ACCELERATING CHILD SURVIVAL AND DEVELOPMENT (ACSD)

Final Report
The Retrospective Evaluation of ACSD: Benin

APPENDICES

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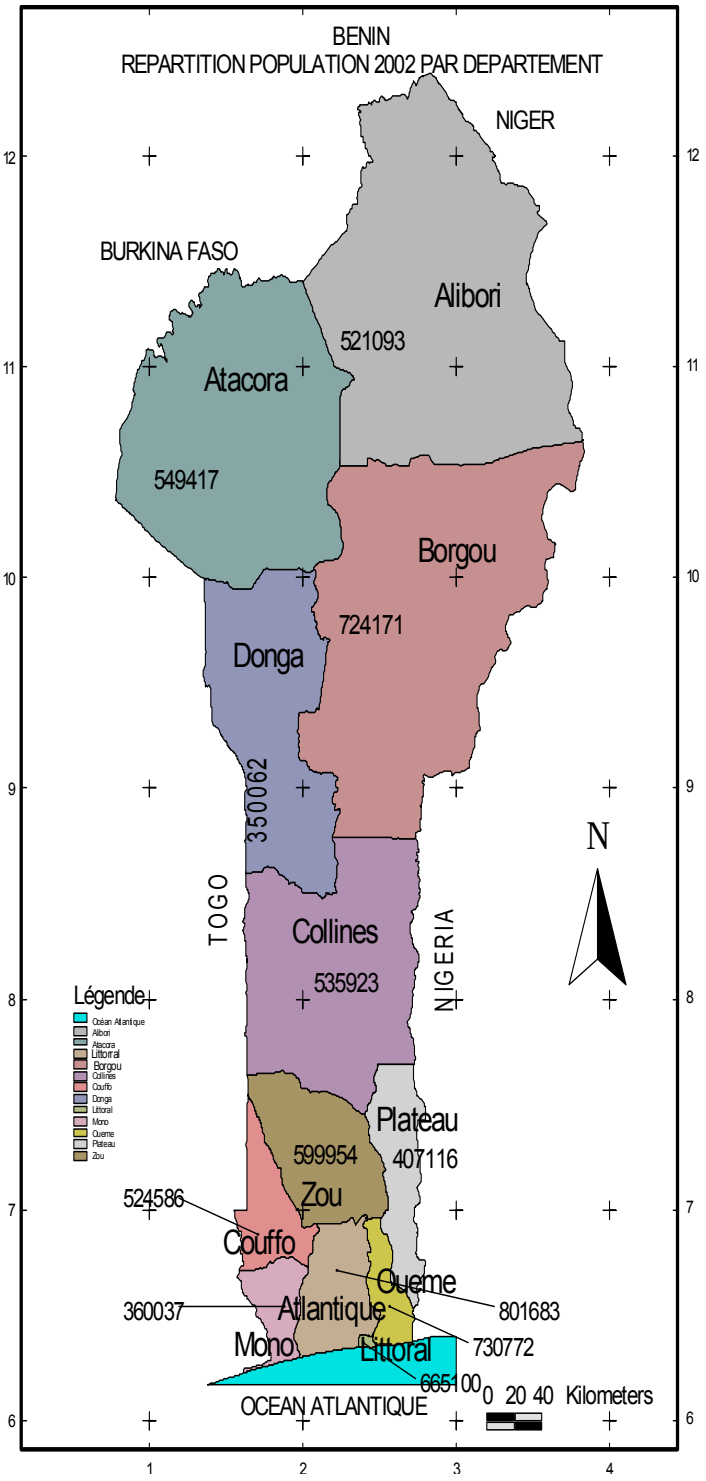
APPENDIX A

Description of Benin and "high-impact" health zones

Located in West Africa, the Benin Republic covers a surface of 114,763 square kilometers. It is bordered in the north by Burkina Faso and Niger, in the east by Nigeria, in the west by Togo and in the south by the Atlantic Ocean with a coastline spanning 120 kilometers. Geographically, Benin is made up of a sandy coastal band in the south, with the two plateau zones of the Atacora in the north where all of Benin's rivers originate.

Figure A1: Map of regions, Benin



Administratively, Benin is made up of 12 departments established since January 15, 1999: Atacora, Donga, Borgou, Alibori, Atlantic, Littoral, Mono, Couffo, Oueme, Plateau, Zou and Collines. These departments are divided into 77 communes, including 3 with particular status: Cotonou, Porto-Novo and Parakou. These communes are subdivided in 546 *arrondissements* comprised of villages and neighborhoods in towns. The Beninese population is characterized by a plurality of ethnic groups and languages, and contains about fifty ethnic groups.

The informal sector continues to develop in the country: according to the third general Population and Housing Census of February 2002 (RGPH3), 95% of people are employed in the informal sector. The secondary sector contributes for 13% to the Gross Domestic Product (GDP) with 35% for the primary sector and 52% for the tertiary sector. The process of administrative decentralization, aimed at promoting community lead development is currently underway.

In the last twenty three years, the population of Benin has doubled in size, growing from 3,331,210 in 1979 to 6,769,914 inhabitants in 2002; a population growth rate of 3.25% between the 1992 and 2002 censuses[1]. This growth rate is very high compared to the average growth rate of other

similarly developed countries. The population is 51.4% female, with 46% of women in reproductive age (15-49 years), with 3.5% of the population under twelve moths and 17.4% under five years of age. With 46.8% of the population under 15 years of age, the Beninese population is very young. Figure 1 depicts the population distribution by department in 2002[1].

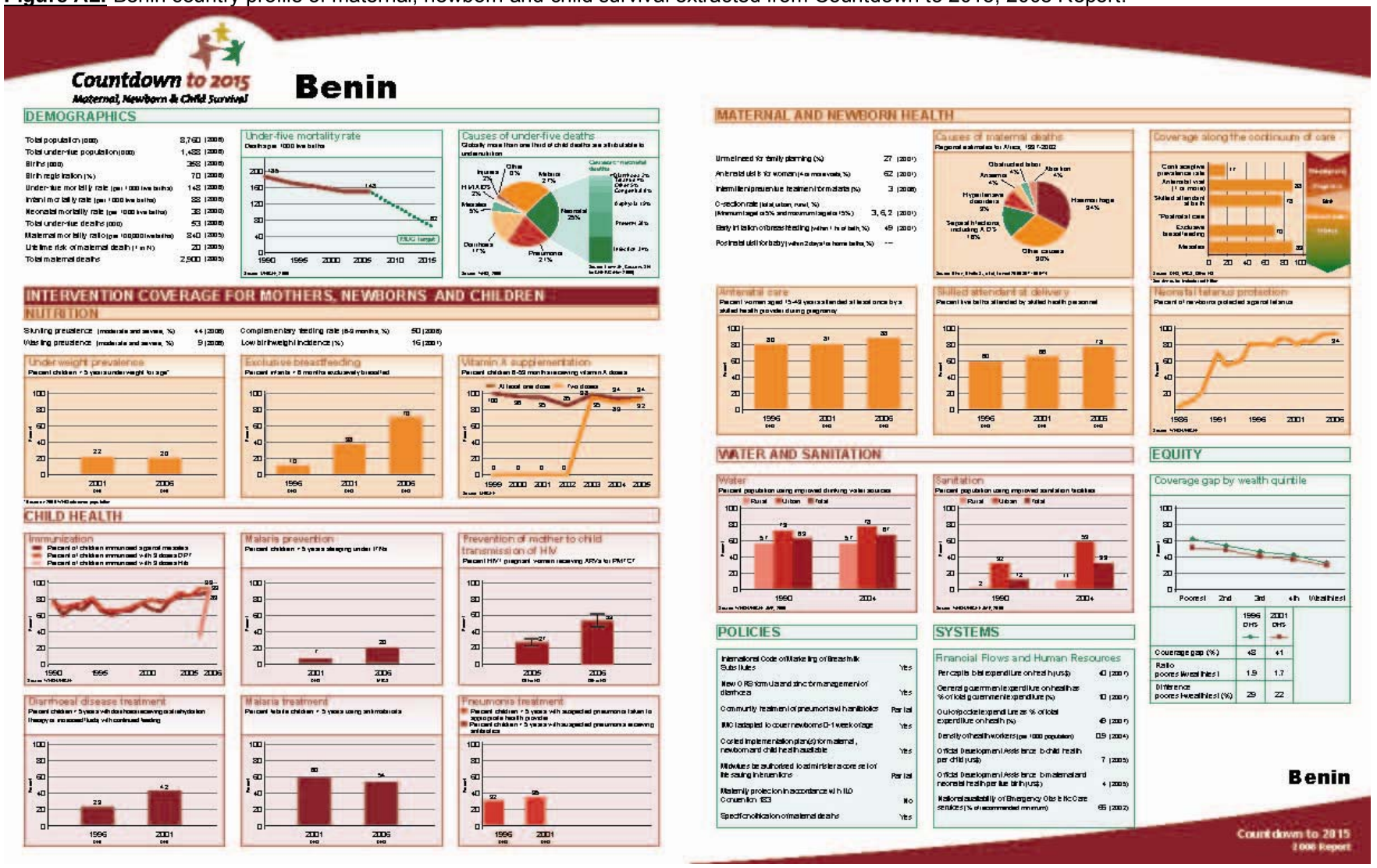
Cultural and educational aspects

The population of Benin is characterized by a plurality of ethnic groups and languages; approximately fifty ethnics groups exist, but French remains the working language. For most of Benin, access to school has notably progressed during the past ten years, however recently it has become relatively stagnated. From 2003-2004 to 2005-2006, the gross schooling in primary education changed from 96.4%, with boys at 108% and girls 84.3%, to 95.6%, with boys at 104.8% and girls 86.1 %. The rate of completion of primary education has increased from 37% in 1998-1999, with boys at 51% and girls 24%, to 54% in 2004-2005, with girls at 42%. The proportion of school aged children aged 6-14 is currently 56.2% as of 2006.

Health situation in Benin

Since 1996, the population has been characterized with a high fertility rate, at approximately 6.3 children per woman. Fertility has since decreased, but remains relatively high, estimated at 5.6 children per woman in 2001 and 5.7 children per woman in 2006. Like other developing countries, Benin is characterized by high child mortality rates; however, the estimated IMR decreased from 83 per 1000 live births in 1991-1996 to 67 per 1000 live births in 2001-2006, and the U5MR decreased from 151 per 1000 population to 125 per 1000 population for the same period.[2] The maternal mortality ratio, estimated at 498 per 100.000 live births in 1996 has remained stable and was estimated at 474 per 100.000 live births in 2002. According to the Expanded Programme of Immunization (EPI), all children should receive all vaccinations before their first birthday. In 1996, 49% of the 12-23 month old children were fully immunized; however 15% of children in this age group did not receive any vaccinations. In 2001, 59% of 12-23 month old children were fully vaccinated and 7% of children did not receive any vaccinations. In 2006, the rates were 47% were fully immunized and 7% did not receive any vaccinations. According to the MOH 2005 routine health information system data, the most frequent child consultations were for malaria (41%), acute respiratory infections ARI (20%) and diarrheal diseases (8%). Case fatality rates for malaria are relatively high among children. Figure A2 presents the overall profile of child, neonatal and maternal health from the most recent *Countdown to 2015 report.*[3]

Figure A2: Benin country profile of maternal, newborn and child survival extracted from Countdown to 2015, 2008 Report.[3]



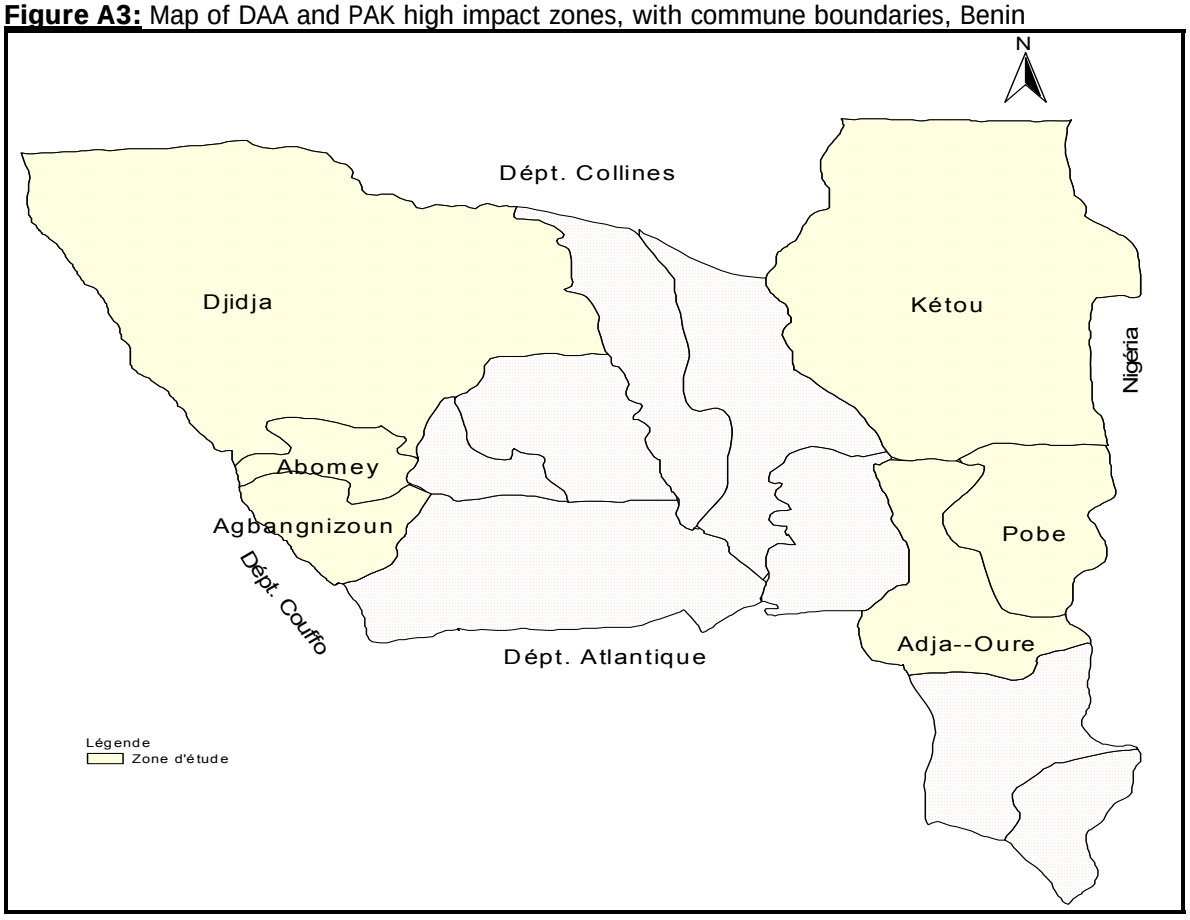
Context of DAA and PAK health districts

Demographic characteristics of DAA and PAK.

