18	896	40	137	6	873	23	50	14	899	7	18	56	49	121
Least Poor	14	723	53	90	5	710	52	36	13	721	20	34	69	49	89
Total	17	4133	36	615	6	4067	31	248	14	4137	13	24	59	46	557

\*n=Children under five with non-missing data for indicator calculation; weighted

**Table 17:** Treatments given for fever in the 2 weeks preceding the survey in “high-impact” districts and comparison areas over time, Mali 2006-7

	Children with a fever in the last two weeks who were treated with:						No. of children with fever in last two weeks***
	SP/ Fansidar	Chloroquine	Amodiaquine	Quinine	ACT/ CoArtem	Appropriate AM**	
<b>DHS 2001</b>							
National comparison	0.3	38	1	3	0	38	40
High Impact zones	0	40	1	4	0	40	43
<b>ACSD-CDC 2003*</b>							
High Impact zones	9	50	0.3	1	0	23	56
<b>ACSD-DHS 2006/07</b>							
National comparison					<i>pending</i>		
High Impact zones	2	23	7	6	0.3	0.3	36
<i>Anti-malarial treatment columns are not mutually exclusive</i>							
<i>* See CDC Data quality issues document</i>							
<i>** Appropriate antimalarial treatment defined as Mali policy for first line malaria treatment (CQ in 2001 &amp; 2003; ACT in 2006/7)</i>							
<i>*** n=Children under five with non-missing data for indicator calculation: weighted</i>							

**Table 18:** Locations where care was sought for suspected pneumonia in the 2 weeks preceding the survey in “high-impact” districts and comparison areas over time, Mali 2006-7

	Children with suspected pneumonia in the last two weeks who were taken to:				Number of children aged 0-59 months with pneumonia**
	Not treated / treated at home / neighbors	Public health center / facility	Private Health center / facility	Private sector drug vendor	
<b>DHS 2001</b>					
National comparison	57	21	0	0	22
High Impact zones	51	28	0	0	21
<b>ACSD-CDC 2003 *</b>					
High Impact zones	42	22	1	20	15
<b>ACSD-DHS 2006/07</b>					
National comparison	38	28	1	14	19
High Impact zones					248

\* See CDC Data quality issues document

\*\*n=Children under five with non-missing data for indicator calculation: weighted

**Table 19:** Prevalence of infant feeding behaviours as reported by mothers by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

Timely initiation of breastfeeding, exclusive breastfeeding among children 0-5 months, complementary feeding among children 6-9 months and continued breastfeeding rates among children 20-23 months						
	<b>Timely initiation of breastfeeding</b> 12m*	Number of children 0-5m**	<b>Exclusively breastfeed</b>	Number of children 6-9m**	<b>Complementary feeding</b>	Number of children 20-23m**
<b>High impact zones</b>						
Koulikoro	46	366	31	156	25	109
Segou	45	432	35	205	30	152
Mopti	56	307	13	140	24	100
<b>Residence</b>						
Urban	53	114	31	47	33	42
Rural	48	989	28	454	26	319
<b>Age in months</b>						
0-2	-	-	42	263	-	-
3-5	-	-	15	238	-	-
<b>Sex</b>						
male	-		26	270	26	189
female	-		30	231	27	172
<b>Mother's education level</b>						
None	48	964	27	452	24	310
Any formal education	53	140	38	49	39	52
<b>Wealth index quintiles</b>						
Poorest	49	215	16	118	21	57
2	43	220	34	91	30	78
3	51	233	27	97	26	85
4	45	235	30	112	27	73
Least Poor	54	199	37	83	27	68
<b>Total</b>	<b>48</b>	<b>1104</b>	<b>28</b>	<b>501</b>	<b>27</b>	<b>361</b>
* n=Women with a live birth in previous 12 months with non-missing data for indicator analysis: weighted						
** n=Total child, still living, living with mother and most recently born with non-missing data for indicator calculation: weighted						

**Table I10:** Antenatal care indicators among women giving birth within the previous 12 months by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

<b>Antenatal care (including IPT, TT, Fe) among women who have given birth in the previous 12 months</b>									
	<b>IPT for pregnant women (2 doses SP)</b>	<b>IPT during pregnancy (any dose SP)</b>	<b>Birth within previous 12m*</b>	<b>Neonatal tetanus protection**</b>	<b>Birth within previous 12m*</b>	<b>Iron supplementation for at least 3 months.</b>	<b>Birth within previous 12m*</b>	<b>3+ Prenatal visits with a trained health care worker</b>	<b>Birth within previous 12m*</b>
<b>High impact zones</b>									
Koulikoro	16	26	366	40	359	22	331	54	354
Segou	17	28	433	45	432	17	405	52	433
Mopti	19	44	307	55	307	10	291	48	306
<b>Residence</b>									
Urban	25	47	114	56	114	27	103	61	112
Rural	16	30	991	45	984	15	924	50	981
<b>Months since birth</b>									
0-5	19	33	539	47	534	16	505	50	537
6-11	16	31	566	45	564	17	522	53	556
<b>Mother's education level</b>									
None	16	30	965	46	958	16	895	50	955
Any formal education	24	43	140	49	140	21	132	64	139
<b>Wealth index quintiles</b>									
Poorest	19	39	215	46	215	12	204	47	212
2	16	28	221	40	220	16	216	45	220
3	13	31	233	45	229	10	217	48	233
4	16	25	236	45	236	18	214	54	234
Least Poor	22	38	199	54	198	26	176	64	196
<b>Total</b>	<b>17</b>	<b>32</b>	<b>1105</b>	<b>46</b>	<b>1098</b>	<b>16</b>	<b>1027</b>	<b>52</b>	<b>1093</b>

\* n=Women with a live birth in previous 12 months with non-missing data for indicator analysis: weighted

\*\* n=At least 2 doses of TT during the pregnancy



**Table I11:** Assisted delivery and post-natal care among women giving birth in the previous 12 months by socio-demographic characteristics in “high-impact” districts, Mali 2006-7

Delivery and postnatal care indicators among women who have given birth in the previous 12 months			
	Skilled birth attendant*	Birth within previous 12m**	Postnatal care within 3 days of delivery by trained health worker*
		Birth within previous 12m**	Postnatal supplementation with Vitamin A*
		Birth within previous 12m**	Birth within previous 12m**
<b>High impact zones</b>			
Koulikoro	55	365	38
Segou	48	433	44
Mopti	34	306	48
<b>Residence</b>			
Urban	81	114	60
Rural	43	990	41
<b>Months since birth</b>			
0-5	45	538	39
6-11	48	565	46
<b>Mother's education level</b>			
None	43	965	41
Any formal education	70	139	54
<b>Wealth index quintiles</b>			
Poorest	29	215	34
2	44	221	39
3	44	233	43
4	51	235	43
Least Poor	66	200	58
<b>Total</b>	<b>46</b>	<b>1104</b>	<b>43</b>
			<b>1095</b>

\* Trained health care worker: doctor or nurse/midwife only

\*\*n= Women with a live birth in previous 12 months with non-missing data for indicator analysis: weighted

**Table I12:** Health providers assisting deliveries in “high-impact” districts and comparison areas over time, Mali 2006-7

	Delivery assisted by:					Birth within previous 12m**
	Doctor	Nurse/midwife	Aux. midwife/ <i>matrone</i>	Traditional birth attendant	No assistance	
<b>DHS 2001</b>						
National comparison	1	15	20	26	38	2257
High Impact zones	1	14	13	34	40	381
<b>ACSD-CDC 2003 *</b>						
High Impact zones	0.4	6	30	42	22	807
<b>ACSD-DHS 2006/07</b>						
National comparison	<b>Pending</b>					
High Impact zones	0.1	13	33	34	20	

\* See CDC Data quality issues document

\*\*n=Women with a birth in previous 12m with non-missing data for indicator calculation: weighted

**Note:** Chart mutually exclusive in order of doctor to no assistance

## APPENDIX J

### Summary of contextual factors possibly associated with coverage outcomes

This section is comprised of tables of contextual factors that may be associated with ACSD coverage outcomes. The examination of these factors contributes to the plausibility analysis—i.e. to determine if observed changes can be attributed to the ACSD and partner activities. Factors presented here complement section 3 in the main report and include: other project activities taking place in the ACSD high impact districts, other activities in the rest of Mali and the evolution of antimarial resistance, policies and availability in Mali.