DAA

The health district of Djidja-Abomey-Agbangnizoun occupies the Western North of the Zou department. It is bordered in the west by Togo and the health district of Aplahoue-Djakotomey-Dogbo (Couffo department); in the north, by the health district of Savalou Bante (Collines departement); in the east by the health district of Cove Zangnanado-Ouinhi; and in the south by the health district of Bohicon-Zogbodomey-Zakpota (Zou department). The distance from Cotonou to Abomey is approximately 135 km. The geography presents obstacles to communication within the health district, in particular in Djidja (e.g. rock outcroppings subdividing the district of Setto). On the administrative level, DAA is comprised of 29 sub-levels ("arrondissements") distributed as follows: Djidja (12), Abomey (7) and Agbangnizoun (10). In 2002, DAA was estimated to have a population of 217,932 inhabitants of which 39% resided in Djidja, 36% in Abomey and 25% in Agbangnizoun[1]. Population growth is estimated at an annual rate of 2.4% compared to 3.3% at the national level. The DAA health zone comprises 77% of the population of the Zou department and 40% of the population of Zou/Collines departments. DAA extends 69 km from west to east, and 72 km from north to south; it covers a surface area of 2,570 km^2, which is 13% of the total area of Zou/Collines and 49% of Zou department. Djidja accounts for 85% surface area of DAA while Abomey accounts for 5.5% and Agbangnizoun for 9.5%.

Figure A3: Map of DAA and PAK high impact zones, with commune boundaries, Benin



The population density of DAA is approximately 85 inhabitants per km^2, of which Abomey is 552 inhabitants per km^2, Agbangnizoun 225 inhabitants per km^2, and Djidja 39 inhabitants per km^2. Djidja is a zone of high migration, with men leaving to search for employment in the bordering districts or elsewhere. In Djidja, development activities are few and the zone is sparsely populated, strongly isolated, and access is difficult, especially during the rainy season when several villages remain inaccessible and roads unsecure.

PAK

The PAK health district is composed of the districts of Pobè, Adja-Ouèrè and Kétou. In 2002, the population was estimated at 264,906 inhabitants, with 38% of the population in Kétou, 31% in Pobè and 31% in Adja-Ouèrè, and an estimated annual growth rate of 4.1%. PAK accounts for 16% of the population of the department of the Plateau and 45% of the departments of Ouémé/Plateau. The current population in PAK came primarily from migration from Ife and Oyo in Nigeria. This population is made up predominantly (68%) of the Yoruba ethnic group and related ethnic groups, such as Nago. The Protestant religion is most dominant within the health district. On the administrative level, PAK is comprised of 17 sub-levels ("arrondissements") distributed as follows: Pobè (5), Adja-Ouèrè (6) and Kétou (6). The area of PAK covers 2,202 km^2, and accounts for 48% of the total surface of Ouémé/Plateau and 67% of the Plateau department. Kétou accounts for 55% of the surface of the PAK health district, while Pobè accounts for 12% and Adja-Ouèrè for 13%. Population density of the PAK zone is estimated at approximately 83 inhabitants per km^2; 207 inhabitants/km^2 in Pobè, 196 inhabitants/km^2 in Adja-Ouèrè, and 57 inhabitants/km^2 in Kétou.

The health district is located in the Plateau department and is limited in the north by the communes of Savè and Dassa, both in the Collines department, in the east by Nigeria, and in the west by the Zou department (districts of Zangnanado and Ouinhi) and Ouémé department (district of Bonou). Ketou is located approximately 138 km from Cotonou.

Table A1: Demographic and administrative features of PAK and DAA and comparison areas, Benin

CHARACTERISTICS	ACSD HI ZONES		COMPARISON AREA
	DAA	PAK	REST OF BENIN MINUS COTONOU & HIZS
Population 2002[1] (to nearest 1000)	217,000	265,000	5,574,000
Area (km^2)	2,570	2,202	109,912
Population density /km^2	85	83	51
Estimated population growth rate	2.39%	4.13%	3.25%*
Primary ethnic/language group(s)	Fon	Yoruba Nago	Fon Yoruba Nago
Number of Communes	3	3	70
Number of *arrondissements*	29	17	487

*National level data, not excluding high impact zones or Cotonou

Environmental characteristics of DAA and PAK.

DAA

DAA has a transitional climate between the subequatorial, tropical wet climate and the Sudano-Guinean climate of northern Benin. The subequatorial climate in the south of Benin is characterized by two rainy seasons, from April to June, and September to October, and by two dry seasons. The

semi-arid tropical climate of the north is characterized by one relatively long dry season from November to May, accompanied by the dry winds of the *harmattan,* and by one relatively long rainy season from June to October. Annual rainfall in DAA varies between 900 and 1200 millimeters. The vegetation is dominated by natural palm plantations and grass lands, with small areas of classified forests. Soils in this zone are "terres de barre" or the ferralitic type argilo-sandy and are highly degraded but well drained, with a low water holding capacity. On the plateau of Abomey, soils are the highly prized prairies. The zone is transected by 293 kilometers of rivers originating from the Couffo basin. During the rainy season, in the districts of Agbangnizoun and especially of Djidja, ponds and pools of water block the access of certain villages and hamlets from health services, supply chains, supervision of health centres and medical evacuations. The climatic, hydrographic, telluric and ecological characteristics of the zone, combined with the essentially agro-pastoral human activities, create favorable conditions for many vectors/reservoirs, such as snails, flies, mosquitoes, rats, monkeys. This maintains the endemicity or periodic and seasonal outbreaks of infectious and parasitic diseases like: cholera, dracunculosis, onchocercosis, malaria, yellow fever, and meningitis). Djidja is one of the most strongly endemic zone of dracunculosis in Benin*.

PAK

The climate in PAK is of Sudano-Guinean type (i.e. two rainy seasons) with the annual rainfall ranging between 1000 and 1400 millimeters. The vegetation is comprised of raised/shrubby savanna and the semi-deciduous dense forest. The geography of PAK is characterized by the plateau of Kétou, the valley of Issaba and the plateau of Pobè. Several types of soil are found in PAK: the ferruginous tropical ones, the "terres de barre" on the "continental terminal profound" and the very argillaceous and humus-bearing fertile soils, but these are often very difficult to work with rudimentary tools. This health district is irrigated by the Ouémé River and its tributaries.

Table A2: Environmental characteristics of PAK and DAA and comparison areas, Benin

Characteristics	ACSD HI zones		Comparison Area
	DAA	PAK	Rest of Benin minus Cotonou & HIZs
Climate	Transitional between tropical wet & semi-arid tropical	Semi-arid tropical	Tropical wet, Semi-arid tropical
Main Geographic Characteristics	Palm plantations Grasslands	Savanna & the semi-deciduous forest	Palm plantations Grasslands; Savanna & the semi-deciduous forest; Sahel
Annual rainfall (mm)	900-1200	1000-1400	900-1500
Months of malaria transmission[4]	8-9 months/year	8-9 months/year	5-9 months/year, with shortening season in north

* Case decrease from 85% of Guinea Worm cases registered in Benin in Zou/Collines (27% in Djidja) in 1998, to 64% and 26% respectively in 2000, 0.02% % in 2002, and 0 % since 2003, for Zou/Collines and Djidja.

Economic aspects of DAA and PAK.

DAA
Agriculture is the dominant economic activity in DAA and accounts for approximately 47%, followed by 29% trade activities. The retail trade is dominated by women and based on distribution of foodstuffs.

The principal food crops are corn, yam, cassava, and beans, with export products of cotton, groundnut, cabbage, and palm products, such as palm oil. A study on the living conditions of rural households carried out in 1999-2000 showed that in the Zou/Collines department, the proportion of poor households with more than 6 people is high (52.5%). The proportion of vulnerable[†] households having more than 6 people is 59.8%. The proportion of non working people in charge of the household is higher in poor households (54%) and vulnerable (50%) that in non poor households (48%). In the department, as in the whole of Benin, the number of non working people in a household is about the same than the number of active people. The average population size of a rural household in Zou is of 7 people, varying from 5 people in non-poor households to 8 people in poor households. The results of the 1st EMICOV[‡] survey in 2006 showed that the average annual expenditure per household in Zou counts for 56% of those of the national level and the average annual expenditure per capita is 62% of those of the national level. The structure of this expenditure shows that the households of Zou spend approximately 50% their expenditure in food items compared to 41% at the national level, and less than a third in the Littoral department (Cotonou). However it is known that the more the household devotes its expenditure to food, the more impoverished it is. In this expenditure structure, health items occupy only 14% and education 1.3%. Incidence of the monetary poverty is estimated at 37.5% in DAA (Abomey 37.7%, Agbangnizoun 34.0% and Djidja 39.9%), mirroring 37.4% at the national level.

PAK
A study carried out in 2000 on the living conditions of rural households showed that in the Plateau department, the proportion of non-working people in the charge of active people in the household is higher in the non-poor households (46%), than in the vulnerable (43%) and in poor households (41%). The average size of the rural household in the Plateau is about 5 people, varying from 5 in the non poor to 6 in the poor households. The results of the 1st passage of EMICOV in 2006 shows that the average annual expenditure per household in the Plateau accounts for 63% of those of the national level and the average annual expenditure per capita, 70% of those of the national level. The structure of this expenditure shows that the households of the Plateau spend approximately 50% of their expenditure in food items, compared to 41% at the national level, and less of the third in the Littoral department. In this expenditure structure, health items occupy only 4% and education 1%. The incidence of monetary poverty in Plateau department is 40.2%, with Adja-Ouèrè at 38.39%, Pobè 42.4% and Kétou 41.2%, one of the third highest incidences, after Alibori 42.97% and Couffo 40.56%.

***Cultural and educational aspects of DAA and PAK*.**

DAA
The population of DAA is mainly composed of the Fon ethnic group. Apart from the agglomeration of Abomey, the population of DAA lives in general with average material conditions and are strongly attached to their traditions. In the whole Zou department, access to school notably progressed during the ten last years and from 2003-2004 to 2005-2006, the gross schooling rate in primary education went from 101.90% for Zou/Collines (boys: 116.66 %; girls: 86.89%) to 104.06 % in Zou (boys:

[†] Considered as non poor household of which average real expenditures are between 100 and 150% of poverty line concerned;
[‡] EMICOV : Integrated modular survey on the living conditions of households with 4 passages in the year (1st passage made in 2006, simultaneously with 2006 DHS). Incidence of monetary poverty is measured by the level of expenditures per capita compared to a poverty line.

119.58%, girls: 88.99%), and to 95.07% for the Collines department (boys: 103.79%, girls: 86.02 %). A basic inquiry in 2004 showed that the gross school attendance rate was 100% and the net rate was 67%. It should be noted, however that the schooling of younger generation has improved considerably. The proportion of the 6-14 years olds currently at school was 58.6% for Zou in 2006; it is higher in Abomey and Agbangnizoun, respectively at 70% and 67%, whereas it is particularly weak in Djidja (39%).

PAK
The population of PAK is mainly composed of the Yoruba and the related Nago, followed by Fon ethnic groups. The population of PAK lives in general under average material conditions and is strongly attached to their traditions. For the whole Plateau department, access to school notably progressed during the ten last years and from 2003-2004 to 2005-2006, the gross schooling rate (TBS) in primary education passed from 107.06% for Oueme/Plateau departments (boys: 124.63 %; girls: 89.34%) to 88.45% in the only Plateau, boys: 104.22% and girls 72.92 %, and to 111.02% for Oueme (boys 124.19 %, girls: 97.86 %).

A 2004 basic survey showed that the gross school attendance rate was 77% and the net rate 53%. The proportion of the 6-14 years olds currently in school was 51.4% for the Plateau in 2006; these proportions are the lowest in Pobè and Kétou (respectively 46% and 48%) whereas it is higher than the average in Adja-Ouèrè (56%).

Health context of DAA and PAK.

DAA
DAA consists of three districts: Djidja, Abomey and Agbangnizoun, which are part of the Zou/Collines department[§]. From 1996 and 2001, it can be assumed that these three communes had a health situation similar to that observed in this department. On this basis, the population of DAA would thus be characterized by a high level of fertility similar to that of the Zou/Collines department: an estimated 6.5 children per woman in 1996 and 6.1 children per woman in 2001. After the territorial reform of decentralization, DAA is part of the new Zou department which comprises 9 health zones. Data is not available at the level of health zone; however, the Zou/Collines departments have high child mortality rates. The IMR in Zou/Collines departments was estimated at 102 per 1000 live births for 1986-1996, which placed it in 4th position of the highest quotients of mortality, after Atacora/Donga, Borgou/Alibori and Mono/Couffo, and U5MR at 202 per 1000 population, the highest rate of mortality after Atacora/Donga 203 per 1000 population. From 1991-2001, these rates were estimated at respectively 120 and 190 per 1000 population, the highest rates of all the departments.

Immunization coverage in Zou/Collines was estimated at 58% of 12-23 month old children were fully immunized compared to 8% children who did not receive any vaccinations in 1996. This increased to 68% and 4.5% in 2001; and in 2006, for the new Zou department, the coverage rates were 44% and 3.5% respectively. This immunization coverage must be interpreted with caution, as the Zou-Collines department in 1996 and 2001 may not be comparable to the 2006 level in Zou department. A survey carried out in 2004 showed that 28% of 15-49 year old women were pregnant or already had a child. Among these women, the median age of first pregnancy was 19 years. In the 15 days preceding the 2004 survey, 24% of children under five had reported fever, including 44% with at least one sign of severity; 12% had reported diarrhoea including 55% with at least one sign of severity; 33% of children had reported symptoms of ARI.

PAK
The 3 districts of PAK (Pobè, Adja-Ouèrè and Kétou) have a health situation considered as similar to that observed in the departments of Ouémé/Plateau. Ouémé/Plateau department, including PAK, is characterized by a high level of fertility, although a slight decline is ongoing: 5.9 children per woman

[§] (in the past called Zou, made up of 15 communes).

(15-49 years) in 1996 and 5.0 in 2001. Today, PAK is administratively attached to the Plateau department which is comprised of 5 districts. Mortality estimates do not exist at the health zone level; however, Oueme/Plateau department is characterized by high child mortality rates. The IMR was estimated at 88 per 1000 live births for 1986-1996 and at 82 per 1000 live births for 1991-2001. In 1996, it was estimated that 58% of the children between 12-23 months old of the Oueme/Plateau departments were fully immunized and 8% did not receive any vaccinations. In 2001, the rates were 68% and 4%. In 2006, the Plateau department recorded 65% fully immunized children and 16% with no immunization. A survey carried out in 2004 showed that the fertility in this department begins early: 36% of women 15-19 years were pregnant or had already a child. Among the 15-49 years old women, the median age for the first pregnancy was of 17 rears. As for u5 children, in the 15 days preceding the 2004 survey, 33% children reported fever including 35% with at least one sign of severity; 21% reported diarrhea including 43% with at least one sign of severity; 28% reported symptoms of ARI.

Table A3: Health system characteristics in PAK and DAA zones and comparison areas 2006, Benin

Characteristics	ACSD HI zones		Comparison Area
	DAA	PAK	Rest of Benin minus Cotonou & HIDs
Total health facilities	31	30	744
Average # of health centers per commune	10	10	11.5
Population per facility	7030	8797	7493
Private or NGO health facilities	5	2	127
Hospitals	1	1	22

Source: Annuaire des statistiques sanitaires 2006

APPENDIX B

Methodology for implementation of ACSD activities and contextual factors

Various techniques were employed to collect information retrospectively about the implementation of ACSD activities and contextual factors in the "high-impact" zones. Much information was gathered from colleagues at the UNICEF-Benin 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. Details of these discussions are provided in table B1. During these encounters, the JHU evaluation team requested any documents providing additional details on ACSD and other partner's activities.

Over 150 documents pertaining to ACSD implementation and other project activities were reviewed; the types of documents reviewed are presented in the text of the report.

Table B1: Description of field visits, key informant interviews, and work sessions carried out to document ACSD implementation activities and contextual factors

DATE	DESCRIPTION	PARTICIPANTS	TOPICS COVERED	EVALUATION TEAM PARTICIPANTS
Field Visits				
Dec 2006	Field Visit to Pobé Ipkinle health center & Igbo-Oro (village) in Ipkinle arrondissement & Issaba	Joseph Zinsou (Health coordinator Pobé) Hamidou Iroleke (head nurse Ipkinle); Health staff and Community workers in Pobé and Ipkinlé; Mother's groups, village chief, Community Health Workers; King of Issaba	Clinical IMCI, ITN promotion distribution retreatment and stock-outs, ANC packages and functioning of maternity; monitoring and monitoring tools; follow up of vaccination through outreach; pharmacy and prices of medicines and interventions (ITNs & ANC bags; functioning & activities of mother's groups; Involvement of community leaders (village chief. King); review of counseling cards; review of village drug kits & contents; (credit for meds, etc)	CV, GJ, KG +UNICEF-Benin team
	Site visit Centre de Santé de Arrondisement Setto	Xavier Tokpo (head dispensaire) ; Estelle Zadsi (head maternity) ; Sosthene Codji Zakpame ; Florence Wanou ; Guilleme Gwawgoven ; Jeanne Kinosietha Sononkindjieha ; Henri Lokossi (PSI)	Facility IMCI functioning; outreach activities; functioning of maternity & ANC activities; review of previous birth technique and records	CV, GJ, KG +UNICEF-Benin team
	Village visit Saluidji village (in Setto arrondisement)	Benoit Adsikpe (1st relais); Felieien Djidago (2nd relais); village groups/leaders	Pilot site for treatment of ARI in community; review of CHW management of ARI and associated materials	CV, GJ, KG +UNICEF-Benin team
Key informant interviews / discussions				
Dec 2006	Interview & discussions	Paul Adovohekpe; Andree Cossi;	All ACSD and contextual factor information	CV, GJ, KG
	Interview & discussions	Loukmane Agbo-Ola	All ACSD and contextual factor information, especially ACSD implementation in PAK zone	CV, GJ, KG
	Interview & discussions	Gilbert G. Vissoh	All ACSD and contextual factor information, especially ACSD implementation in DAA zone	CV, GJ, KG

DATE	DESCRIPTION	PARTICIPANTS	TOPICS COVERED	EVALUATION TEAM PARTICIPANTS
	Interview & discussion	Joseph Zinsou Zone Sanitaire Pobé	Staffing; advantages & difficulties of SASDE approach; stock out of ITNs	CV, GJ, KG +UNICEF-Benin team
	PROLIPO presentation & discussion	Faustin Onikpo; Odje Adeichan PROLIPO	PROLIPO activities in PAK region; preceding birth technique & findings from this technique	CV, GJ, KG
	Interview & discussion	Madame Osseni, prior ACSD Consultant	Community-based situation analysis and community IEC/promotion activities/materials in Benin and other ACSD countries	CV, GJ, KG
	Interview & discussion	Alban Quenum – director, Direction de Santé Familiar (DSF)	MOH involvement in ACSD activities; Policy implications of ACSD; challenges and successes of ACSD per MOH	CV, GJ, KG +UNICEF-Benin team
Sept 2007	Interview & discussion	Gabriel Sayi – Chief medical officer for DAA zone	External partners in DAA zone	SvH
	Interview & discussion	Seraphin Vissoh, Chief of Health Dept at Catholic Relief Services, Benin)	External partners in DAA and PAK health zone	SvH
	Interview & discussion	Chief medical officer at the CIPEC (Centre d'Information de Prospective d'Education et de Conseils pour le SIDA) – part of the National AIDS Programme (PNLS).	External partners in DAA zone	SvH
	Interview & discussion	Joseph Zinsou - Chief medical officer for PAK district	External partners in PAK zone	SvH
Oct 2007	Interview & discussion	Dr Gilbert Vissoh, MOH (previously ACSD consultant in DAA zone)	ACSD activities in DAA zone and external partners in DAA zone	SvH

DATE	DESCRIPTION	PARTICIPANTS	TOPICS COVERED	EVALUATION TEAM PARTICIPANTS
Work sessions to review and interpret preliminary results				
Aug 2007	Meetings to review preliminary results	Paul Adovohekpe; Andree Cossi; Alban Quenum; Dominique Robez-Masson; Arnaud Houndeganme; INSAE staff involved in DHS & supplemental surveys	Revision of preliminary results, discussion of contextual factors and methodological issues	KG
Oct 2007	Regional workshop to review & interpret preliminary results (Dakar, Senegal)	Paul Adovohekpe; Andree Cossi; Alban Quenum; Gilbert G. Vissoh; Elise Ahovey	Revision of preliminary results, discussion of contextual factors and methodological issues	JB, CV, GJ, KG, SvH

APPENDIX C

Documentation of ACSD implementation activities in "high-impact" zones

The ACSD implementation activities are described in more detail here, expanding on the information provided in the main body of the report. Each ACSD component is described in more depth, and timelines of implementation activities for each ACSD component are presented in tabular format. For clarity, much of the information included in the main report narrative is repeated here. The timelines and information presented here should not be regarded as comprehensive, as gaps in information are inevitable given the retrospective nature of the evaluation. Some of the information presented here is based solely on key informant interviewers and could not be independently confirmed.

The implementation of ACSD contained many components of training for clinical personnel. Table C1 presents an overview of the types of training health agents received between 2002 and 2006 in the DAA health zone. The activities for the implementation of ACSD are presented in tables C2-C5.

Table C1: Overview of health agent training in DAA health zone during ACSD implementation

TOPIC	NUMBER OF HEALTH AGENTS TRAINIED	%
Clinical IMCI	52	100
Normal care and neonatal resuscitation in the delivery room	32	100
Minimum Package of Activities in Nutrition	188	100
Refocused ANC and IPTp	32	100
EPI+	92	100
Medicine management	44	95
PMTCT	74	98

Extracted from a presentation on health provider training in DAA zone by P. Adovohekpe, 2006

Vaccination and vitamin A supplementation (EPI+).

Vaccination activities and supplementation of children 6-59 months with vitamin A were already in place through the MOH system prior to the introduction of ACSD. The health system in Benin delivers vaccines to children in three principle ways: 1) routine, facility-based vaccination; 2) routine outreach activities; and 3) vaccination campaigns. Vitamin A supplementation is linked to vaccination campaigns, as well as recommended to be given during IMCI visits for sick children. However, key informants noted this system of delivery was only carried out in health centres with vitamin A stocks leftover from national vaccination days, since 2006 stocks of vitamin A for both campaigns *and* routine distribution are supported by UNICEF and CAME. Vitamin A is not distributed through routine or outreach vaccination activities. Child health cards are to be completed and kept at health facilities include a section to report dates of the child's vitamin A supplementation. The completion and use of this vitamin A information on the health cards is unknown.

Reinforcement of existing EPI activities was one of the earliest ACSD activities in Benin. According to administrative and summary reports of late 2002 UNICEF provided: 1) basic medical materials; 2) four-by-four vehicles and motorcycles for supervision and outreach; 3) refrigerators for the cold chain; and 4) computers for monitoring and data collection activities to the "high-impact" zones and their corresponding health departments (Zou-Collines and Ouémé-Plateau). The MOH, in collaboration with UNICEF, trained facility-based health agents in PAK and DAA periodically between 2002 and 2006 to reinforce capacity in EPI related activities, such as vaccine policy, stock management, secondary effects, outreach, active defaulter tracing, cold chain management, monitoring, and surveillance (appendix table C2). ACSD staff collaborated on local vaccination catch-up campaigns for all vaccinations and active defaulter tracing in 2003 and 2005 in PAK and DAA zones, as well as participating in measles epidemic investigations and response in 2005 in Djidja. Administrative reports from 2004 onward noted challenges in implementing the vaccination portion of the EPI+ package, such as irregular outreach activities, low health agent motivation and at times a lack of catch-up vaccination activities. Supervision and monitoring reports, as well as key informants, also noted resistance to vaccination in certain areas of the PAK zone.

In 2003, ACSD supported the selection and training of over 400 community health workers (CHWs) in approximately 200 remote villages in PAK and DAA. Promotion of vaccination and defaulter tracing in the community were among the topics covered during initial CHW training sessions in mid-2003. Key informant interviews and observations during field visits revealed that defaulter tracing for vaccination may have also been strengthened through collection of monitoring data. Each child registered in the health facility catchment area should have a health record card maintained at the health facility. These cards are issued for children at birth or through outreach activities for children not born in facilities. In some health centers, facility-based staff use these cards to determine which children are behind in vaccinations to better target outreach activities, and to rely on community health workers (CHWs) to help locate these children in their villages.

Measles campaigns took place in early 2003 and late 2005. After the importation of wild polio virus from Nigeria was detected in Benin in 2003,[5] the quality and quantity of national-level supplemental immunization days (NIDs) for polio were reinforced (appendix table C2). Vitamin A supplementation is done twice a year, linked to NIDs and other isolated campaigns since 2002, with support from UNICEF. ACSD incorporated a de-worming strategy into campaigns in the "high-impact" zones in 2003. The Government of Benin introduced de-worming with national campaigns in 2005 using its own financing.