**Table J1:** Presence of other health projects collaborating with UNICEF in “high-impact” districts, Mali

UNICEF PARTNERS	DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING	DESCRIPTION OF COLLABORATIONS WITH UNICEF
Support and supervision of CHWs engaged in promotion of family planning, HIV prevention & ACSD key family practices; 1 CHW per 35 households supervised	ASDAP	1995-present; 21 sub-districts in Bla and others in Kolokani	Contract with UNICEF to provide support and supervision to CHWs	
Interventions in education, water, agriculture/economy and health; Construction of community health centers and assist with medical supplies and equipment	OMAES (Œuvre Malienne d'Appui à l'Enfance au Sahel)	12 communes in the Djenné district	Partner with UNICEF and USAID	
Interventions with family health care and support for NIDs	Handicap International	Niono district	MOH, UNICEF	

**Table J2:** Presence of other health projects collaborating with UNICEF in “high-impact” districts, Mali

District	OTHER DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING
<b>Banamba</b>	Organization of EPI; refrigerators in health centers; 8 motos given in 2001 & 2002	Plan Mali	Banamba 1997-June 2007
	Donation of materials; Education & mobilization of mothers	GAVI	
	Follow-up of CHWs	ASDAP	2002-?
	HIV interventions	ARCAD SIDA	2002-?
	Donation of 1 motorbike and 1 refrigerator to the referral hospital	Donko-COFESA	2002-?
	HIV/STD education & awareness for young adults	Conseil appuis a l'education de base (CAEB)	Kolokani (before 2001)
<b>Kolokani</b>	Micro savings & literacy center; HIV/STI awareness for young adults	Carrefour de developpement (CARD)	Kolokani (before 2001)
	HIV/STD education & awareness for young adults	ADERA	Based in Didieni (before 2001)
	Water & hygiene	Water Aid	Kolokani (2004-2006)
	Poverty reduction & agro-forestry protection	Sahel 21	Kolokani (after 2002)
	Water-borne illnesses (trachoma & others); water and hygiene; sponsorship of 2400 children; micro-credit; child nutrition through local food-stuffs; nutritional programs; training of health agents; training and equipping hygiene committees; training and equipping 2 masons for each village for latrine building	ADAFGALE	Kolokani (after 2002)
	Training of approx. 50 TBA and midwives; construction of houses for traditional medicine-men; donation of a vehicle to the hospital	World Vision	Kolokani; 2005-present
	Support and supervision of CHWs engaged in promotion of family planning, HIV prevention & ACSD key family practices; 1 CHW per 35 households supervised	TerraNova	Kolokani; ?
	Construction and equipping of 4 community health centers; provision of vehicle, driver and gas for the referral hospital; existence of a PADEC drug kit in each village	ASDAP Kolokani	1995
		PADEC (Projet d'appui du developpement communautaire)	Kolokani ; 2001

District	OTHER DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING
Djenne	Construction & equipment in health facilities; Education; Agriculture; large wells	Œuvre Malienne d'appuis a l'enfance au Sahel (OMAES), financed through UNICEF & USAID	1996 - ?
	Organization of community development; literacy; gardens; environmental protection; agriculture; women's associations	Sahélienne d'appuis aux initiatives de base (SAIB)	June 2001- present
	Interventions on water resources, training women's organizations and agriculture	Groupe d'action de d'application technique (GRAT)	1997- present; 1 area of the Djenné district
	Agriculture micro-credit; access to social services; capacity building	Projet de reduction de la pauvrete (PRP)	2005 - present; 9 areas of the Djenné district
	Agriculture; organization and mobilization of women's groups	Action Mopti	October 2005 - ?
	Agriculture; fishing; micro-credit; environmental protection; capacity building	Association pour l'appuis au developpement intègre (AADI)	2003 ; 9 areas of the Djenné district
	Literacy	Association Malienne pour la promotion et le développement au Sahel (AMPROD)	January 2006 ; 11 areas of the Djenné district
	Democracy based interventions	PGP (Programme de gouvernance partagée)	September 2003 ; Djenne district
	Water resource projects	V.R.E.S. (Valorisation des Ressources en Eau de Surface)	2004 ; 2 areas in Djenne district
	Interventions of technical support to local organizations	PRODEPAM	2004 ; 1 area of the Djenne district

District	OTHER DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING
<b>Koro</b>	Water-borne illnesses (trachoma & others); water & sanitation, including communication; bore holes in Massko & Konoblebougou; 14 masons (2/village) equipped to make improved latrines; sponsorship of 2400 children; de-worming of 8000 children; enriched foods and nutrition demonstrations; sensitization of mothers for early treatment of childhood illness	World Vision	1989-present
	Interventions in water resources, education, agriculture, and micro-finance; Awareness raisings about maternal-child health in collaboration with CARE	AEM : Agence Evangélique de développement du Mali in collaboration with CARE	2000 ; entire Koro district
	Focus on education and health of students; Trainings and collaboration with Parent-Teacher Associations for latrines, potable water and canteens	AMPRODE SAHEL Koro (Association Malienne pour la protection et le développement au sahel	2003 ; entire Koro district
	Wat-San projects such as latrine building, rehabilitating pumps, and making bore holes	ARAFD (association recherche action femme et développement)	2000 ; urban Koro
	Interventions include income generating projects, FGM awareness raising, conflict resolution and water	AID in collaboration with CARE	2005 ; 3 areas of the Koro district
	Interventions with micro-loans to farmers, and commercialization of cereal grains	PACCEM (Programme d'appui à la commercialisation des céréales au Mali)	1996-1997 = pilot phase ; Bla district
<b>Bla</b>	Interventions in trainings for rural community groups; agriculture; women's micro-credit and health projects; Health activities include training of TBAs, CHWs on water-borne disease, ASASCO members on medicine and pharmacy management; HIV prevention; construction or rehabilitation of 51 community health centers	Projet Moyen Bani	1999 ; Bla district
	HIV prevention with VCT; training of 1 CHW per village on HIV/STD; mass sensitization with 92 film screenings per year	G-Force	June 2006 ; Bla
	Micro-finance activities	CAECE JIGISEME	December 2005
	Latrine construction and rehabilitation; provision of hygiene materials to schools; education sessions on hand washing/ hygiene; weekly 30-min radio spots on hygiene	ALPHALOG (Association libre pour la promotion de l'habitat et du logement)	2005 ; 4 communes of the Bla district

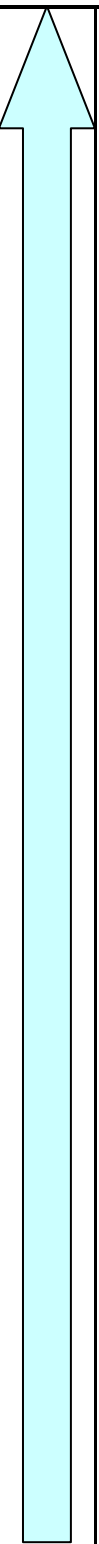

District	OTHER DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING
<b>Niono</b>	Water delivery to rice initiatives	L'Office du Niger	
	Interventions such as sanitation projects and equipping of community health committees as sub-district level ASASCO	ALPHALOG (Association libre pour la promotion de l'habitat et du logement)	
	Projects include equipping community health centers, family planning, and HIV/ STDs interventions	AES (Agir ensemble au Sahel)	
	VCT and HIV/STD programs	ONG JIGI	
	HIV/STD interventions with CSW	ONG SOUTOURA	
	Interventions for HIV/STD programs, and advocacy for increased use of community health centers	AMAPROS/ACD (Association malienne pour la promotion du sahel)	
	Interventions with the referral hospitals	Moteur Sans Frontières	Niono district
	Sanitation programs; garbage pick up	Faso Kanu ; Sanya ; Entreprise Epakala ; Dugu Ka Djeya	Niono district
	Relief interventions	SECAMA (secours catholique au Mali)	Niono district

**Table J3:** Other child health and development partner activities in Mali, 2000 to 2007.

PROGAM	TYPE OF ACTIVITY	DISTRICTS COVERED	TIMING	NOTES / LINKS TO UNICEF
<b>Save the Children, USA</b>	Promotion of ITNs through cotton cooperatives	Bougouni	1998-1999	Many child survival and family planning activities funded through USAID-Washington; Newborn interventions funded through Gates foundation
	Training of national trainers for nutrition promotion		2002-2005	
	Newborn interventions, especially community-based, through Saving Newborn Lives		2002-2006	
	Promotion and distribution of zinc for diarrhea		2004-present	
	Training and deployment of CHWs with chloroquine, ORS, referral of pneumonia		2004-present	
	Operational research for community distribution of ACTs by CHWs		2006-present	
<b>Helen Keller International</b>	Family planning promotion	Macina, Baraaouli, Niono, Tomonian	2004-present	Partnerships and collaborations with UNICEF, USAID
	Promotion of nutrition, prevention of malnutrition, promotion of handwashing, sanitation & micronutrients	Koulikoro, Banamba, Dioila, Fana, Oulessebougou, Kangaba, Kati, Kolokani	2005 to present	
	Management of acute malnutrition; supplies and provider training	Kolokani & Nara	2007-present	
	Support for national nutrition campaigns (SIAN) for vitamin A and deworming	Nation-wide	2005-present	
<b>CARE-Keneya Ciawara, in collaboration with JHU-CCP</b>	Training and equipping 4000 CHWs for key family practice promotion	Kati, Dioila, San, Segou, Markala, Sikasso, Kadiolo, Koutiala, Badiangara, Tombouctou, Gao, Boureme, Kidal & Bamako communes	2003-2008	Large-scale project funded through USAID; Partnerships with 17 NGOs
	Training of trainers and assistant midwives in ANC services			
	Support for outreach to deliver EPI and ANC services			
	Training in skilled delivery, family planning and referral for CHWs			

PROGRAM	TYPE OF ACTIVITY	DISTRICTS COVERED	TIMING	NOTES / LINKS TO UNICEF
Plan-Mali	Sponsorship of children; construction of schools, boreholes and wells	Banamba, Kangaba, Kita, Kati, Baraoueli	Unknown timing	Funded through Ireland, Canada and USAID
	Construction and equipping of CSComs, including motorcycle maintenance			
	Support for EPI outreach, training in ANC services Information, Education and communication for HIV/AIDS, female cutting and malaria			
UNICEF-ACSD expansion districts	Training and equipping CHWs for key family practice promotion (C-IMCJ)	Banamba, Kangaba, Kita, Kati, Baraoueli	2004-2008	In collaboration with UNICEF/ACSD; complementary to areas without UNICEF/ACSD coverage
	Supplies of ITNs for CSComs; training of CHWs for retreatment			
	EPI+ and ITN components of ACSD; later implementing IMCI+ and ANC+ components	Segou; Baraoueli; Macina; Markala; San; Sedou; Tominian <u>Koulikoro</u> ; Diola; Fana; Kangaba; K4. Kati; Koulikoro; Nara; Ouelessegougou Mopti; Bandiagara; Bankass; Douentza; Mopti; Tenenkou; Youwarou <u>Kayes</u> ; Bafoulabe; Diema; Kayes Kenieba; Kita; Nioro; Yelimane	2004-present	n/a