Table C2: Timeline of implementation of EPI+ activities in DAA and PAK health zones 2002 to 2007, Benin

Year	Trimester	National campaigns	Other national / general EPI+	EPI+ activities in DAA	EPI+ activities in PAK
2002	Baseline - Jan-Jun	vitamin A campaign (CIDA funding)		Situation of EPI: Immunizations coverage low; Cold chain not functioning in all health centres (HC); No outreach: HC have not filled in their immunization coverage curves, as well as lost cases; Immunization plan implemented, but no monitoring.	Situation of EPI: No outreach implemention due to transport resources
	Jul-Sept			Training in all health centers for EPI, including: 1) Cold chain maintenance & 2) Plotting monthly immunization curves	20 motos for Ouémé, 4 for PAK zone; supervision vehicles for the whole department[6] Training of qualified health providers in EPI & outreach activities[7]
	Oct-Dec			20 motorcycles provided to the Zou; 4 motos given to DAA for outreach activities[6] Door-to-door immunization campaigns as a results of supervision visits that concluded low coverage rates[8]	
2003	Jan-Mar	Measles campaign[7]	(1) ACSD adds yellow fever and Vitamin A deficiency to the list of illnesses to be combatted. (2) 2 doses of Vit. A are added. (3) De-worming campaigns and ITN distribution in HIZ	Monitoring of activities/results 2nd semester 2002, review of results[8]	11 motorcycles for PAK, refrig. for cold chain[7]
	Apr-Jun	vitamin A campaign (CIDA funding)			Monitoring of 1st semester 2003[8] Catch-up vaccination (all) in Ketou & Pobé[7]
	Jul-Sept			CHW training in techniques for bed net impregnation and correct management vaccination cards.	Catch-up vaccination (all) in villages of Adja-Ouere[7]
	Oct-Dec				
2004	Jan-Mar	Polio campaign + Vit A[9]	Intro of Hep B vaccination	3 day (Mar) training for health providers on nutrition (incl. Vit. A)	
	Apr-Jun			Supervision of 7 health centers; 5/7 distributing vitamin A; 6/7 cold chains working[10]	Regional campaign for ITN trt, vit A distribution & de-working; 37,174 children de-wormed[11, 12]
	Jul-Sept			Catch-up vaccination activities in Monsourou, Agouna & Houto, Djidja[13]	10 days of supervision of EPI activities in 17 health centers[14]
	Oct-Dec	Polio campaign + Vit A		3 day training of 19 providers (public + private) in EPI+; vaccine mgmt, policy, stocks, 2ndary effects, surveillance, quality control, equipment mgmt, supervision[15]	

Year	Trimester	National campaigns	Other national / general EPI+	EPI+ activities in DAA	EPI+ activities in PAK
2005	Jan-Mar	Polio campaign		CHW (20) training in EPI management (Jan) 3 day training of 20 providers (public + private) in EPI+; vaccine mgmt, policy, stocks, 2ndary effects, surveillance, quality control, equipment mgmt, supervision[16] 16,152 children vaccinated for polio during NID[17]	
	Apr-Jun	Polio campaign + Vit A + deworm	Intro of Hib vaccine	16,423 children vaccinated for polio during NID[17]	
	Jul-Sept	Polio campaign		15,767 children vaccinated for polio during NID[17] Measles epidemic in Djidja with 16+ cases in U5s; response with investigation & catch-up vaccination campaign in villages in Djidja (623 U5 vaccinated)[18]	
	Oct-Dec	Measles campaign + deworm Polio campaign + Vit A .		15,936 children vaccinated for polio during NID[17] 9,172 vaccinated for measles[17] (Campaign coupled with distribution of albendazole & paracetamol to mobilize population)	
2006	Jan-Mar			3 day training of auxiliary nurses (aide soignants) in EPI+; vaccine admin stocks, 2ndary effects, surveillance, quality control, equipment mgmt[19]	Monitoring activities for the 2nd semester for 2005 in all health centers; review of results[20]
	Apr-Jun	Polio campaign + Vit A			
	Jul-Sept				
	Oct-Dec	Polio campaign + Vit A		200 CHW trained in EPI promotion	

Insecticide-treated nets (ITNs).

ACSD in Benin utilized different strategies for the provision and promotion of utilization of ITNs in the l'Ouémé-Plateau and Zou-Collines, including the PAK and DAA health zone.

In the Ouémé-Plateau departments, including the PAK zone, bednets were sold and their use promoted by women's groups and through maternity centers. At the end of 2002, UNICEF signed an agreement with the international NGO, Africare, to support these strategies. Africare had been in collaboration with a local malaria control project, PROLIPO, to engage women's groups in malaria control activities; 270 women in 90 villages were trained in ITN promotion in late 2002. The promotion, distribution and re-treatment of ITNs were also carried out by over 200 CHWs selected and trained by UNICEF and the MOH starting in mid-2003. In some cases, but not always, the CHWs were also members of the women's groups. Activity reports show that the first ACSD-supported insecticide treatment campaign in PAK zone treated 9,330 bednets in 2003. Re-treatment campaigns of similar magnitude have been carried out periodically over the ACSD period in the Ouémé-Plateau departments, including PAK zone.

In the departments of Zou-Collines, including the DAA health zone, bednets were sold through social marketing techniques in towns, at larger town markets, as well as at health centers; they were also sold by intermediaries—community volunteers—in villages. Population Services International (PSI) was a key partner in this activity. UNICEF and PSI started collaborating in late 2002 with the promotion of ITNs for pregnant women; *Bonne Maman* (good mother) bednets were launched in November 2002 in DAA health zone. Similar to PAK, the strategy in the DAA health zone promoted, distributed and treated bednets through approximately 200 trained CHWs in 100 villages. Re-treatment campaigns were carried out in the community throughout the period of 2003 to 2006. According to summary presentations given by UNICEF staff, 44,250 ITNs have been distributed at a subsided price between 2002 and 2006 in the DAA health zone.

Mosquito nets were retreated through periodic community-based re-treatment campaigns in the four departments, including the PAK and DAA zones; insecticide treatment were also provided at no cost with support from UNICEF and other partners, such as the national malaria control program (PNLP). More details about ITN distribution and re-treatment are presented in Annex table C3.

When ACSD was first implemented, the official cost of ITNs was CFA 3500 (~ USD 7.00) for everyone. The official price was then reduced to CFA 1500 (~ USD 3.00) in 2004 for pregnant women and children less than five years of age. The price was further reduced in 2005 to CFA 500 (~ USD 1.00) for targeted populations. Program managers report that this most recent price reduction led to a large increase in demand for bednets, which combined with problems in the financing of the program, created widespread ITN stock-outs beginning in late 2005 to early-mid 2007. Issues in retreating bednets, such as the onerous logistics and problems with meeting the required periodicity, prompted the government to opt for long-lasting bednets in 2005.

Table C3: Timeline of implementation of bednet activities in DAA and PAK health zones 2002 to 2007, Benin

Year	Trimester	General ITN information	ITN activities in DAA	ITN activities in PAK
2002	Jan-Jun		No activities - researching conditions	No activities - researching conditions
	Jul-Sept		Signing of 3 yr. agreement btw. PSI & UNICEF to promote ITNs for pregnant women in Zou-Colllines[6]	
	Oct-Dec		Launch of "Bonne Maman" ITNs for pregnant women in Agouna in DAA[6]	Signing of agreement btw. Africare & UNICEF to promote ITNs through women's groups & maternities in Oeume-Plateau[6]; 270 women trained through PROLIPO in 90 villages for ITN promotion[7]
2003	Jan-Mar			
	Apr-Jun		Free impregnation campaigns (2,892 ITNs trt)[6]	Free door-to-door impregnation campaigns; 9,330 ITNs trt. in 5574 households (fully paid by UNICEF 44mil cfa)[6, 7, 21] Sale of 2,300 PNLP ITNs at reduced price of 2000cfa[7]
	Jul-Sept		ITN promotion, distribution & retrt by CHWs (trained) throughout 100 villages[6] Sale of 4,207 ITNs after CHW training[6] Free impregnation campaigns (4,509 ITNs trt)[6]	ITN promotion, distribution & retrt in village drug kits throughout 102 villages (30 ITNs of 3 places given to each locality to sell at 3,500cfa (then reduced to 2500cfa), along with 30 K-Othrine[6]
	Oct-Dec		PSI ensured availability of bed nets in HC: 1500 bed nets (50 MII x 29 centres de santé) for 1500 CFA (approx. $3) for pregnant women and children less than five years old were provided to all 29 HC. Local HC restock their bed nets from Abomey HC. After the sale, the health workers were used proceeds for a second round of bed net distribution/provision.	ITN re-treatment campaign; 10,883 ITNs treated (881 1 place; 6206 2 place; 3796 3 place) in 5616 households[7] Through 12/31/03, 9765 ITNs sold thru health centres, women's groups & in villages via ACSD[7, 9]
2004	Jan-Mar	Price of ITNs at 1500cfa for U5 & pregnant women (2500cfa for all others)	Continuing provision of bednets[8]	2nd bed net retreatment campaign[8]
	Apr-Jun			Continuing provision of bednets[8]
	Jul-Sept			Door-to-door ITN retrt campaign with CHW involvement & BCC thru town criers; 9295 ITNs trt in PAK (100,000 Ko-Tabs given to Oeume-Plateau 3 days after start of campaign)[11, 12] Jan 04 to Jun 04, 1367 ITNs sold through health centers in PAK[11]
	Oct-Dec			

Year	Trimester	General ITN information	ITN activities in DAA		ITN activities in PAK	
2005	Jan-Mar	1. Price of ITNs drops to 500cfa (~1usd) 2. Policy changed for retreatment every 12m (from every 6m)	CHW trainings preceded ITN treatment campaigns.			
	Apr-Jun					
	Jul-Sept					
	Oct-Dec			ITN retreatment campaign (cost shared by PNLP & UNICEF)	ITN retreatment campaign; IEC with 30,379 persons, and 19,794 bednets retreated[22]	
2006	Jan-Mar	ITN Stock-outs	ITN Stock-outs		ITN Stock-outs	
	Apr-Jun					
	Jul-Sept					
	Oct-Dec					

Case management of childhood illnesses and feeding, including breastfeeding.

Integrated case management of child illness and promotion of improved feeding practices were carried out in both facilities and the community through the ACSD strategy. The Plateau department, including the PAK health zone, was one of the first to introduce facility-based IMCI in Benin in June 2001, before ACSD. The DAA health zone was part of the IMCI extension phase, with training for facility-based workers occurring in late 2002, for doctors and supervisors, and early 2003 for providers. According to administrative and summary reports, the UNICEF and ACSD teams helped the MOH coordinate this early IMCI training in DAA. Standard IMCI monitoring tools are utilized, some with enhancements developed through the PROLIPO project, implemented in collaboration with the US Centers for Disease Control and Prevention (CDC) and UNICEF in July 2002. Periodic supervisory visits and review of monitoring data collected from IMCI-compatible health registers have been carried out to reinforce IMCI implementation. Many of the local monitoring and supervision reports reviewed by the evaluation team focused on financial and stock management; fewer included quality of care assessments. It should be noted that the IMCI focuses on stock availability and quality of care, rather than financial management.

In addition to IMCI training, approximately 180 health trainers and providers in Ouémé-Plateau, including 44 providers in the PAK zone, were trained in healthy child consultations in mid-2003. These trainings comprised 6 modules pertaining to the minimum package of nutrition activities: 1) iron and folic acid supplementation for pregnant women; 2) exclusive breastfeeding for children less than 6 months; 3) complementary feeding and continued breastfeeding for children aged 6-24 months; 4) vitamin A supplementation for children aged 6-59 months and postnatal supplementation of women; 5) nutritional management of sick children; and 6) consumption of iodized salt. Child health cards kept at health facilities included sections to collect information and dates about feeding practices, nutritional counseling, vitamin A supplementation, and de-worming. It is unknown to what extent these sections are completed in practice. In the DAA zone, approximately 50 health providers were also trained in the minimum package of nutrition activities in 2004.

The PAK and DAA health zones were pilot zones for community IMCI. UNICEF organized a series of workshops and supported community situation analysis exercises to assist in the planning of the community IMCI strategies and activities and development of materials in late 2002 and early 2003. MOH officials, local health zone staff and community members and leaders attended the workshops and participated in the data collection for the situation analysis and planning of activities. According to MOH officials, the experiences in these zones served as lessons to improve and expand C-IMCI, which is currently implemented in ten other health zones in Benin.

In mid-2003, 102 remote villages in PAK and 100 remote villages in DAA (the majority in Djidja) were chosen by local health agents and other local partners, in association with UNICEF, as sites for the installation of community health workers (CHWs). Local community officials selected two CHWs in each site. CHWs, 204 in PAK and 200 in DAA, received 5 days of initial training in vaccination promotion, defaulter tracing, home management of malaria, and re-treatment of bed nets soon after their selection. Administrative reports describing the training reveal that over 50 local leaders also participated in this training. In late 2003, CHWs and community leaders received further training for 3 days, on: 1) promotion of exclusive breastfeeding and supplementary feeding; 2) prevention and home-based management of diarrhea; 3) elimination of stools and hand washing practices; 4) recording births; 5) medicine management; 6) promotion of vitamin A supplementation; and 7) communication techniques. Around this time, the CHWs were issued bednets and a medicine box with ORS, chloroquine, paracetamol, mebendazole, and iron. The medications were to be sold to sick children in the villages at reasonable prices; a small margin of benefit for the CHWs and community committees was planned.

Visual aids, also known as “image boxes,” were finalized and pre-tested in mid-2004. These visual aids included modules to promote appropriate malaria, diarrhea and pneumonia management, as well as appropriate infant feeding and vitamin A promotion. In mid 2005, the CHWs were also responsible

for promoting appropriate case management, exclusive breast-feeding, complementary feeding and good nutrition practices, using the new visual aids.

In 2004, a UNICEF-supported operational research project supported by UNICEF allowed the training of approximately 40 CHWs in the Ketou commune of PAK and 40 CHWs in the Djidja commune of DAA to manage pneumonia with cotrimoxizole at the community level. Officials in Benin report that the MOH is currently reviewing this experience and discussing whether community-based treatment of pneumonia will be adopted as national policy.

Table C4: Timeline of implementation of IMCI+ activities in DAA and PAK health zones 2002 to 2007, Benin

Year	Trim-ester	DAA		PAK	
		Facility-IMCI activities	C-IMCI activities	Facility-IMCI activities	C-IMCI activities
2002	Jan-Jun	No activities: researching situation of health zones		Facility training for IMCI (2 sessions of 11 days for 24 providers)-early - 2001 No ACSD activities: researching situation of health zones	
	Jul-Sept			Development of F-IMCI supervision tools, with PROLIPO[6] Pre-test of health child visit tools[8]	
	Oct-Dec	IMCI training for 10 IMCI trainers (doctors); initial 11 day IMCI training for 24 health providers in Zou-Collines[6]	Workshop to develop C-IMCI materials for Abomey commune (~50 community leaders); community assessment for every locality[6]		
2003	Jan-Mar	Training of supervisors to monitor IMCI-trained providers[6]			10 day workshop/situation analysis to develop C-IMCI materials for PAK done with community leaders[6, 7]
	Apr-Jun		3 day workshop in Porto-Novo to develop & adapt CHW training materials[6, 23]	Training of 6 trainers for "health child visits" training; Training of 44 providers for health child visits in Pobé[6]	Identification of 102 CHW sites, community committees & 240 CHWs[6, 7] 3 day workshop in Porto-Novo to develop & adapt CHW training materials[6, 23] Training of 30 CHW trainers & supervisors[24]; 5 day training of 240 CHWs & 40 arrondisement mayors in promotion of ITNs, vaccination, & home malaria trt. (3 days training, 2 days promotion in different communities[6, 7]
	Jul-Sept	Initial 11 day IMCI training for 24 health providers in DAA[6]	Training of 24 CHW trainers; training of 200 CHWs & 20 arrondisement mayors in promotion of ITNs, vaccination (2 days training, 2 days promotion in different communities)[6] (majority of CHWs—140—in Djidja)		
	Oct-Dec	1st IMCI supervision of 22 health providers [8]	3 day training of 192 CHWs & 20 mayors (8 training sites) in breastfeeding, feeding, diarrhea prevention & management, handwashing, hygiene, medicine & ITN management, birth registration[25]		102 villages are equipped with village drug kits (CQ, AAS, Paracetamol, Mebendazole, ORS, Fe); Training of 320 CHWs & community leaders in diarrhea home management, hand-washing, minimum

Year	Trim-ester	DAA		PAK	
		Facility-IMCI activities	C-IMCI activities	Facility-IMCI activities	C-IMCI activities
			CHW supervision by 24 district directors and other health workers		nutrition package & completion of record-books & monitoring tools[7, 26]
2004	Jan-Mar	3 day training for 180 healthcare providers (in 4 sessions); minimum activity package for nutrition, including iron, feeding practices, vitamin A, iodine, breastfeeding, management of sick child[27]	Launching of CHW activities & drug kits in Djidja[28]	5 days of IMCI supervision in health centers	Planning for situation analysis, & development of case management strategy[9] 11 days supervision of CHWs to organize on-going supervision, organize community surveillance committees, give feedback on BCC activities, control finance mgmt, monitor record completion, find target pop.[7, 9 29]
	Apr-Jun			7 new nurses trained in facility IMCI	
	Jul-Sept		22 participants for 4 day finalization of CHW visual aids for diarrhea, ARI, & malaria in 3 languages; visual aids for MAP nutrition Porto-Novo, DAA, PAK, ABD[14, 30] 5 day pre-test of malarial, ARI, & diarrhea visual aids in 20 communities[31]		22 participants for finalization & pre-test of CHW visual aids for diarrhea, ARI, & malaria in 3 languages; visual aids for MAP nutrition – Porto-Novo, DAA, PAK, ABD[14, 30]; 5 day pre-test of malarial, ARI, & diarrhea visual aids in 20 communities[31] 5 days supervision of CHWs[14]
	Oct-Dec		7 days CHW supervision done in all communes by health zone coordinators, Drs, nurses, midwives, etc; Monitoring of job tools, registers, management of drug stocks & finances; 1 day feedback mtg. for CHWs in Djidja & Agbangnizou to go over recommendations & CHW needs[32]	38/42 health agents trained in IMCI[7]	2 day group CHW & community supervision by 2 district medical officers, 19 nurses, & 13 others at health centers; Monitoring of community participation, job tools, registers, management of drug stocks & finances; 89/102 communities participated; 654 child treated & 51 child referred since start[29]
2005	Jan-Mar		4 day training session for 10 CHWs from Djidja on management of pneumonia, danger signs, practices, etc[33] 3 day supervision activities of CHWs managing pneumonia in Djidja[34]		

Year	Trim-ester	DAA		PAK	
		Facility-IMCI activities	C-IMCI activities	Facility-IMCI activities	C-IMCI activities
	Apr-Jun		4 day training session for 9 CHWs from Djidja on management of pneumonia, danger signs, practices, etc[35] 3 day training for 28 trainers on BCC tools/job aids for diarrhea, malaria, ARI, & nutrtion[36]		
	Jul-Sept		4 day training session for 11 CHWs from Djidja on management of pneumonia, danger signs, practices, etc[37] Supervision activities of CHWs managing pneumonia in Djidja[38]		
	Oct-Dec				CHW field supervision for BCC activities, curative care, surveillance, medicine mgmt, record completion; coupled with a KAP survey for 7 days in 92 /102 villages with 274 CHW & community members[26, 39] KAP survey & presentation of results in each commune of PAK[26]
2006	Jan-Mar	Training for health providers in Abomey for micro-insurance[40] 2 supervisors over 5 days			
	Apr-Jun				
	Jul-Sept		3 day training of 20 participants for breastfeeding & infant nutrition support groups in Abomey commune[41]		
	Oct-Dec				

Antenatal, delivery and postnatal care.

Antenatal care interventions supported under the ACSD approach of "Focused ANC+," in Benin included: 1) focused antenatal care; 2) utilization of ITNs; 3) intermittent preventive treatment for malaria for pregnant women (IPTi) with a combination of sulfadoxine and pyrimethamine (SP), also commonly known as Fansidar; 4) prevention of mother-to-child transmission of HIV (PMTCT); and 5) deworming, and 6) supplementation with iron and folic-acid. "Focused ANC" reorients ANC care to treat all pregnancies as "at risk". Starting in the first ANC visit, this strategy is intended to encourage: 1) women to plan for the delivery; 2) planning logistically and financially for evacuation in the case of complications; and 3) husbands to assist at least one ANC visit to help with this planning. Increasing the decision power of pregnant women is at the heart of this strategy.

IPTi was introduced for the first time in the "high-impact" zones in late 2003, at the same time as "focused ANC." IPTi was implemented in 2004 after a study that compared the effectiveness of chloroquine versus SP. Prevention of mother-to-child transmission of HIV (PMTCT) was also introduced at maternity centers in the high impact health zones in 2005 and integrated with "focused ANC" in 2007. In late 2005 an "ANC kit" was introduced that contained a bednet, iron/folic acid supplements, SP for IPT of malaria, and mebendezole for de-worming. In the DAA zone this "ANC kit" was developed to be provided in a special sachet containing all the elements to facilitate distribution. The ANC kit is sold for CFA 1000 (~ USD 2.00) to a woman at her first antenatal visit to a community health center or maternity. In the PAK zone these different elements are sold separately to pregnant women. According to health officials, these kits are sold at a loss, which causes problems with stock and re-supply.

In 2004, a radio communication system was put into operation with UNICEF support to facilitate evacuation of obstetrical emergencies in the DAA zone. In PAK zone, the radio system installation began in 2001 and was completed in 2004.

Table C5: Timeline of implementation of ANC+ activities in DAA and PAK health zones 2002 to 2007, Benin

Year	Trimester	DAA		PAK	
		Trainings & other activities	Community-based & on-going activities	Trainings & other activities	Community-based & on-going activities
2002	Jan-Jun	No activities: researching situation of health zones		Facility training for IMCI --- mid-2001 No ACSD activities: researching situation of health zones	
	Jul-Sept				
	Oct-Dec		Provision of medical kits & supplies[8]	Pilot zone for IPT; Comparative IPTp study between SP in HIZs & in neighbour zones that use CQ. Study was delayed & results did not come out before the national launching & adoption of IPT.	
2003	Jan-Mar				
	Apr-Jun		Mop-up campaign for TT vaccination among women of reproductive age, Djidja[8]		
	Jul-Sept				
	Oct-Dec				
2004	Jan-Mar	3-day training for maternity personnel in management of the neonate (1st session); funded by Unicef[42]	IPTp starts in Abomey & Agbangnizoun maternities,[28] with maternal cards		IPTp introduced into all health centers in PAK[9]
	Apr-Jun	3-day training for maternity personnel in management of the neonate (2nd session); funded by Unicef[42] 6 day training of 16 nurses on active management of the third stage of labor (AMTSL) done by 1 gynecologist and 3 nurses in Zou		3-day training for maternity personnel (9 midwives, 9 nurses, 1 Dr.) in management of the neonate [11]	Supervision of ANC activities, with emphasis on IPTp[11]
	Jul-Sept				10 days of supervision of SONU & EPI activities in 17 health centers[14]
	Oct-Dec	AMTSL training	Development of micro-insurance in Abomey (care and support for emergency obstetrical complications). 3 days of supervision of IPTp[43]; 2 day supervision of 18/20 maternities in refocused ANC & IPTp[44]	5 day workshop to train 58 participants (media & community leaders) in HIV/AIDS and PMTCT	2 days of supervision of IPTp[43] Receipt of materials for maternities

Year	Trimester	DAA		PAK	
		Trainings & other activities	Community-based & on-going activities	Trainings & other activities	Community-based & on-going activities
2005	Jan-Mar				
	Apr-Jun	5 day training of 28 nurses, midwives, lab techs, nurses, Drs in PMTCT & HIV+ neonatal care [45] 4 day training (2nd session) for HZ Drs, midwives, social workers, nurses, lab techs etc in PMTCT[46] 5 day training of 16 midwives & nurses in AMTSL (2nd session)[47]	2 day workshop with 46 participants from DAA & Zou to review & validate obstetrical & neonatal references from health centers to Zou hospital[48]		
	Jul-Sept				
	Oct-Dec	Workshop to adapt PMTCT messages & visual aids for DAA zone, led by Unicef consultants,[49] validation of messages,[50] and contracts with media[51]	Promotion/involvement of royal courts in development of PMTCT strategies(2 days prep, 3 days field)[52] Introduction of ANC kit for 1000 CFA (~$2). Includes ITN, SP, de-worming, Folic Acid & Iron suppl.)[40]		
2006	Jan-Mar	Training of mid-wives in use of ventouse[40]	Supervision of ANC activities, IPTp, reanimation of neonate[40]		Monitoring activities for the 2nd semester for 2005 in all health centers; review of results[20]
	Apr-Jun				
	Jul-Sept				
	Oct-Dec				

APPENDIX D

Definition of priority indicators in the evaluation of ACSD

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

NO.	ACSD TARGET	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR [1] [2]	PROTOCOL FOR MISSING/UNKNOWN DATA
	EPI+					
1	Measles immunization coverage §	Percentage of children aged 12-23 months who received measles vaccine before first birthday	Child	Eligible children received measles innoculation before 12 months of age; according to immunization card, mother's report or reciept of vaccination during national campaign[3]	All children 12-23m, still alive, include MB	IMPUTE TIMING 1: Missing card or vaccination on card: use mother's report & impute timing with distribution of known vaccination dates
2	DPT3 immunization coverage §	Percentage of children aged 12-23 months who received 3 doses of DPT vaccine before first brithday.	Child	Eligible children received DPT3 before 12 months of age; according to immunization card or mother's report[3]	All children 12-23m, still alive, include MB	IMPUTE TIMING 2: Missing/invalid date on card: impute timing with distribution of known vaccination dates
3	Hib3 immunization coverage §	Percentage of children aged 12-23 months received full (3x doses) HIB vaccination before first brithday.	Child	Eligible children received Hib3 before 12 months of age; according to immunization card	All children 12-23m, still alive, include MB	EXCLUDE CASES: Unknwon/missing mother's report and no card data
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	Eligible children receiving vitamin A in previous 6m according to mother's report or immunization card	All children 6-59m, still alive, include MB	EXCLUDE CASES: Missing mother's report and no entry on vaccination card

§ International Consensus Coverage Indicator

[1] MB=Multiple birth: include all multiple birth children

[2] CDC 2003 - due to data quality issues, all children with valid data for indicator variables were included

[3] 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
	IMCI+					
5	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
6	Case management malaria-programmatic (programmatic)	Percentage of children aged 0-59 months with fever receiving any antimalarial drugs	Child	Eligible children received any antimalarial mediciation 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
7	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
8	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)				

§ International Consensus Coverage Indicator

[1] MB=Multiple birth: include all multiple birth children

[2] 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
	IMCI+					
9	Timely initiation of breastfeeding §	Percentage of newborns put to the breast within one hour of birth; most recent live birth previous 12m	Women	Women iniatiated breastfeeding within the first hour after delivery	Women with a birth in previous 12m	EXCLUDE CASES: Reported ever breastfeeding, but missing timing of initiation
10	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 postive/missing for still breastfeeding EXCLUDE CASES 2: Negative/ missing for all feeding variables AND missing for still breasfeeding
11	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 postive/missing for still breastfeeding EXCLUDE CASES 2: Postive/missing for all feeding variables AND missing for still breasfeeding
12	Continued breastfeeding (20-23 months) §	Percentage of children aged 20-23 months who are currently breastfeeding	Child	Eligible children still breasfeeding	Children (20-23): most recently born (include only one MB) still alive & living with mom.	EXCLUDE CASES: Missing for still breastfeeding
13	Consumption of iodized salt	Percentage of households consuming iodized salt: **exclude** HH with no salt	HH	Eligible HH has salt with >=15ppm iodine	All HH with completed surveys and salt available for testing	EXCLUDE CASES: Missing salt test and HH with no salt
14	Consumption of iodized salt	Percentage of households consuming iodized salt: **include** HH with no salt	HH		All HH with completed surveys	EXCLUDE CASES: Missing salt test

§ International Consensus Coverage Indicator

[1] MB=Multiple birth: include all multiple birth children

[2] 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
	ITNs					
15	Use of bednets by pregnant women	Percentage of pregnant women sleeping under any mosquito net last night	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
16	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)	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
17	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)	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