**Table J4:** Chloroquine resistance patterns and first line treatment availability and policies in Mali, 2000 to 2007

<b>1<sup>st</sup> line antimalarial policy</b>								
Chloroquine								
ACTs								
<b>Availability of:</b>								
Chloroquine								
ACTs								
<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004<sup>72</sup></b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
<b>Chloroquine Resistance in Mali</b>								

\*Starting in 2005, ACTs were available at a very limited scale in Kolendieba and Kangaba districts through operational research projects supported by Save the Children and Doctors without Borders

## APPENDIX K

### Methodological Challenges

This section discusses the methodological challenges of the evaluation design. Many of the weaknesses are due to the retrospective nature of the evaluation, which necessitates relying on existing—even if imperfect—data and information. The drawbacks of retrospective evaluations have been explained elsewhere.<sup>73</sup> We first discuss general methodological considerations, and then describes challenges in measuring levels of coverage for each ACSD implementation package. Complementing this section, appendix F provides descriptions of surveys included in the evaluation and appendix E provides a side-by-side comparison of the questions utilized for indicator calculation for each survey.

#### ***Challenges in documentation.***

Due to the retrospective nature of the evaluation, it was difficult to collect complete and standardized information on ACSD implementation activities and other health activities in the HIDs. The collaborative nature of ACSD makes it difficult to distinguish which activities were: 1) carried out as part of the ACSD program, 2) carried out with only partial technical and/or financial support from the ACSD program, or 3) carried out by ACSD partners, but independent of the ACSD program. Primary data sources pertaining to ACSD activities taking place in 2003 and earlier were less available than more recent documents; where necessary, we relied on summative reports and presentations for this information. Sometimes, although not often, information in one document conflicted with information found in other sources. In these cases, we present the information found in the most primary source. The evaluation team is continuing to collect and review information pertaining to ACSD implementation and contextual factors to ensure the most complete documentation and interpretation possible. However, some uncertainty and gaps in information will be inevitable.

#### ***Challenges in utilization of existing surveys.***

One methodological weakness in the retrospective evaluation is the limited sample size available in the 2001 DHS survey for calculation of baseline coverage indicators, especially those indicators measured among limited populations, such as exclusive breastfeeding among infants less than 6 months or complementary feeding among children 6-9 months of age. Although these small sample sizes are still representative of the HIDs and do not introduce a bias into the estimations, they are less precise than later estimates based on larger sample sizes. Appendices G and H present confidence limits for the point estimates. These small sample sizes also affect the statistical power to detect small differences over time.

Appendix F provides a full description of the methodology and conduct of surveys utilized in the analysis. The 2001 and 2006/7 DHS utilized for both the adequacy and plausibility comparisons in the evaluation were very similar in methodology and conduct, including; the sampling strategy, technical assistance provided, field agents recruited, and data processing procedures. The data from the supplemental surveys carried out in the HIDs in May of 2007 were merged with the data from households surveyed during the DHS 2006. Although these surveys were methodologically similar in almost all aspects, one of the main differences was the increase in the quality of the 2007 supplemental survey due to: 1) interviewers were already experienced in the DHS questionnaire and received additional training, based partially on common errors seen in the 2006 DHS, 2) shorter questionnaires in 2007, and 3) more intensive supervision.

The period of the data collection in the surveys was different and seasonality must be considered when comparing certain indicators. In the 2001 DHS, data were collected between January and May, which is the dry, hot season in most of Mali. Interview teams collected data for the DHS 2006 June through December 2007, which spanned the entire rainy season. The supplemental survey was carried out in June and July of 2007, which was the start of the rainy season. These differences in the seasonality of data collection need to be considered carefully for indicators relating to ITNs and illness case management.

**Challenges in measuring vaccination and vitamin A coverage.**

The SIAN, a national campaign for vitamin A supplementation was carried out in June 2007, at the same time as data collected for the 2007 supplemental survey. The overlap of this campaign with the data collection in HIDs may differentially affect results of vitamin A coverage in the HIDs versus the national comparison areas. This will need to be further explored once the 2006 DHS national datafile becomes available.

**Challenges in measuring ITN coverage.**

The measurement of comparable indicators of net use over time in Mali posed considerable challenges. The DHS 2001 did not collect information on the use of bed nets by individual children. Rather, questions about how many children slept under the net, categorized as “all, some, none,” were posed on the household questionnaire, without information regarding the treatment status of the net. Thus, it was not possible to calculate the proportion of children sleeping under any net or an ITN the night before the survey in 2001. Questions in 2001 pertaining to bed net use among pregnant women did not assess the treatment status of the bednet. ITN use among pregnant women in 2001 could not be calculated, and bed net use—irrespective of treatment status—is presented as proxy indicator. For the sake of comparison, we can assume that the use of ITNs in 2001 among children and pregnant women was close to nil, as at this time there were no large-scale ITN programs in Mali.

In 2006-7, information concerning bed net use and treatment was collected in the household questionnaire. The response categories for the type of mosquito net in the household were somewhat confusing, shown in the box. Permanent nets (*Moustiquaire permanente*), coded as 11, 12, or 18, were considered long-lasting nets in the analysis, not needing re-treatment. According to our documentation, we have no record of locally manufactured permanently treated mosquito nets; and we are unsure how to interpret this response, which accounts for 41% of the reported mosquito nets. We suspect that some local nets coded as local, permanent nets (code 11) may not have been permanently treated nets; although due to the skip pattern, no treatment information is available. It is also difficult to know which type of mosquito net interviewers recorded under the code for impregnated, long duration mosquito net (*Moustiquaire imprégnée, longue durée*), which accounted for 28% of reported bednets. It is possible that interviewers recorded some long-lasting nets under this response.

In order to follow the questionnaire logic and maintain comparability with the 2006 national DHS, in our analysis all permanent mosquito net (*Moustiquaire permanente*) responses (11, 12, 18) were considered long-lasting nets and all impregnated mosquito net responses (21, 22, 28) needed to be purchased or retreated within 12 month of the survey to be considered an ITN. The first case would lead to an over-estimate of ITN use, but the second case would lead to an under-estimation of ITN use. Thus, it is difficult to know in which direction ITN results may be biased, if at all.

**Box: Category of response codes for bed nets in Mali, DHS & ACSD Supplemental survey 2006-7**

MOUSTIQUAIRE PERMANENTE	
LOCAL	11
IMPORTE	12
NSP MARQUE (PASSER À 32D)	18
←	
MOUSTIQUAIRE IMPRÉGNÉE	
LONGUE UREE	21
COURTE UREE	22
NSP MARQUE (PASSER À 32B)	28
←	
AUTRE	31
NSP/PAS SÛR	98

**Challenges in measuring case management and feeding practices.**

The preferred indicator for treatment of fever is “treatment with an appropriate antimalarial with 24 hours of the onset of fever.” However, the 2001 DHS survey did not contain any information about the timing of antimalarial, and therefore we have presented treatment of fever within the last 2 weeks for all comparisons.

**Challenges in measuring antenatal, delivery and postnatal care.**

The measurement of IPT with SP among pregnant women presented challenges. The DHS 2001 and ACSD 2003 surveys contained no information on the number of doses of SP, whereas 2 doses of SP during pregnancy is the preferred indicator. We calculated coverage with any dose of SP during pregnancy throughout our analyses to maintain comparability. There is also a possible bias in this indicator because there were no antimalarial samples in 2006 or 2007, and pregnant women that had received SP for IPT, may have reported use of chloroquine—another white, commonly known antimalarial tablet.

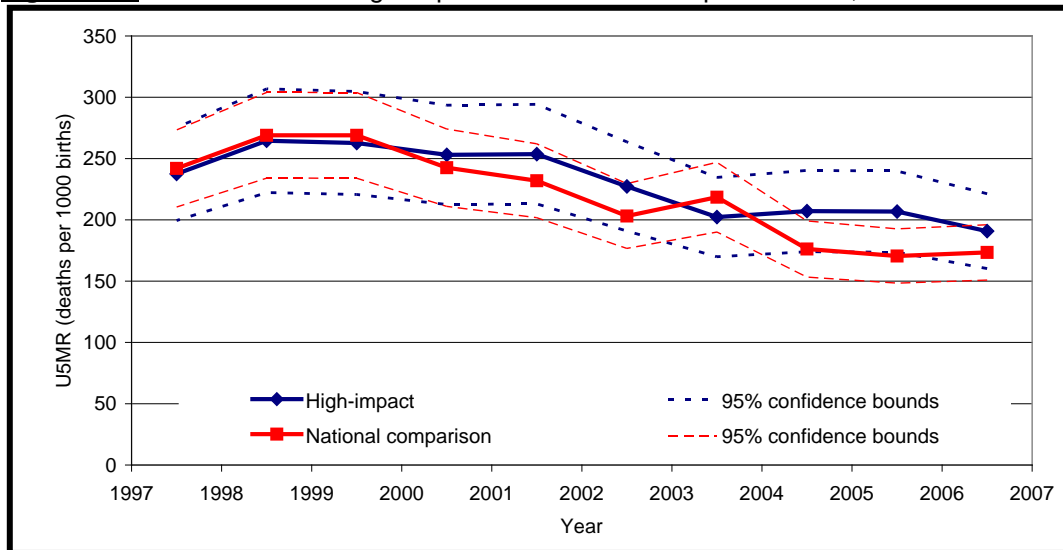
In 2001, only women who had delivered outside a facility were questioned about postnatal consultation, and it was assumed that women who had delivered in a facility received a postnatal visit. With this assumption, the indicators of postnatal visit and assisted delivery are highly correlated. In the 2006 DHS and 2007 supplemental survey, **all** women were asked about postnatal consultation, regardless of place of delivery. In order to maintain comparability of indicators over time, we utilized the 2001 assumption that women delivering in a facility received a postnatal visit, and present the

**Data quality assessment for mortality measurement.**

The aim of this section is to provide more detail on child mortality data in Mali high-impact areas, particularly as to the data quality and its likely impact on the estimates documented in the main report.

As explained in the main report, the focus in this appendix is on U5MR data from a single survey that collected data in 2006 and 2007. Figure K1 shows mortality decline by year for the high-impact and national comparison areas. There is an apparent decline in U5MR over the ten years displayed for both areas. However, with the large 95% confidence limits around these yearly estimates, particularly for the high-impact areas, little else is clear, including differences between the mortality decline in high-impact areas versus decline in the national comparison area. Hence it is necessary to consider other measures that can provide more specifics on the likely survey data quality.

**Figure K1.** Annual U5MR in “high-impact” districts and comparison area, Mali



A first step in the data quality assessment is to focus on the elements included in table K1. This table is extensively used in the DHS final reports to provide an assessment of data quality (see for example the Mali DHS 2006 report, page 363). The table naturally divides into three parts.

The first part, on number of births, is used to identify any unexpected peaks or dips in the number of living, dead or total births, and the right-most set of three columns in the table, headed *Calendar year ratio* helps more easily identify these variations. If the number of births changed in the same direction by the same amount each year, the value in these last three columns would be 100. The wider the difference from this smooth change in the number of births, the larger the divergence from 100. Table K1 shows a medium variation around 100 – from 89 to 120.

**Table K1.** Births by calendar year in the Mali “high-impact” districts (combined for 2006 and 2007 surveys)

Calendar year	Number of births			Percentage with complete birth date <sup>1</sup>			Sex ratio at birth <sup>2</sup>			Calendar year ratio <sup>3</sup>		
	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total
2007	436	19	456	-	-	-	-	-	-	-	-	-
2006	841	73	914	100.0	100.0	100.0	109.8	115.3	110.2	-	-	-
2005	864	131	996	100.0	100.0	100.0	95.5	115.9	98.0	103.3	104.4	103.6
2004	831	178	1009	99.6	99.0	99.5	101.7	112.6	103.6	100.3	108.9	101.7
2003	793	196	988	99.8	100.0	99.8	104.5	95.7	102.7	101.7	101.6	101.5
2002	729	208	938	99.5	99.2	99.4	112.7	103.5	110.6	96.7	103.2	98.2
2001	715	207	922	99.6	97.4	99.1	100.5	66.9	91.8	94.5	89.6	93.3
2000	785	254	1039	91.8	87.6	90.8	94.6	120.2	100.3	112.1	119.5	113.8
1999	685	218	904	93.0	90.8	92.5	90.5	134.0	99.5	93.5	89.0	92.5
1998	680	236	916	90.9	85.8	89.6	103.6	117.7	107.1	-	-	-
2003-2007	3766	597	4363	99.9	99.7	99.8	104.9	107.5	105.2	-	-	-
1998-2002	3596	1123	4718	95.0	91.8	94.2	100.1	106.8	101.7	-	-	-
1993-1997	2661	990	3651	89.4	88.0	89.0	101.8	111.9	104.4	-	-	-
1988-1992	1824	762	2585	89.5	85.9	88.4	107.3	107.2	107.3	-	-	-
<= 1991	1563	923	2486	85.9	86.7	86.1	106.2	101.3	104.3	-	-	-
All	13410	4393	17803	93.5	89.9	92.6	103.4	106.9	104.2	-	-	-

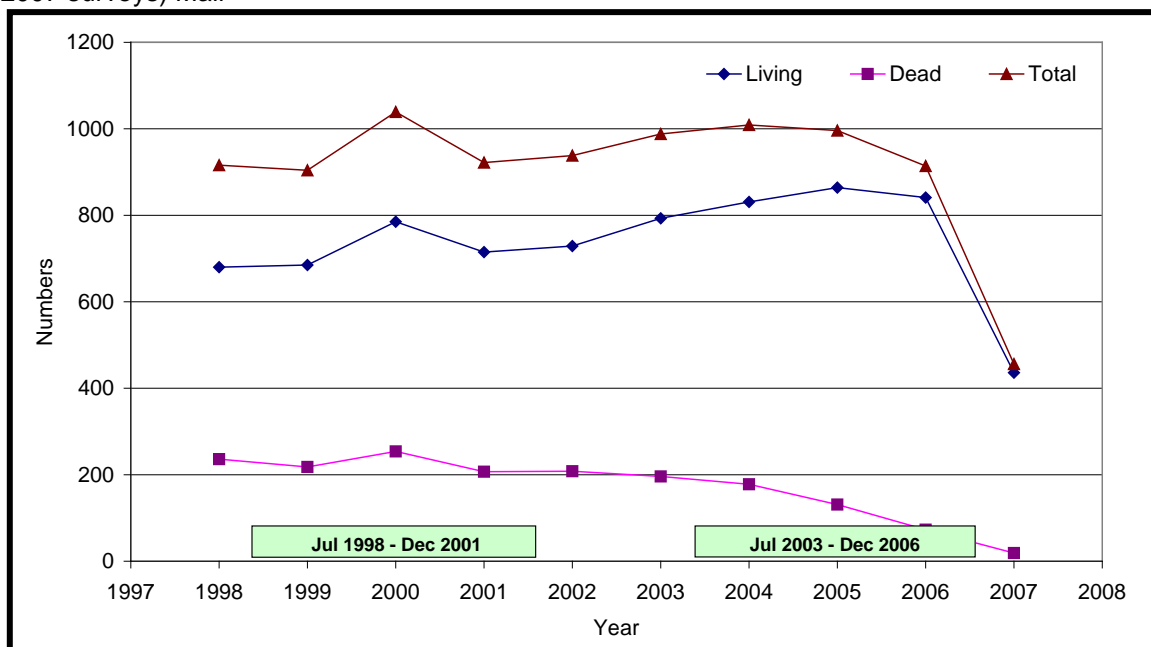
<sup>1</sup> Both year and month of birth given  
<sup>2</sup> (Bm/Bf)x100, where Bm and Bf are the numbers of male and female births, respectively  
<sup>3</sup> [2Bx/(Bx-1+Bx+1)]x100, where Bx is the number of births in calendar year x

Despite the detail provided by these data, a chart can provide a clearer picture. Figure K2 shows the number of births by year from table K1 and highlights an issue that has become a common occurrence in DHS – the shift of births from the 5-year period immediately before the survey data collection, to the previous 5-year period.

The primary cause of this shift of births has been ascribed to interviewers pushing births outside a period where they have to ask many detailed questions about a child. For the DHS 2006, this period applied to any child born after 1 January 2001, and for the 2007 survey component the period was for any child born after 1 January 2002. The dip in births for 2001 and 2002 is evident in figure K2, as is the peak in 2000. The result of this can be a shift in mortality between the two 5-year periods used for reporting U5MR by DHS. In general this appears to lead to a decrease in mortality for the 5-year period immediately before data collection, and an increase in mortality for the preceding 5-year period – leading to an estimated faster decline in mortality than is actually occurring.

However, the comparison periods used in this ACSD evaluation, shown in the boxes at the base of figure K2, result in a reduction of the impact of this shift of births on mortality estimation. This is due to the averaging of births over each of the comparison periods and, in particular, the baseline period includes both the peak at 2000 and most of the major dip at 2001-02.

Figure K2. Number of births by year by survival status in “High-impact” districts, (combined 2006 and 2007 surveys) Mali



The second part of table K1 is the three sets of columns headed *Percentage with complete birth date*. This shows that births with a complete birth date vary from 100% down to 86% over the ten-year period from 1998 to 2007. Not having a complete birth date (month and year) increases the uncertainty of the mortality estimates and hence one would like to have close to 100% of births with complete birth dates. Respondents in Mali and other countries in West Africa have difficulty in providing complete birth dates, as can be seen from a review of the comparable table in DHS reports in Benin and Senegal. At the same, Mali is not the worst of countries in West Africa in providing a complete birth date.

However, month is the major missing part of the birth date. For example, the 2006 DHS had 7% of birth dates with missing month and only 0.1% with missing year. The 2001 DHS had 5% missing month and 0.2% missing year. The implication is that mortality estimates for multiple year periods should reduce the impact of missing month.

The third part of table K1 is the three columns headed *Sex ratio at birth*. These are used to check for the last row of table that the sex ratio of total births is around 105, as generally more males than females are born. The sex ratio for those that have died should also be larger than sex ratio for total births since in general more males die than females. In addition, the table is used to assess variability by year. In the latter case, there is a noticeable dip around 2001, to 67, and a peak around 1999 to 134. This suggests that the shift in births noted in figure K2 may also be associated with a differential shift with respect to sex, and particularly in terms of deaths.

However, table K2 shows that the periods used for calculating mortality (as delineated in figure K2) provide an averaging of births and deaths data across the low and high sex-ratios. Hence the periods used in the ACSD evaluation in Mali for estimating endline and, particularly, baseline mortality, reduce the impact of these sex-ratio variations.