[1] MB=Multiple birth: include all multiple birth children

[2] 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
	ANC+	**Most recent live birth within previous 12m**				
18	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	All eligible women with a pregnancy resulting in a live birth in the previous 12m	EXCLUDE CASES: Unkonwn/missing for number prenatal visits AND positive/missing for skilled HCW
19	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
20	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: Unkwown/missing if received TT or received TT but unknown dosage
21	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		EXCLUDE CASES: Unknown/missing if received iron or received iron but for unknown time period
22	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
23	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: Noninstitutional delivery and positive/missing skilled HCW and positive/missing received postnatal care
24	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

[1] MB=Multiple birth: include all multiple birth children

** IPT for pregnant women: at least 1 dose of SP during pregnancy

[2] 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 preg

Table D1: Definition of priority impact indicators

NO.	INDICATORS	DATAFILE	NUMERATOR	DOMINATOR§	PROTOCOL FOR EXCLUSION OF CASES§
1	Stunting (low height for age) among children 24-59 months of age*	Household	**Moderate and Severe:** Children with <-2 z scores for height for age based on the 2006 WHO growth curves[53] **Severe:** Children with <-3 z scores for height for age based on the 2006 WHO growth curves[53]	Children aged 24-59 months who: 1. Have a reported (non-missing) birth month & year 2. Have a valid (non-missing) anthropometric measure 3. Slept in the house the night before the survey 4. Live with biological mother	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	**Moderate and Severe:** Children with <-2 z scores for weight for height based on the 2006 WHO growth curves[53] **Severe:** Children with <-3 z scores for weight for height based on the 2006 WHO growth curves[53]	Children aged 0-23 months who: 1. Have a valid (non-missing) anthropometric measure 2. Slept in the house the night before the survey 3. Live with biological mother	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	**Moderate and Severe:** Children with <-2 z scores for weight for age based on the 2006 WHO growth curves[53] **Severe:** Children with <-3 z scores for weight for age based on the 2006 WHO growth curves[53]	Children aged 0-59 months who: 1. Have a reported (non-missing) birth month & year 2. Have a valid (non-missing) anthropometric measure 3. Slept in the house the night before the survey 4. Live with biological mother	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

§ See appendix L for more details
** Also calculated for children 0-59 months of age*

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

CONTEXTUAL VARIABLE	SOURCE OF DEFINITION	DESCRIPTION OF DEFINITION	APPLICATION OF DEFINITION TO DATAFILES			
			2001		*2006/7*	
			Assets	***Recode variable (questionnaire number)***	***Assets***	***Questionnaire number***
Wealth quintiles	DHS standard calculation of wealth quintiles (http://www.childinfo.org/mics/mics3/docs/DHS%20Wealth%20Index%20(DHS%20Comparative%20Reports).pdf)	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. For the calculation of wealth quintiles for the ACSD evaluation, Cotonou was removed and the indices calculated for households in the HIZ and comparison area only.	Water source	M21 (hv021)	Water source	M21
			Toilet/latrine	M23 & M24 (hv205&hv 225)	Toilet/latrine	M23 & M24
			Flooring material	M27 (hv213)	Flooring material	M27
			Wall material	M27b (hv214)	Wall material	M27B
			Roofing material	M27c (hv215)	Roofing material	M27C
			Cooking fuel	M26 (hv226)	Cooking fuel	M26
			Main Lighting source	M26a(sh26a)	Main Lighting source	M26A
			Possession of electricity	M25 (hv206)	**Possession of** Car, moto or bike	M25
			radio	(hv207)	Stereo	M25
			television	(hv208)	Refrigerator	
			refrigerator	(hv209)	Iron	M25
			bicycle	M28(hv210)	Improved Stove	
			mobylette/moto	(hv211)	Bed or mattress	M25
			Car/truck	(hv212)	Phone	
					Radio	M25
					DVD or VCR	
					Sofa	M25
					Sewing machine	
					Fan	M25
					Generator	
					Television	M25
					Land ownership	M25

CONTEXTUAL VARIABLE	SOURCE OF DEFINITION	DESCRIPTION OF DEFINITION	APPLICATION OF DEFINITION TO DATAFILES			
				DHS datafile label (hv201)	***DHS 2001***	***HID DHS 2006/7***
Improved Water Source	MDG water and sanitation definitions (http://www.unicef.org/wes/mdgreport/definition.php)	**Improved drinking water sources include:** 1) Household connection, 2) Public standpipe, 3) Borehole, 4) Protected dug well, 5) Protected spring, 6) Rainwater collection **Unimproved drinking water sources include:** 1) Unprotected well, 2) Unprotected spring, 3) Rivers or ponds, 4) vendor provided water, 5) Bottled water, 6) Tanker truck water	***Questionnaire (m21);***			
			EAU DU ROBINET			
			EAU COURANTE A LA MAISON	piped into dwelling	√	√
			EAU COURANTE AILLEURS	piped into yard/plot	√	√
			ROBINET PUBLIC/BORNE FONTAINE	public tab	√	√
			EAU DE PUITS			
			FORAGE EQUIPE DE POMPE MANUEL	manual pumped water	√	√
			PUITS BUSE OU PROTEGE	protected well	√	√
			PUITS NON PROTEGE	open well	NO	NO
			EAU DE SURFACE			
			SOURCE AMENAGEE	spring	NO	NO
			RIVIERE/MARIGOT/MARE	river, stream	NO	NO
			EAU DE PLUIE DANS LA CITERNE	rainwater in a cistern	√	√
			AUTRE EAU DE PLUIE	rainwater	NO	NO
			CAMION CITERNE	tanker truck	NO	NO
			EAU EN BOUTEILLE	No label	NO	NO
			AUTRE	No label	NO	n/a

CONTEXTUAL VARIABLE	SOURCE OF DEFINITION	DESCRIPTION OF DEFINITION	APPLICATION OF DEFINITION TO DATAFILES			
			Questionnaire (m23 & m24)	DHS datafile variable label	DHS 2001	DHS 2006-2007
Improved Sanitation Facilities	MDG water and sanitation definitions (http://www.unicef.org/wes/mdgreport/definition.php)	**Improved sanitation facilities include:** 1) Connection to a public sewer, 2) Connection to a septic system, 3) Pour-flush latrine, 4) Simple pit latrine, 5) Ventilated improved pit latrine. . **Unimproved sanitation facilities include:** 1) Public or shared latrine, 2) Open pit latrine, 3) Bucket latrine.	LATRINE À FOSSE VENTILÉE	ventilated latrine - shared or not shared	√	√
			TOILETTE À CHASSE	flush toilet - shared or not shared	√	√
			RÉSEAU D'ÉGOUT			
			LATR. SUSPENDUE/SUR PILOTIS	unventilated, open pit latrine	NO	NO
			LATRINES À TINETTE	shared	NO	
			LATRINE À FOSSE NON VENTILÉE	shared	NO	NO
				not shared	√	√
			PAS DE TOILETTES /NATURE	no facility, bush, field	NO	NO
			AUTRE		NO	NO

APPENDIX E

Comparison of survey questions utilized for calculation of priority coverage indicators

Please note that the questionnaires used in surveys analysed as part of the retrospective evaluation are available from the IIP-JHU evaluation team upon request.

Table E1: Questions utilized for priority indicator calculation from DHS 2001, ACSD survey 2003, DHS/supplemental survey 2006-7

NO.	ACSD TARGET	DHS Questionnaire 2001	ACSD Questionnaire 2003	DHS Questionnaire 2006/2007
	EPI+			
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	Hib3 immunization coverage	N/A	N/A	Have vaccination card (q458); Hib3 innoc. on card (q460)
4	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)
	IMCI+			
5	Case management malaria (effective)	Had fever(q466); gave meds (q466A); what meds (q466B)	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	Case management malaria-programmatic (programmatic)	Had fever(q466); gave meds (q466A); what meds (q466B)	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)
7	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)

NO.	ACSD TARGET	DHS Questionnaire 2001	ACSD Questionnaire 2003	DHS Questionnaire 2006/2007
8	ORS/RHF/increased fluids for children with diarrhoea + continued feeding	Had diarrhea (q475)	Had diarrhea (q501)	Had diarrhea (q475)
	ORS	ORS (q478a)	ORS (q506a)	ORS (q478a)
	ORT/RHF	RHF (q478b)	RHF (q506b)	RHF (q478b)
	Increased fluids (IF)	Increased fluids (q476)	Increased fluids (q504)	Increased fluids (q476)
	Continued feeding	Continued feeding (q477)	Continued feeding (q505)	Continued feeding (q477)
9	Timely initiation of breastfeeding	Ever breastfed (q440); Timing of BF initiation (q441)	Ever breastfed (q323); Timing of BF initiation (q3243)	Ever breastfed (q440); Timing of BF initiation (q441)
10	Exclusive breastfeeding through 6 months (0-5m)	Still breasfeeding (q445); liquids in last 24h (q492a-e); food in last 24h (q493a-j)	Still breasfeeding (q326); liquids/food in last 24h (q331b-g)	Still breasfeeding (q445); liquids in last 24h (q492a-e); food in last 24h (q493a-j)
11	Breastfeeding and complementary feeding (6-9 months)	Still breasfeeding (q445); food in last 24h (q493a-j)	Still breasfeeding (q326); food in last 24h (q331g)	Still breasfeeding (q445); food in last 24h (q493a-j)
12	Continued breastfeeding (20-23 months)	Still breasfeeding (q445)	Still breasfeeding (q326)	Still breasfeeding (q445)
13	Consumption of iodized salt	Iodized salt (q35)	Iodized salt (q29)	
14	Consumption of iodized salt			
	ITNs			
15	Use of bednets by pregnant women	Pregnant (q226); Slept under net last night (q494)	Pregnant (q221); Slept under net last night (q602)	Pregnant (q226); Slept under net last night (q494)
16	Effective use of bednets by children < 5yr	Child slept under net last night (q465C); How long ago was net obtained (q465E); Was a treated net obtained (q465F); Was the net ever treated(q465G); How long ago treated (q465H)	Child slept under net last night (q526); Was the net ever treated(q527); How long ago treated (q528)	Child slept under net last night (q465C); How long ago was net obtained (q465E); Was a treated net obtained (q465F); Was the net ever treated(q465G); How long ago treated (q465H)
17	Effective use of bednets by pregnant women	N/A	Pregnant (q221); slept under net last night (q601); Was the net ever treated(q602); How long ago treated (q603)	N/A (data in HH file)

NO.	ACSD TARGET	DHS Questionnaire 2001	ACSD Questionnaire 2003	DHS Questionnaire 2006/2007
	ANC+			
18	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)
19	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)
20	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)
21	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)
22	Skilled attendant at delivery	Assisted with birth (q426)	Assisted with birth (q320)	Assisted with birth (q426)
23	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)
24	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 Benin 2001 to 2007

The methodologies and implementation of households surveys re-analyzed for the ACSD retrospective evaluation are presented in table F1. Less documentation of the methods and implementation were available for the ACSD-CDC 2003 survey and the Benin-UNICEF Cooperation Baseline coverage 2005 survey. These surveys are 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-CDC 2003 survey is available on request from the JHU evaluation team. Table F2 presents a general review of the surveys and data sources that were not utilized in the main ACSD retrospective evaluation, extracted from available documents. The note at the bottom of the table provides an explanation of non-inclusion in the main ACSD retrospective evaluation. For further data sources (including those outside the health sector), an excellent review of all studies and surveys carried out in Benin and supported by UNICEF between 2001-2006 is available.[54]

Comparability between surveys pertinent to the evaluation is highlighted below: 1) the comparability of the Benin DHS 2006 and the ACSD supplemental DHS in 2007, which were combined for endline estimates, and 2) the comparability of the Benin 2001 DHS and the Benin 2006 DHS, from which estimates which are utilized for the before-after and differences-in-differences comparisons.

Comparability of the Benin DHS 2006 and the ACSD supplemental DHS 2007.

The data from the supplemental surveys carried out in the HIZs in May of 2007 were merged with the data from households surveyed during the DHS 2006. Although these surveys were methodologically similar, there are differences that should be noted, as they might impact the calculation of certain indicators:

- The questionnaires in the 2007 supplemental survey were much shorter than standard DHS surveys making the questionnaire administration easier for both interviewers and respondents
- Interviewer performance was better because of experience with the DHS 2006, additional training and shorter questionnaires
- Stronger supervision in the 2007 supplemental survey, with constant supervision
- Overall better quality of the supplemental survey which built on lessons from the errors in the 2006 DHS survey
- The period of the data collection in the 2001 and 2006 DHS surveys was between August and September which spans a part of the dry season and a part of the rainy season. The supplemental survey was carried out in May of 2007, which was the start of the rainy season.
- In the national DHS surveys in 2001 and 2006, antimalarial medicines, ORS sachets, iron supplements and vitamin A capsules examples were shown to women interviewed. These medication samples were not available during the data collection for the 2007 supplemental survey until the 2nd and 3rd weeks of data collection (approximately ½ data collection period).

Comparability of the Benin DHS 2001 and the Benin DHS 2006.

The 2001 and 2006/7 DHS utilized for comparison in the evaluation are very similar in methodology and conduct, including: the sampling strategy, technical assistance provided, field agents recruited, and data processing procedures. These two surveys did have different greatly sample sizes and levels of stratification. In 2006, the DHS survey was conducted in conjunction

with an economic survey that was representative at the commune level. Interviewer training, especially for the vaccination and bed net modules, was more intensive in 2006.