A conclusion from the above is that there are quality concerns with the mortality data from the high-impact areas, but that they are reduced by the selection of baseline and endline periods for calculation of U5MR.

**Table K2.** Sex ratios at birth in the Mali “high-impact” districts (combined for 2006 and 2007 surveys)

Calendar year	Sex ratio at birth*			Sex ratio, multi-years		
	Living	Dead	Total			
2007	-	-	-			
2006	109.8	115.3	110.2	L	D	T
2005	95.5	115.9	98.0	102.1	114.2	103.6
2004	101.7	112.6	103.6			
2003	104.5	95.7	102.7			
2002	112.7	103.5	110.6			
2001	100.5	66.9	91.8	99.3	104.0	100.4
2000	94.6	120.2	100.3			
1999	90.5	134.0	99.5			
1998	103.6	117.7	107.1			
All	103.4	106.9	104.2			

\* (Bm/Bf)x100, where Bm and Bf are the numbers of male and female births, respectively

## APPENDIX L

### Tables presenting additional nutritional analyses

Figure L1 : Protocol for inclusion and exclusion of cases for nutrition analyses in “high-impact” districts and national comparison as measured in 2001 DHS, Mali

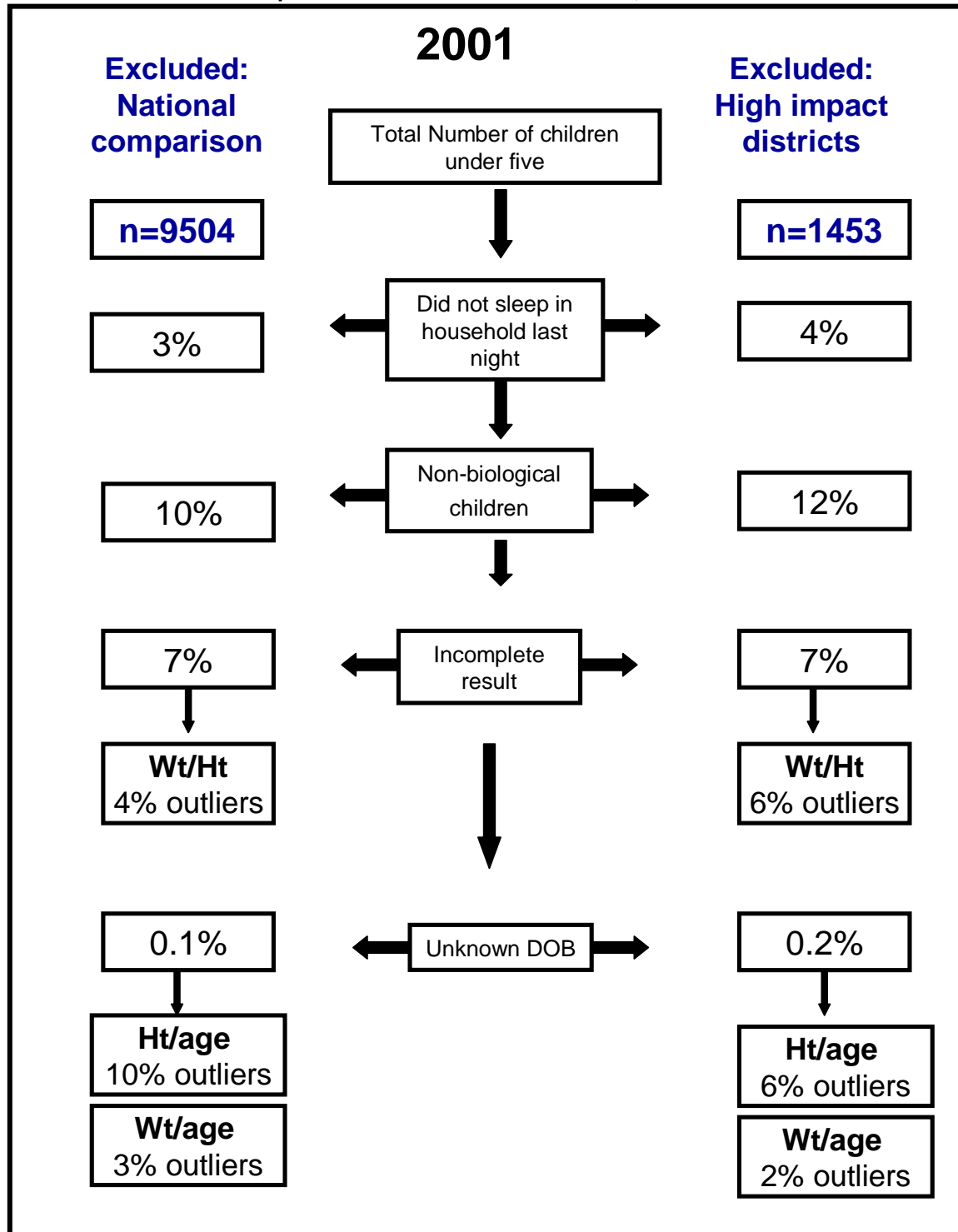
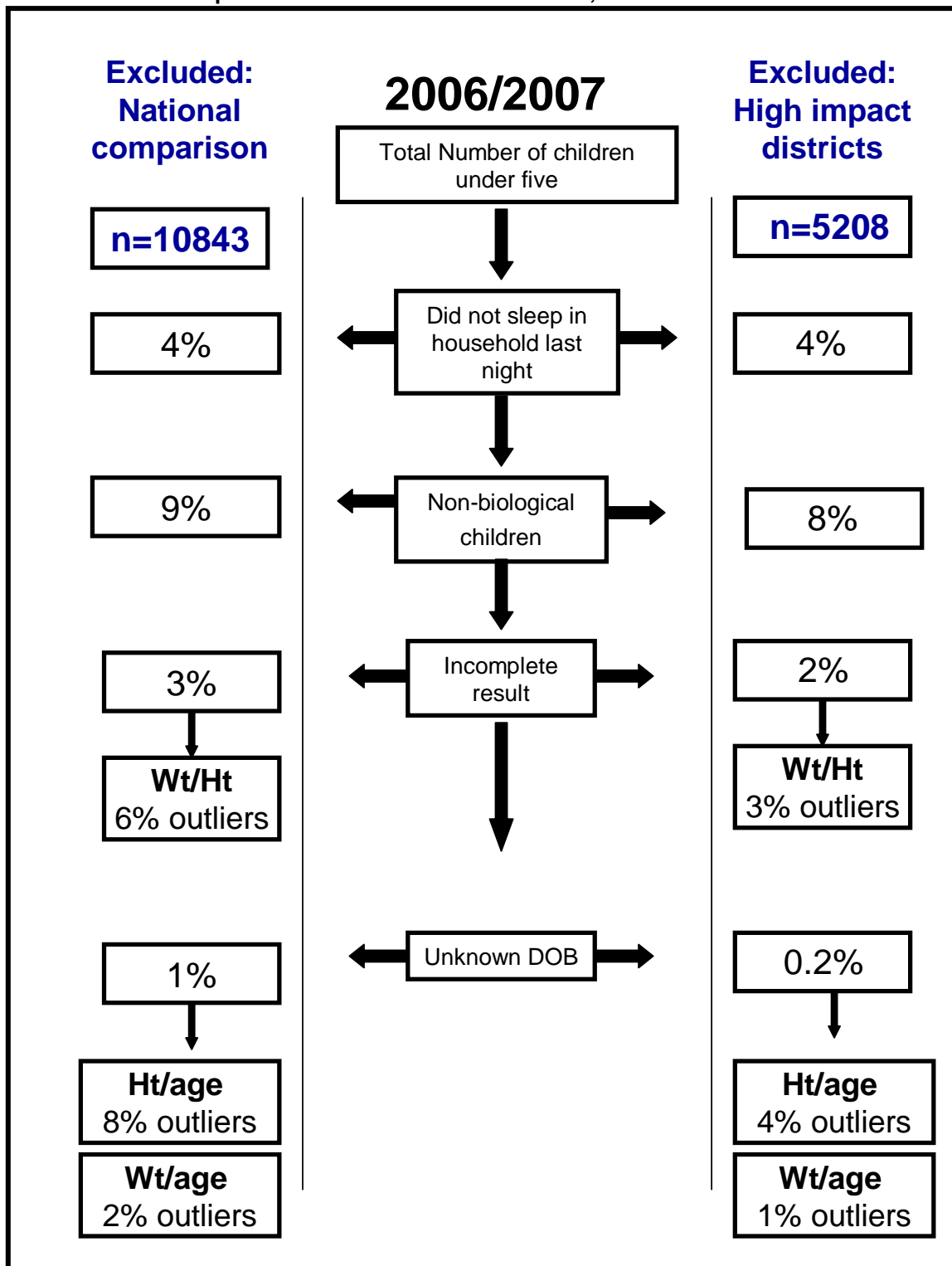
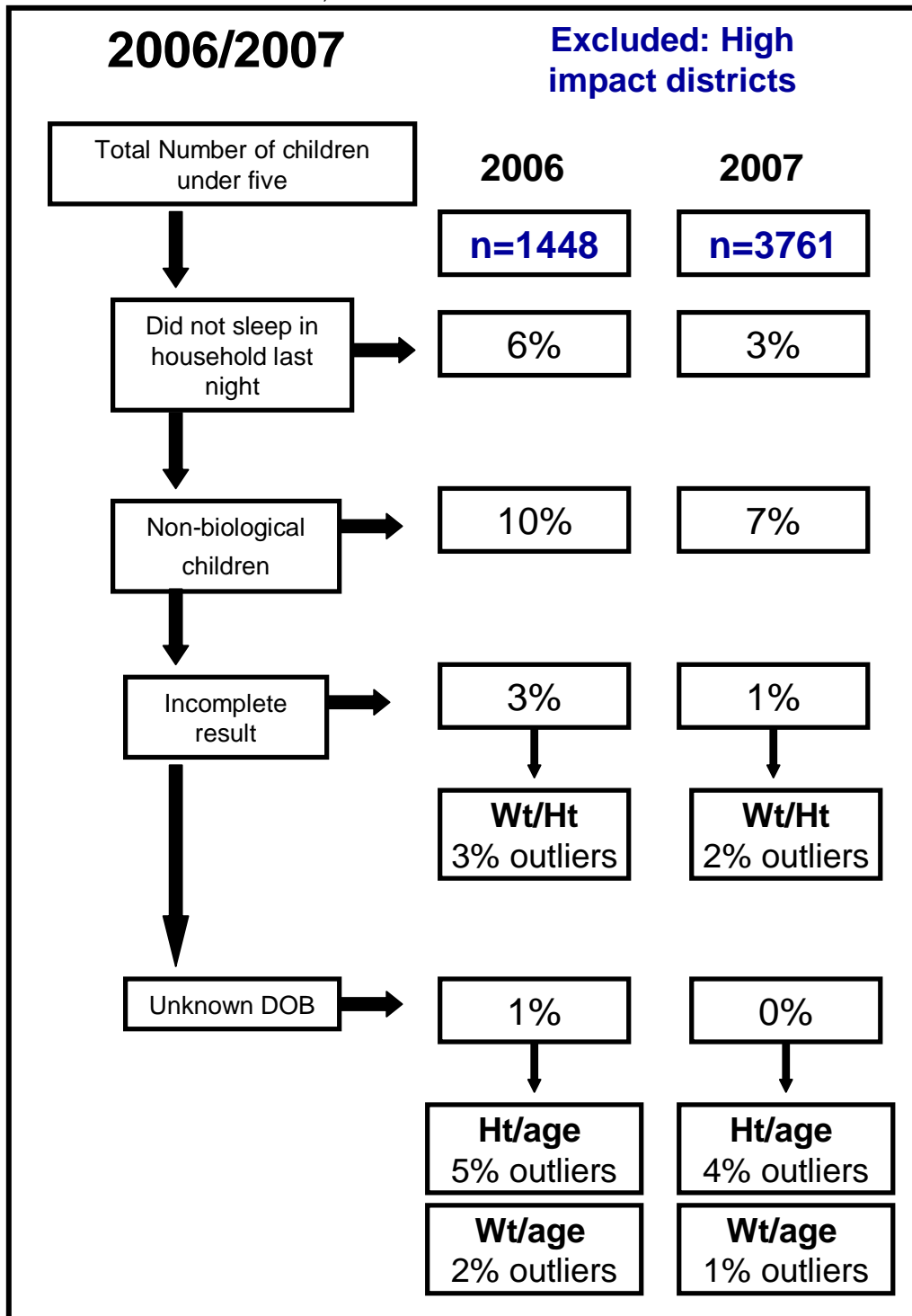