- In 2006, there was a concurrent survey (EMICOV) conducted in conjunction with the DHS. This survey required data collection in 77 communes and in 95% of the *arrondissements* in order to ensure representative data at the commune level. There was no survey conducted in conjuction with the 2001 DHS
- In 2001, Benin was divided into 6 departments (regions) which were utilized for stratification; in 2006 there were 12 administrative departments in Benin;
- The number of households and women interviewed was much greater in 2006 compared to the 2001 DHS: 5769 households in 2001 and 17,511 households in 2006, 6219 women in 2001 compared to 17,794 women in 2006 ;
- Interviewer training was more intensive in 2006 for vaccination due to the introduction of the pentavalent vaccine in 2005. Training was also more intensive for identification of types of nets and the types of re-treatment kits.

Table F1: Methodology and implementation of household surveys in Benin 2001 to 2007 presented in the ACSD evaluation report

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
General	**Geographic Coverage**	National	"High Impact" zones PAK & DAA	31 communes in 5 departments (Zou, Collines, Oeume, Plateau, Borgou) (includes ACSD "HIZ")	National	"High Impact" zones PAK & DAA
	Implementing Agency (& TA)	INSAE (Macro)	CERTI	CEFORP	INSAE (Macro)	INSAE (Macro)
	Datafile available for reanalysis	Yes	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; Revised questionnaire; Datafile for analysis; Report of data analyses	Sampling methods/ size; Revised questionnaire Datafile for analysis; 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

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
Sampling & enumeration	**Stratification & sampling of clusters**	2 stage sampling, cluster selection stratified by 6 departments (+ Cotonou) and urban/rural residence (13 strata); clusters chosen from census 1992	2 stage sampling, clusters selection stratified by health zone; clusters chosen from census 2002	2 stage sampling stratified by health zone; clusters chosen from census 2002	2 stage sampling, cluster selection stratified by commune and urban/rural residence; clusters chosen from census 2002	Clusters not included in DHS 2006 using same methodology as DHS 2006 - done by INSAE & revised by Macro
	Number of clusters	**National:** 247 clusters **HID:** 8 PAK, 9 DAA, 17 Total	**HID:** 44 PAK, 43 DAA, 87 total	**Departments:** 259 clusters **HID:** 20 PAK, 25 DAA, 45 Total	**National:** 750 clusters total **HID:** 29 PAK, 30 DAA, 59 Total	**HID:** 40 clusters total
	Number of households per cluster (total HH in HIDs)	~25	30 (2610 HHs)	25 (1097 HHs)	24	35 (1540 HHs)
	Mapping/ listing	HH listing done in selected clusters by trained team leaders & other agents in May & June 2001; Segmentation for ZD larger than 399 HHs	**Benin Report & Standard CDC Protocol:** Listing of HHs done before the survey	Done at same time as questionnaire administration	Household listing done in selected clusters by the team leaders before survey start	Same as DHS 2006
	Household selection	Standard systematic sample from listed HHs	**Benin Report:** Randomly from listed households **Standard CDC Protocol:** 30 contiguous HHs selected (using random starting point)	Done by survey teams in field systematically from updated lists	Standard systematic sample from listed HHs	Standard systematic sample from listed HHs

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
Question-naires	**Language of questionnaire**	French; Adja; Bariba; Fon; Yoruba; Ditamari	French; Fon; Yoruba	French	French	French
	Questionnaires used	Household, women's [men's]	Household, women's	Household, women's, children's	Household, women's [men's]	Household, women's
	Modules included in women's/child questionnaire	Socio-demographic Info; Reproduction; Contraception; Pregnancies, ANC, & breastfeeding; Vaccination & child health and nutrition; Marriage and sexual activity; Fertility preferences; Work of women & partner; HIV/AID and STIs; Female genital cutting	Socio-demographic Info; Reproduction; Contraception; Pregnancies, ANC, & breastfeeding; Vaccination; Child health & illness; Hygiene, marital status, work of women	**Women's:** Socio-demographic Info; Micronutrients & IPTp; KAP child illnesses; KAP HIV/AIDS; KAP child trafficking & labor; Female Genital Cutting; Exposure to IEC **Child:** Birth certificate; vitamin A; breastfeeding; prevalence & care for diarrhea, fever, & ARI; de-worming	Socio-demgraphic Info; Reproduction; Contraception; Pregnancies, ANC, & breastfeeding; Vaccination & child health and nutrition; Marriage and sexual activity; Fertility preferences; Work of women & partner; HIV/AID and STIs; Female genital cutting; Maternal mortality	Socio-demographic Info; Reproduction; Pregnancies, ANC, Breastfeeding, Vaccination, child health and nutrition
	Pre-test / pilot	Pre-tested in 4 urban & rural clusters (interviewer & respondent understanding) 73 HH, 300 women's, 100 men questionn. administered; Training, revision & pre-test from 15 May to 5 June 2001	Pre-tested 4 days in Aug 2003 in 2 zones Abomey & Ketou (for interviewer & respondent understanding), w/ revisions after	Pre-tested 2 days in Dec 2004 in 4 different language zones (for interviewer & respondent understanding) 253 HH, 324 women's, 113 child questionn administered	Pre-tested for 6 days in 4 rural & urban clusters (done by 27 interviewers)	None – as modules used in DHS 06

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
Training	**Manuals**	Yes - but unknown	Yes	Yes - but unknown	Standard DHS manual (longer version than suppl-07 manual)	Interviewer manual; also manual for team supervisor
	Logistics & timing	Training took place 9 - 30 July (interviewers, health agents) - many had University degree	Training took place 5-9 Aug 2003 in Abomey for interviewers & editors	6 days of training done for interviewers, editors and data entry agents	Training took place 23 may - 13 June 2006	Led by El-Aarbi Housni (Macro) from April 23-27 with INSAE; Training shortened as teams same field agents as DHS-06
	Training content	Knowledge tests used to choose field agents	1 day of simulations in local languages with translation of key words	Based on training manual	Based on standard DHS modules	Supervisor and interviewer manual available
	Practice survey admin in field	Yes; 3rd week of training for French & local language simulations	Unknown - but see pre-test	Yes - see pre-test	Unknown	None; as interviewers were the same as DHS 2006 and were experienced with questionnaire

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
Field organization / work	**Survey team composition**	1 team leader; 1 controler/editor; 2 interviewers; 2 male interviewer; health agent; driver	1 interview for household quest; 1 controler/editor; 2 interviewers for women's quest	Total of 12 supervisors; 27 team leaders; 259 guides; 54 interviewers	1 team leader (EMiCov); 1 controler/editor; 1 health agent; 2-5 interviewers; 1 male interviewer; driver	1 supervisor/editor (2 teams with male, 2 teams with female) 4 interviewers Driver
	Number of teams	9 teams	8 teams (4 teams per health zone)	27 (?) teams	25 teams	4 teams (2 in PAK and 2 in DAA)
	Survey start-up	2 months into survey, teams were re-arranged due to attrition of 4 interviewers	Done at same time (perhaps overlapped) as training	Slight delay btw. Pre-test & survey start -- X-mas holiday	There was a 6 week pause in between training and field collection -- 3 days of refresher training was given to interviewers	1. Teams started in more remote areas (Adja-Oere & Djidja) to have access before rains 2. El-Arbi Housni accompanied H Togouni (director of survey) 30th April/May 1st for supervision (no pause in start-up)
	Period of field work	2 Aug to 13 Nov 2001	08 Aug to 05 Sept 2003	4 Jan to 8 Feb 2005	3 August to 18 Nov (all 3 months in same regions - dry season)	April 29th to June 1st (start of rainy season)

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
Supervision	**Observation of interviews (by supervisor or controller/ editor)**	Specified in report - editors observed women's question admin	Unknown	Unknown	Specified in manuals	Specified in manual; Never done in teams with male supervisor; done irregularly in women-led teams
	Verification interviews (done by supervisors for ages, etc)	Yes - specified in report	Unknown	Unknown	Unknown	Not specified in manual; Done by male team 2 in PAK
	Technical team supervision	Every 2 weeks with technical team from INSAE	1 responsible for survey; 2 supervisors (1 in each zone; 8 editors (1 per team)	5 cadres of CEFORP supervision in each department	Every 2 week technical supervision by INSAE team	Done almost continuously in PAK & DAA regions by 1 INSAE technical officer in each zone; unknown focus on interview observations, re-administering questionnaires, etc
Data processing	**Editing of questionnaires**	5 editors/agents were responsible for editing & recoding		4 editors/agents were responsible for editing & recoding	20 agents were reponsible for coding & editing	Likely similar

Survey Component		Benin – Surveys 2001 - 2007				
		DHS 2001	CDC-ACSD 2003	Benin-UNICEF Cooperation Baseline Coverage Survey 2005	DHS 2006	ACSD Supplementary DHS 2007
	Data entry procedures	1. Double data entry in ISSA done by 11 data entry agents, under supervision of 2 data managers 2. Verification and editing after double entry	1. 5 trained Data entry agents 2. Entry from 15 Aug to 13 Sept 2003 3. Database in CSPro adapted from standard CDC base	1. 6 Data entry agents trained for 3 days 2. Database in EpiInfo 3. 2 1/2 months of entry 4. Control for inconsistencies (but not double entry)	**1.** Double data entry in CSPro done by 40 data entry agents (20 additional agents in Dec/Jan), under supervision of 4 data managers, 1 programmer & assistant 2. H Koche (Macro) set up entry procedures & supervised data entry	1. Double data entry in CSPro done by data entry agents, under supervision of data managers 2. H Koche (Macro) set up data entry procedures & supervised data entry start-up
	Quality control loop	Data completeness and errors detected after data entry sent back to each team & interviewer through the supervision	Unknown	Unknown	Data completeness and errors detected after data entry sent back to each team & interviewer through the supervision	None - survey too short to have feedback loop
	Data editing	Data edited/cleaned for internal consistency by 2 DP agents at INSAE, with TA from Macro	Unknown	Data edited/cleaned for internal consistency by CEFORP	Data edited/cleaned for internal consistency by INSAE, with TA from Macro	similar
	Finalization of data	Recode file done by INSAE & Macro to include "other" codes, imputed values, and sampling weights	Recoding done in SPSS	Unknown	Done by technical committee and Macro consultants	Done by technical committee and Macro consultants
	Imputation of birth dates	Done according to standard DHS	Not in final datafile	Not in final datafile	Done according to standard DHS	Done according to standard DHS
References		DHS Benin 2001[55]	Enquête de couverture de la SASDE 2003[56]	Etude de base dans les zones d'intervention du Progr.amme de Coopération Benin-UNICEF 2005[57]	DHS 2006 Preliminary report[58]	Survey documents, discussions & observations

Table F2: Methodology and implementation of other surveys and data in Benin 2001 to 2007

Survey Component		Benin			
		2003 UNICEF Cluster survey (Dec 03)	2004 PSI survey	2006 PSI KAP survey	Routine monitoring data
General Info	Geographic Coverage	Zou, Collines, Oeume, Plateau Departments (includes ACSD "HIZ")	Unavailable	Zou & Collines Departments	National
	Implementing Agency (& TA)	UNICEF Consultant		R Adjimon, C Sessou, A Tollegbe, M Gigigaye	Ministry of Health
	Datafile available for reanalysis	No		No	Data available at health zone level 2003-2006
	Survey documentation available	Report of findings		Report of findings	Reports of findings
Sample		Done according to WHO cluster methodology; Selection of villages unclear; Total of 90 clusters sampled in departments		1200 HHs (654 in Zou & 555 in Collines)	Through routine data collection at health centers
Survey Elements	Respondents	Caregivers/mothers of children U5; women with pregancy last yr.		HH heads, Women and Women of U5s	

Survey Component		Benin			
		2003 UNICEF Cluster survey (Dec 03)	2004 PSI survey	2006 PSI KAP survey	Routine monitoring data
	Information collected	Vaccination, ITN & vitamin A forms		Socio-demographic characteristics, KAP of ITN use	Epidemiological surveillance (malaria, diarrhea, ARI, EPI dx); malnutrition; vaccination; anemia; ANC & PNC; sick child visits; deliveries
Field work	**Training**	1 day of training with a "pre-test"		unknown	Routine
	Organization	30 interviewers in each health zone (60 total in PAK & DAA) with 1 coordinator & 2 supervisors per zone		unknown	Routine
	Period of field work	22 & 23 Dec 2003		unknown	On-going
Sources		UNICEF coverage survey of vaccination, ITN, & Vitamin A 2003[59]		Mid-term survey 2006 for ITNs, PSI-Benin[60]	"Annuaire" of health statistics 2003-2006 [61-64]
Notes		Not utilized due to comparability of sampling methodology & survey conduct	**Documentation not available**	Not utilized due to geographical coverage, unknown sampling methodology, & comparability of indicators	Not utilized in evaluation due to difficulties in estimating reference population & comparability of active versus passive surveillance

APPENDIX G

Tables presenting priority indicators over time for ACSD high impact zones

Table G1. EPI+ and ITN coverage indicators over time in PAK and DAA zones, Benin (weighted)

Indicators*	2001 DHS				2003 ACSD-CDC			2005 Benin - UNICEF Cooperation Coverage Survey			2006/7 DHS & Supplemental survey			
	n	%	missing (%)	95% CI	n	%	missing (%)	n	%	missing (%)	n	%	missing (%)	95% CI
EPI+														
Percentage of children aged 12-23 months who are immunized against measles	66	51	2	n/a	368	45	8	No data			483	49	3	n/a
Percentage of children aged 12-23 months who received 3 doses of DPT vaccine	66	63	2	n/a	372	51	7				493	60	1	n/a
Percentage of children aged 12-23 months who are immunized against Hib	No data				No data						496	17	0.2	n/a
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	323	10	0	**3 - 17**							2080	61	2	57 - 65
Percentage of children 12-32 who received at least one high dose vitamin A supplement within the last 6 months	125	17	0	5 - 29	627	54	4	467	84	27	820	63	3	58 - 68
ITNs**														
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN: trt'd <=12m) (woman quest.)	359	6	2	1 - 12	No data			833	38	1	2349	26	2	23 - 30
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN: trt'd <=6m) (woman quest.)	359	5	2	1 - 10	**1984**	**31**	**7**	795	27	6	2348	18	2	15 - 20
Percentage of pregnant women sleeping under a mosquito net (women quest)	62	14	0	0.1 - 27	236	43	1	No data			328	34	0	29 - 39
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN: <=12) (household quest)	No data				No data						320	22	1	18 - 26
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN: <=6) (household quest)					235	27	1				320	17	1	13 - 21