Figure L2: Protocol for inclusion and exclusion of cases for nutrition analyses in “high-impact” districts and national comparison as measured in 2006-7 DHS, Mali



**Figure L3:** Protocol for inclusion and exclusion of cases for nutrition analyses in “high-impact” districts as measured in 2006 versus 2007 DHS, Mali



**Table L4:** Prevalence of stunting among children 24-59 months of age by sub-groups of the population in the “high impact” districts and comparison area as measured by the 2001 and 2006-7 DHS, Mali

	2001 DHS						2006/2007 DHS					
	High Impact Districts			Geographic comparison area			High Impact Districts			Geographic comparison area		
	% stunted (< -2 SD)	% severely stunted (< -3 SD)	n	% stunted (< 2 SD)	% severely stunted (< -3 SD)	n	% stunted (< 2 SD)	% severely stunted (< -3 SD)	n	% stunted (< 2 SD)	% severely stunted (< -3 SD)	n
<b>Region</b>												
HID - Koulikor	44%	23%	303	0.43	22%	1293	35%	15%	1093	32%	16%	1561
HID - Segou	34%	19%	378	38%	20%	1328	38%	16%	1570	40%	20%	1519
HID - Mopti	47%	28%	344	53%	29%	2096	44%	23%	1132	45%	24%	2045
Kayes				45%	30%	1129				41%	19%	1311
Koulikor				43%	22%	925.6				41%	20%	963.5
Sikasso				50%	30%	263.8				46%	26%	510.7
Segou				37%	19%	154.4				36%	22%	465.5
Mopti				33%	6%	15.26				35%	24%	39.54
Tombouctou												
Gao												
Kidal												
<b>Residence</b>												
Urban	27%	14%	131	39%	18%	1013	29%	11%	391.6	31%	14%	1682
Rural	44%	25%	894	47%	26%	6191	40%	18%	3403	43%	22%	6732
<b>Sex</b>												
Male	43%	24%	513	47%	27%	3655	41%	19%	1947	42%	22%	4297
Female	40%	23%	513	44%	23%	3549	37%	16%	1847	39%	19%	4117
<b>Mother's education level</b>												
None	41%	23%	913	47%	26%	6327	41%	19%	3393	41%	21%	7433
Any formal education	41%	22%	112	36%	16%	877.3	25%	10%	401.1	32%	16%	981.6
<b>Age</b>												
0-11	18%	8%	287	19%	7%	1775	15%	5%	962.1	18%	9%	1838
12-23	45%	27%	170	52%	26%	1450	48%	20%	747.6	46%	22%	1843
24-35	55%	32%	193	60%	37%	1336	55%	26%	731.3	51%	27%	1579
36-47	54%	32%	211	58%	35%	1423	44%	22%	700	50%	26%	1560
48-59	46%	23%	164	47%	25%	1220	42%	21%	653.5	39%	21%	1595
<b>Wealth index quintiles</b>												
Poorest	52%	31%	314	49%	29%	1406	44%	23%	756.5	46%	26%	1644
2	37%	21%	193	49%	27%	1433	39%	18%	738.3	43%	22%	1676
3	42%	22%	192	47%	26%	1412	45%	19%	816.9	43%	23%	1791
4	33%	20%	160	45%	25%	1484	38%	17%	819	41%	18%	1692
Least Poor	34%	17%	164	38%	19%	1468	29%	12%	663.6	28%	13%	1612

**Table L5:** Prevalence of wasting among children 0-24 months of age by sub-groups of the population in the “high impact” districts and comparison area as measured by the 2001 and 2006-7 DHS, Mali

	2001 DHS						2006/2007 DHS					
	High Impact Districts			Geographic comparison area			High Impact Districts			Geographic comparison area		
	% wasting (< -2 SD)	% severely wasting (< -3 SD)	n	% wasting (< -2 SD)	% severely wasting (< -3 SD)	n	% wasting (< -2 SD)	% severely wasting (< -3 SD)	n	% wasting (< -2 SD)	% severely wasting (< -3 SD)	n
<b>Region</b>												
HID- Koulikoro	12%	3%	309	12%	3%	1328	15%	7%	1105	16%	5%	1593
HID - Segou	23%	11%	415	12%	3%	1351	12%	4%	1597	16%	7%	1531
HID - Mopti	11%	3%	350	11%	3%	2138	16%	6%	1153	16%	7%	2071
Kayes				12%	3%	1328	16%	5%		16%	6%	1320
Koulikoro				12%	4%	953.9	14%	5%		17%	6%	1071
Sikasso				18%	5%	271.2	17%	6%		17%	6%	516.2
Segou				20%	5%	157.2	17%	6%		17%	6%	470.1
Mopti				7%	3%	15.45	28%	9%		28%	9%	42.48
Tombouctou												
Gao												
Kidal												
<b>Residence</b>												
Urban	19%	10%	133	10%	3%	1033	19%	9%	394	15%	5%	1746
Rural	15%	6%	942	14%	4%	6379	14%	5%	3461	16%	6%	6869
<b>Sex</b>												
Male	18%	8%	542	13%	4%	3767	15%	6%	1983	17%	6%	4396
Female	13%	4%	532	13%	3%	3646	14%	5%	1871	15%	6%	4219
<b>Mother's education level</b>												
None	16%	7%	957	13%	4%	6510	15%	5%	3449	16%	6%	7607
Any formal education	11%	4%	117	13%	4%	902.5	15%	5%	406	15%	5%	1008
<b>Age</b>												
0-11	14%	4%	304	18%	6%	1851	26%	10%	1001	24%	10%	1924
12-23	25%	9%	185	19%	5%	1496	20%	8%	753	23%	9%	1870
24-35	18%	8%	203	10%	3%	1357	10%	3%	739	13%	4%	1640
36-47	11%	7%	218	7%	2%	1465	7%	2%	708	9%	4%	1583
48-59	12%	4%	165	8%	2%	1242	5%	1%	653	9%	2%	1598
<b>Wealth index quintiles</b>												
Poorest	16%	5%	324	14%	4%	1467	16%	5%	767	15%	6%	1675
2	17%	7%	202	14%	5%	1481	18%	6%	756	16%	6%	1707
3	17%	7%	203	13%	4%	1440	15%	4%	824	18%	7%	1813
4	14%	7%	167	12%	3%	1508	12%	6%	834	15%	5%	1755
Least Poor	16%	7%	174	12%	3%	1515	13%	5%	673	15%	6%	1666

**Table L6:** Prevalence of underweight among children 0-59 months of age by sub-groups of the population in the “high impact” districts and comparison area as measured by the 2001 and 2006-7 DHS, Mali

	2001 DHS						2006/2007 DHS					
	High Impact Districts			Geographic comparison area			High Impact Districts			Geographic comparison area		
	% underweight (< -2 SD)	% severely underweight (< -3 SD)	n	% underweight (< -2 SD)	% severely underweight (< -3 SD)	n	% underweight (< -2 SD)	% severely underweight (< -3 SD)	n	% underweight (< -2 SD)	% severely underweight (< -3 SD)	n
<b>Region</b>												
HID- Koulikor	28%	12%	314	28%	10%	1351	28%	10%	1351	23%	10%	1647
HID - Segou	28%	10%	439	29%	10%	1352	30%	11%	1598	30%	11%	1598
HID - Mopti	30%	14%	351	36%	13%	2166	32%	13%	2150	32%	13%	2150
Kayes				35%	15%	1221	29%	11%	1381	29%	11%	1381
Koulikor				32%	13%	962	30%	12%	1055	30%	12%	1055
Sikasso				35%	15%	289	34%	16%	538	34%	16%	538
Segou				33%	14%	157	30%	13%	496	30%	13%	496
Mopti				13%	7%	16	29%	13%	43	29%	13%	43
Tombouct												
Gao												
Kidal												
<b>Residence</b>												
Urban	21%	7%	146	22%	7%	1052	26%	11%	405	22%	9%	1785
Rural	30%	12%	958	34%	13%	6461	28%	10%	3510	31%	13%	7124
<b>Sex</b>												
Male	31%	13%	560	34%	13%	3823	30%	11%	2012	31%	13%	4554
Female	26%	10%	544	31%	12%	3690	26%	9%	1903	28%	11%	4355
<b>Mother's education level</b>												
None	29%	12%	983	34%	13%	6595	28%	10%	3504	30%	12%	7863
Any formal education	27%	8%	122	23%	8%	919	22%	9%	412	22%	9%	1046
<b>Age</b>												
0-11	19%	8%	314	22%	8%	1897	21%	7%	1023	20%	8%	2052
12-23	37%	19%	188	40%	16%	1517	35%	16%	767	36%	15%	1928
24-35	38%	16%	209	39%	18%	1373	34%	12%	741	33%	14%	1678
36-47	28%	12%	224	34%	12%	1478	26%	10%	726	32%	13%	1622
48-59	25%	6%	169	31%	9%	1248	23%	5%	660	27%	10%	1630
<b>Wealth index quintiles</b>												
Poorest	33%	16%	325	38%	16%	1481	33%	12%	788	35%	16%	1727
2	29%	10%	210	36%	14%	1503	29%	11%	764	31%	13%	1773
3	29%	12%	209	32%	13%	1472	28%	11%	836	31%	13%	1888
4	24%	9%	176	31%	10%	1523	25%	8%	846	28%	10%	1811
Least Poor	24%	10%	181	25%	9%	1533	22%	7%	681	20%	7%	1709

## APPENDIX M

### Tables presenting additional equity analyses

**Table M1:** Selected coverage indicators by wealth quintile, and concentration indices, in the “high impact” districts and comparison area as measured by 2001 and 2006-7 DHS, Mali.

ACSD coverage indicator	2001 DHS					2006/7 DHS				
	High Impact Districts		Geographic comparison area**		p	High Impact Districts		Geographic comparison area**		p
	n	%	n	%		n	%	n	%	
<b>Any measles Innoculation (12-23m)</b>										
Wealth Index Quintiles										
Poorest	59	30.5%	317	36.3%		149	69.1%	379	59.1%	
2	41	30.7%	298	34.9%		160	72.3%	362	65.5%	
3	46	37.0%	348	44.4%		169	69.0%	437	65.8%	
4	26	54.6%	355	52.1%		166	75.8%	397	73.9%	
Least Poor	34	56.2%	351	63.3%		135	83.9%	407	74.9%	
Total	205		1670			779		1983		
Concentration Index - SE	0.133	0.050	0.114	0.015	0.71	0.037	0.012	0.062	0.008	0.10
<b>ITN use for under five children</b>										
Wealth Index Quintiles										
Poorest						894	21.6%	2054	24.6%	
2						839	30.1%	2048	29.4%	
3						909	31.4%	2202	27.5%	
4						934	34.2%	1997	32.8%	
Least Poor						759	44.4%	1983	37.0%	
Total						4335		10284		
Concentration Index - SE						0.129	0.012	0.074	0.009	0.00
<b>Vitamin A supplementation of children (6-59m)</b>										
Wealth Index Quintiles										
Poorest	302	18.0%	1426	29.5%		700	72.3%	1605	63.7%	
2	194	35.8%	1398	39.4%		681	70.9%	1631	72.2%	
3	207	36.1%	1389	43.5%		764	76.9%	1781	73.8%	
4	170	43.2%	1432	46.2%		763	78.4%	1645	71.1%	
Least Poor	169	54.7%	1464	48.9%		631	86.8%	1568	82.3%	
Total	1041		7109			3539		8230		
Concentration Index - SE	0.168	0.026	0.104	0.009	0.02	0.043	0.005	0.069	0.004	0.00
<b>ORT for diarrhea</b>										
Wealth Index Quintiles										
Poorest	89	30.6%	375	37.3%		85	30.8%	245	32.6%	
2	39	28.1%	342	40.5%		126	47.1%	257	32.6%	
3	46	45.9%	331	43.9%		137	47.7%	309	36.1%	
4	24	57.9%	327	56.7%		121	49.3%	288	36.6%	
Least Poor	25	57.8%	264	52.7%		89	49.0%	196	46.9%	
Total	223		1639			557		1296		
Concentration Index - SE	0.1578	0.0504	0.0731	0.0157	0.02	0.072	0.025	0.044	0.020	0.39
<b>Skilled birth attendant: doctor or nurse/midwife</b>										
Wealth Index Quintiles										
Poorest	122.6	4%	434.9	2%		215.3	5%	469	7%	
2	80.34	13%	490.9	6%		220.8	11%	454	12%	
3	64.35	16%	440.6	10%		232.7	6%	482.9	16%	
4	59.67	21%	421.7	18%		235.3	14%	466.7	21%	
Least Poor	52.26	33%	466.6	40%		199.6	35%	391.1	45%	
Total	379		2255			1104		2264		
Concentration Index - SE	0.273	0.070	0.387	0.029	0.13	0.348	0.047	0.352	0.023	0.39
<b>3+ visits ANC care</b>										
Wealth Index Quintiles										
Poorest	120	10.3%	421	20.2%		212	46.9%	467	26.5%	
2	80	22.1%	471	26.1%		220	45.0%	448	41.0%	
3	63	31.3%	434	32.2%		233	48.5%	482	51.1%	
4	55	34.9%	412	40.5%		234	53.9%	457	54.7%	
Least Poor	52	48.1%	441	59.8%		196	64.5%	383	75.7%	
Total	372		2179			1093		2236		
Concentration Index - SE	0.2671	0.0502	0.2195	0.0154	0.36	0.062	0.017	0.185	0.010	0.00

**Table M2:** Selected impact indicators by wealth quintile, and concentration indices, in the “high impact” districts and comparison area as measured by 2001 and 2006-7 DHS, Mali.

ACSD Impact measure	Baseline					Endline				
	High Impact Districts		Geographic comparison area**		p	High Impact Districts		Geographic comparison area**		p
	n	%	n	%		n	%	n	%	
<b>Moderate stunting (24-59m)</b>									51	
Wealth Index Quintiles										
Poorest	167	68.3%	794	60.5%		432	53.5%	928	54.1%	
2	97	53.8%	794	61.0%		386	47.4%	987	51.2%	
3	107	52.4%	767	54.2%		450	51.8%	980	49.1%	
4	93	39.6%	838	54.5%		454	47.3%	935	47.4%	
Least Poor	101	38.1%	786	45.1%		364	34.0%	905	30.3%	
Total	565		3978			2085		4734		
Concentration Index - SE	-0.049	0.047	-0.020	0.014	0.36	-0.066	0.021	-0.059	0.013	0.39
<b>Under-five mortality (group level data)</b>	<b>births</b>	<b>U5MR</b>	<b>births</b>	<b>U5MR</b>		<b>births</b>	<b>U5MR</b>	<b>births</b>	<b>U5MR</b>	
Wealth Index Quintiles										
Poorest	701.8	255.8	1530	240.8		625.2	191.8	1399	183.8	
2	671.7	252.7	1588	271.2		676.8	203.4	1407	186.7	
3	711.6	289.0	1734	241.4		719.4	210.5	1519	166.6	
4	682	268.0	1482	250.1		714.5	200.1	1416	182.4	
Least Poor	486.9	223.0	1422	236.5		579	175.0	1327	141.5	
Concentration Index - SE	-0.009	0.025	-0.009	0.012	0.98	-0.013	0.020	-0.040	0.024	0.46

**Table M3:** Selected child health coverage indicators by gender in the “high impact” districts and comparison area as measured by 2001 and 2006-7 DHS, Mali.

COVERAGE or NUTRITIONAL INDICATOR	AREA	DHS 2001					p	DHS 2006/2007					p
		TOTAL	Male	Female	%	n		TOTAL	Male	Female	%	n	
Any measles inoculation (12-23m)	HIDs	39.3%	34.6%	45.4%	116	90	0.19	68.0%	70.8%	65.0%	1036	948	0.05
	Comparison	46.8%	49.0%	44.7%	834	836	0.14	73.7%	74.6%	72.9%	383	396	0.58
ITN use for under five children	HIDs							32.0%	32.4%	31.6%	2211	2124	0.62
	Comparison							30.2%	29.9%	30.4%	5249	5037	0.64
Vitamin A supplementation of children (6-59m)	HIDs	34.9%	32.4%	37.2%	511	534	0.21	76.9%	75.7%	78.2%	1804	1735	0.10
	Comparison	41.5%	42.4%	40.6%	3605	3506	0.24	72.6%	72.3%	72.9%	4206	4026	0.74
ORT for diarrhea	HIDs	39.0%	39.3%	38.7%	120	105	0.94	45.6%	48.9%	42.1%	282	275	0.09
	Comparison	45.7%	43.6%	47.9%	852	788	0.08	36.5%	36.6%	36.4%	674	622	0.96
Moderate & severe stunting (24-59m)	HIDs	52.4%	53.7%	51.2%	269	298	0.55	47.2%	50.3%	44.1%	1064	1021	0.02
	Comparison	55.1%	56.4%	53.8%	2036	1943	0.19	46.6%	47.1%	46.0%	2409	2325	0.50
<b>MORTALITY</b>	<b>AREA</b>	<b>U5MR</b>	<b>U5MR</b>	<b>U5MR</b>	<b>Births</b>	<b>Births</b>	<b>U5MR</b>	<b>U5MR</b>	<b>U5MR</b>	<b>Births</b>	<b>Births</b>	<b>U5MR</b>	<b>Births</b>
Under-five mortality	HIDs	259.5	278.2	240.4	1610	1644		197.2	196.5	197.8	1692	1623	
	Comparison	248.3	265.2	230.0	4039	3718		172.3	169.9	174.7	3686	3386	

**Table M4:** Selected child health coverage indicators by urban/rural in the “high impact” districts and comparison area as measured by 2001 and 2006-7 DHS, Mali.

COVERAGE or NUTRITIONAL INDICATOR	AREA	DHS 2001						DHS 2006/2007									
		URBAN			RURAL			URBAN			RURAL						
		%	n	p	%	n	p	%	n	p	%	n	p				
Any measles Inoculation (12-23m)	HIDs	39.4%	22	0.00	[72.7%]	186	0.00	84.3%	88	73.7%	691	0.09	73.7%	88	72.4%	691	
	Comparison	46.8%	242	0.00	43.8%	1428	0.00	73.4%	416	68.0%	1568	0.48	68.0%	416	66.5%	1568	
ITN use for under five children	HIDs							46.7%	450	32.0%	3886	0.00	46.7%	450	30.3%	3886	
	Comparison							30.0%	2118	30.2%	8167	0.95	30.2%	2118	30.2%	8167	
Vitamin A supplementation of children (6-59m)	HIDs	34.9%	138	0.00	30.2%	906	0.00	81.3%	389	76.9%	3150	0.24	81.3%	389	76.4%	3150	
	Comparison	41.5%	957	0.00	38.9%	6155	0.00	78.6%	1669	72.6%	6563	0.08	78.6%	1669	71.1%	6563	
ORT for diarrhea	HIDs	n too small						48.2%	49	45.6%	509	0.73	48.2%	49	45.3%	509	
	Comparison	45.7%	152	0.08	44.6%	1488	0.08	36.9%	187	36.5%	1109	0.95	36.5%	187	36.4%	1109	
Skilled birth attendant: doctor or nurse/midwife	HIDs	14.5%	44.63	0.00	7.6%	335.8	0.00	57.2%	11420.0%	13.8%	989.5	0.00	57.2%	11420.0%	8.7%	989.5	
	Comparison	15.3%	315.8	0.00	7.8%	1940	0.00	55.1%	423	19.5%	1841	0.00	55.1%	423	11.4%	1841	
3+ visits ANC care	HIDs	25.4%	45	0.00	22.2%	328	0.00	61.0%	112	51.5%	981	0.09	61.0%	112	50.4%	981	
	Comparison	35.7%	302	0.00	31.0%	1879	0.00	71.0%	413	48.9%	1823	0.00	71.0%	413	43.9%	1823	
Moderate & severe stunting (24-59m)	HIDs	52.4%	79	0.00	55.4%	489	0.00	35.4%	209	47.2%	1876	0.01	35.4%	209	48.6%	1876	
	Comparison	55.1%	543	0.02	56.5%	3436	0.02	33.0%	973	46.6%	3762	0.00	33.0%	973	50.1%	3762	
MORTALITY	AREA	U5MR	Births	U5MR	Births	U5MR	Births	U5MR	Births	U5MR	Births	U5MR	Births	U5MR	Births	U5MR	Births
	HIDs	260	333.8	264	2920	264	2920	132	345	197.2	2970	204	345	204	2970	204	2970
Under-five mortality	Comparison	248	1489	255	6268	255	6268	135	1430	172.3	5642	182	1430	182	5642	182	5642

**NOTE:** [unweighted - based on less than 50 cases]

**Table M5:** Selected child health coverage indicators by ethnicity in the “high impact” districts and comparison area as measured by 2001 and 2006-7 DHS, Mali.

INDICATOR	AREA	DHS 2001												p
		Bambara		Peulh		Sarkole		Dogon		Other				
		%	n	%	n	%	n	%	n	%	n			
<b>TOTAL</b>														
Any measles Inoculation (12-23m)	HIDs	39.6%	86	[45.4%]	26	[42.3%]	26	[46.2%]	26	[22.2%]	27	[33.3%]	42	0.21
	Comparison	46.8%	637	50.6%	198.1	39.5%	202.1	51.4%	202.1	21.6%	91.41	47.5%	526	0.04
ITN use for under five children	HIDs													
	Comparison													
Vitamin A supplementation of	HIDs	34.7%	389	43.4%	109.7	36.1%	114.5	40.2%	114.5	12.8%	203.9	36.3%	214.6	0.01
	Comparison	41.3%	2366	47.2%	962	43.1%	845.1	48.9%	845.1	23.8%	393.4	35.2%	2462	0.00
ORT for diarrhea	HIDs	41.2%	106	[43.4%]	25	[36%]	35	[37.1%]	35	[36.4%]	33	[47.1%]	34	0.82
	Comparison	45.7%	469	47.0%	232.9	39.6%	197.6	49.2%	197.6	34.4%	90.17	47.5%	641.8	0.35
Skilled birth attendant: doctor or nurse/midwife	HIDs	12.7	167	[10.2%]	37	[10.8%]	43	[20.9%]	43	[10.2%]	59	[17.2%]	64	0.26
	Comparison	0.1483	692.1	0.1196	291.4	0.1525	273.9	0.2106	273.9	0.039	157.8	0.1718	804.1	0.0248
3+ visits ANC care	HIDs	26.3%	162	[27.2%]	36	[16.7%]	42	[38.1%]	42	[20.7%]	58	[27%]	63	0.22
	Comparison	35.3%	665	32.8%	269.1	28.9%	272.8	36.2%	272.8	21.9%	157.8	41.9%	779.9	0.05
Moderate & Severe Stunting (24-59m)	HIDs	52.0%	227	49.2%	53.77	58.6%	62.99	55.3%	62.99	72.6%	107.6	32.3%	109.4	0.00
	Comparison	55.0%	1349	56.5%	526	58.4%	498.3	48.5%	498.3	61.8%	204.9	53.4%	1357	0.08
INDICATOR	AREA	DHS 2006/2007												p
		Bambara		Peulh		Sarkole		Dogon		Other				
		%	n	%	n	%	n	%	n	%	n			
<b>TOTAL</b>														
Any measles Inoculation (12-23m)	HIDs	73.7%	292	72.5%	67	56.5%	107	73.5%	107	83.5%	144	74.5%	170	0.04
	Comparison	68.0%	568	73.2%	264	64.1%	243	63.8%	243	75.9%	95	65.9%	813	0.19
ITN use for under five children	HIDs													
	Comparison													
Vitamin A supplementation of	HIDs	76.9%	1352	77.9%	328	75.1%	423	79.3%	423	73.5%	666	77.6%	770	0.80
	Comparison	72.6%	2330	74.4%	1212	69.4%	972	75.3%	972	68.1%	400	72.3%	3314	0.44
ORT for diarrhea	HIDs	45.6%	242	45.9%	54	48.8%	81	52.8%	81	29.1%	52	45.6%	128	0.27
	Comparison	36.5%	324	36.1%	237	34.2%	174	45.6%	174	39.3%	43	34.5%	518	0.45
Skilled birth attendant: doctor or nurse/midwife	HIDs	14%	448	13%	94	13.2%	141	33.3%	141	6.0%	181	10.5%	240	0.00
	Comparison	20%	611	19%	390	20.7%	267	15.8%	267	11.2%	109	21.7%	886	0.31
3+ visits ANC care	HIDs	51.5%	442	55.2%	92	56.3%	138	53.6%	138	50.6%	181	42.2%	240	0.20
	Comparison	48.9%	612	53.7%	380	41.8%	260	54.3%	260	41.6%	108	47.9%	877	0.10
Moderate & Severe Stunting (24-59m)	HIDs	47.2%	818	46.6%	177	40.8%	234	43.1%	234	55.9%	411	45.3%	444	0.01
	Comparison	46.6%	1358	48.6%	702	49.6%	541	42.5%	541	52.5%	196	44.6%	1935	0.14

**NOTE:** [unweighted - based on less than 50 cases]

## APPENDIX M

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## APPENDIX O

### Annotated list of documents reviewed for ACSD retrospective evaluation

Available upon request.