**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.*

Table G2. EPI+ and ITN coverage indicators over time stratified by PAK and DAA zones, Benin (weighted)

	2001 DHS %(n)		2003 ACSD-CDC %(n)		2005 Coverage Survey %(n)		2006/7 DHS %(n)	
	PAK	DAA	PAK	DAA	PAK	DAA	PAK	DAA
Percentage of children aged 12-23 months who are immunized against measles	41 (31)	59 (36)	43 (224)	50 (144)	n/a	n/a	40 (229)	57 (254)
Percentage of children aged 12-23 months who received 3 doses of DPT vaccine	50 (31)	77 (36)	52 (229)	49 (143)	n/a	n/a	49 (235)	70 (258)
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	4 (58)	28 (68)	47 (392)*	66 (235)*	79 (102)	87 (135)	56 (394)	69 (426)
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN treated <=6m) (women's quest.)	4 (186)	6 (173)	33 (1173)	30 (782)	31 (404)	23 (391)	17 (1112)	18 (1236)
Percentage of pregnant women sleeping under a mosquito net (woman quest)	15 (33)	12 (30)	42 (145)	45 (91)	n/a	n/a	34 (139)	34 (189)
*among children 6-32 months of age								

Table G3. Illness case management indicators from 2001 to 2006/7 in PAK and DAA zones, Benin (weighted)

IMCI case management indicators	2001 DHS				2003 ACSD-CDC			2005 Benin - UNICEF Cooperation			2006/7 DHS & Supplemental Survey			
	n*	%	Missing (%)	95% CI	n*	%	Missing (%)	n*	%	Missing (%)	n*	%	Missing (%)	95% CI
Percentage of children aged 0-59 months with fever receiving antimalarial drugs*	151	70	1	55 - 85	617	70	2	241	53	1	633	67	3	62 - 72
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	43	32	0	20 - 44	236	31	1	38	26	0	156	30	1	23 - 37
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	30	38	0	0 - 77	245	46	2	141	43	0	176	34	0.4	24 - 44

**Any antimalarial medication*

Table G4. Illness case management indicators from 2001 to 2006/7, stratified by PAK and DAA zones, Benin (weighted)

	2001 DHS %(n)		2003 ACSD-CDC %(n)		2005 Coverage Survey %(n)		2006/7 DHS %(n)	
	PAK	DAA	PAK	DAA	PAK	DAA	PAK	DAA
Percentage of children aged 0-59 months with fever receiving antimalarial drugs**	70 (62)	71 (89)	65 (303)	74 (314)	49 (144)	59 (97)	64 (208)	69 (425)
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	¥	¥	31 (153)	31 (83)	¥	¥	39 (45)	26 (111)
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	¥	¥	45 (165)	49 (80)	32 (92)	63 (49)	30 (90)	37 (86)

¥ Sample size too small - >25 in either comparison **any antimalarial treatment in previous 2 weeks

Table G5. Feeding behaviour indicators from 2001 to 2006/7 in PAK and DAA zones, Benin (weighted)

IMCI feeding behavior indicator	2001 DHS				2003 ACSD-CDC			2005 Benin - UNICEF Cooperation			2006/7 DHS & Supplemental survey			
	n	%	Missing (%)	95% CI	n	%	Missing (%)	n	%	Missing (%)	n	%	Missing (%)	95% CI
Percentage of newborns put to the breast within one hour of birth	88	45	0	29 - 62	503	32	0	No data			608	47	0	41 - 54
Percentage of infants aged 0-5 months who are exclusively breastfed	45	40	0	23 - 57	250	25	2	102	24	0	278	27	0.3	21 - 34
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	27	80	0	54 - 100	167	59	3	76	59	0	215	78	0	70 - 87
Percentage of children aged 20-23 months who are currently breastfeeding	16	n/a	0	n/a	87	71	2	51	80	0	157	66	0	56 - 75

Table G6. Feeding behaviour indicators from 2001 to 2006/7, stratified by PAK and DAA zones, Benin (weighted)

	2001 DHS %(n)		2003 ACSD-CDC %(n)		2005 Coverage Survey %(n)		2006/7 DHS %(n)	
	PAK	DAA	PAK	DAA	PAK	DAA	PAK	DAA
Percentage of newborns put to the breast within one hour of birth	44 (42)	46 (46)	42 (311)	17 (192)	n/a	n/a	43 (284)	51 (324)
Percentage of infants aged 0-5 months who are exclusively breastfed	¥	¥	28 (163)	18 (87)	4 (52)	44 (50)	22 (138)	32 (140)
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	¥	¥	54 (96)	65 (71)	52 (48)	71 (28)	83 (85)	76 (130)
Percentage of children aged 20-23 months who are currently breastfeeding	¥	¥	73 (59)	68 (28)	¥	¥	69 (63)	63 (94)

¥ Sample size too small - >25 in either comparison

Table G7: Antenatal care for women with a birth in the previous 12 months from 2001 to 2006/7 in PAK and DAA zones, Benin (weighted)

ANC indicators	2001 DHS				2003 ACSD-CDC			UNICEF Cooperation Coverage Survey			2006/7 DHS & Supplemental Survey			
	Total births*	%	Missing (%)	95%CI	Total births*	%	Missing (%)	Total births*	%	Missing (%)	Total births*	%	Missing (%)	95%CI
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse or midwife)	88	71	0	53-89	496	74	1	No data			606	64	0.4	58-69
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse, midwife or auxiliary midwife)	88	80	0	70-91	497	79	1	No data			606	74	1	69-79
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (any SP)	88	28	0	11-46	494	18	2	177	1	0	606	7	0.4	5-9
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (2+ doses SP)	No data				No data			177	1	0	606	6	0.4	3-8
Percentage of newborns protected against tetanus (2+ doses TT during pregnancy)	88	44	0	33-54	479	52	5	No data			597	55	2	49-60
Percentage of pregnant women receiving 3 months of iron supplementation.	87	32	1.3	18-46	470	36	7	No data			594	56	2	51-62

Table G8. Assisted deliveries and postnatal care from 2001 to 2006/7 in PAK and DAA zones, Benin

Assisted delivery and postnatal care indicators	2001 DHS				2003 ACSD-CDC			2005 Benin - UNICEF Cooperation Coverage Survey			2006/7 DHS & Supplemental survey			
	Total births*	%	Missing (%)	95%CI	Total births*	%	Missing (%)	Total births*	%	Missing (%)	Total births*	%	Missing (%)	95%CI
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	88	76	0	59-92	503	70	0	177	90	0	607	74	**0.2**	68-79
Percentage of births attended by skilled health personnel (doctor, nurse, midwife or auxiliary midwife)	88	92	0	84-100	503	80	0	177	90	0	607	85	**0.2**	79-90
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 received postnatal care)	88	94	0	87 - 100	No data			No data			607	84	**0.2**	79-89
Percentage of newborns receiving a postnatal visit by a trained worker (doctor, nurse or midwife) within 3 days of delivery. (**NO** assumption of postnatal care with institutional delivery)	No data				No data						606	68	0.4	62 - 73
Percentage of women receiving vitamin A supplementation within 2 months of birth	88	5	0	1-10	491	21	4	177	9	0	608	38	0	33 - 44

**weighted* ***among women with live birth in 12 months previous to the survey*

Table G9: Antenatal, delivery and postnatal care for women with a birth in the previous 12 months from 2001 to 2006/7, stratified by PAK and DAA zones, Benin (weighted)

	2001 DHS %(n)		2003 ACSD-CDC %(n)		2005 Coverage Survey %(n)		2006/7 DHS %(n)	
	PAK	DAA	PAK	DAA	PAK	DAA	PAK	DAA
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse or midwife)	62 (42)	80 (46)	65 (307)	88 (189)	n/a	n/a	52 (284)	74 (322)
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (any SP)	57 (42)	3 (46)	4 (303)	39 (191)	0 (89)	2 (88)	1 (282)	12 (324)
Percentage of newborns protected against tetanus (2+ doses TT during pregnancy)	21 (42)	64 (46)	43 (301)	67 (178)	n/a	n/a	38 (275)	69 (322)
Percentage of pregnant women receiving 3 months of iron supplementation.	30 (41)	34 (46)	39 (306)	31 (164)	n/a	n/a	57 (270)	56 (323)
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	68 (42)	82 (46)	61 (311)	85 (192)	83 (89)	97 (88)	63 (284)	83 (323)
Percentage of newborns receiving a postnatal visit by a trained worker (doctor, nurse or midwife) within 3 days of delivery**	98 (42)	90 (46)	n/a	n/a	n/a	n/a	73 (283)	94 (324)
Percentage of women receiving vitamin A supplementation within 2 months of birth	0 (42)	10 (46)	13 (306)	34 (185)	9.0 (89)	9 (88)	28 (284)	47 (324)

¥ Sample size too small - < 25 in either comparison **Women with institutional deliveries are assumed to have had a post-natal visit

APPENDIX H

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

Table H1. EPI+ and ITN coverage indicators over time in high impact (PAK & DAA) and comparison zones, Benin (weighted)

Indicators	2001 EDS					2006/7 EDS & Enquête Supplémentaire				
	High impact zones (PAK + DAA)		Comparison area ¥			High impact zones (PAK + DAA)		Comparison area ¥		
	n	%	n	%	Missing (%)	n	%	n	%	Missing (%)
EPI+ *										
Percentage of children aged 12-23 months who are immunized against measles	66	51	748	54	2	483	49	2520	60	2
Percentage of children aged 12-23 months who received 3 doses of DPT vaccine	66	63	760	67	1	493	60	2566	64	1
Percentage of children aged 12-23 months who are immunized against Hib	No data		No data			496	17	2579	14	0
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	323	10	3283	17	5	2080	61	10617	63	5
ITN **										
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN) (woman quest.)	359	6	3724	5	4	2349	26	11785	28	6
Percentage of pregnant women sleeping under a mosquito net (women quest)	62	14	579	31	0	328	34	1455	42	13
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN) (household quest)	No data		No data			320	22	1684	17	0.4

**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 area is Benin – national level, excluding the HIZs and Cotonou

Table H2. Case management indicators over time in high impact (PAK & DAA) and comparison zones, Benin (weighted)

IMCI case management indicators	2001 DHS					2006/7 DHS & Supplemental survey				
	High impact zones		Comparison zones¥			High impact zones		Comparison zones¥		
	n*	%	n*	%	Missing (%)	n*	%	n*	%	Missing (%)
Percentage of children aged 0-59 months with fever receiving antimalarial drugs (program)*	151	70	1559	66	5.8	633	67	3311	58	8
Children 0-59m with fever in previous 2 weeks, rec'd appropriate antimalarial treatment (effective)**	151	63	1559	62	6	633	0	3311	0.5	8
Benin antimalarial policy	Chloroquine		Chloroquine			ACT		ACT		
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	43	32	472	32	0.4	156	30	1198	35	0.4
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	30	38	545	43	2	176	34	1187	42	1

¥

Comparison area is Benin – national level, excluding the HIZs and Cotonou
**Includes treatment with any antimalarial*
***Includes treatment with first-line antimalarial recommended by national policy*

Table H3. Feeding behaviour indicators over time in high impact (PAK & DAA) and comparison zones, Benin

IMCI feeding behavior indicators	2001 DHS					2006/7 DHS & Supplemental survey				
	High impact zones		Comparison zones¥			High impact zones		Comparison zones¥		
	n	%	n	%	Missing (%)	n	%	n	%	Missing (%)
Percentage of newborns put to the breast within one hour of birth	88	45	921	47	0.1	608	47	2838	54	0.2
Percentage of infants aged 0-5 months who are exclusively breastfed	45	40	426	38	0.2	278	27	1265	45	1
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	27	80	294	66	1	215	78	986	73	1
Percentage of children aged 20-23 months who are currently breastfeeding	16	53	243	67	1	157	66	689	59	0
Percentage of households consuming iodized salt (>=15ppm)	420	76	4615	67	0.2	1518	49*	13683	55	3
Percentage of households consuming iodized salt (>=15ppm)	388	84	4279	72	8	1405	53*	12852	58	9

** Salt not tested in 2007 supplemental survey* *¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou*

Table H4: Antenatal, delivery and postnatal care indicators over time in high impact (PAK & DAA) and comparison zones, Benin

ANC, assisted delivery and postnatal care indicators	2001 DHS					2006/7 DHS & Supplemental survey				
	High impact zones		Comparison zones¥			High impact zones		Comparison zones¥		
	n	%	n	%	Missing (%)	n	%	n	%	Missing (%)
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse or midwife)	88	71	907	65	2	606	64	2800	67	2
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (any SP)	88	28	915	6	1	606	7	2804	7	1
Percentage of newborns protected against tetanus (2+ doses TT during pregnancy)	88	44	914	47	1	597	55	2806	51	1
Percentage of pregnant women receiving 3 months of iron supplementation.	87	32	870	39	6	594	56	2649	53	7
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	88	76	920	63	0.2	607	74	2844	75	0
Percentage of newborns receiving a postnatal visit by a trained worker within 3 days of delivery*	88	94	919	78	0.3	607	84	2839	80	0.2
Percentage of women receiving vitamin A supplementation within 2 months of birth	88	5	921	17	0.1	608	38	2836	40	0.3

¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou

** Women with institutional deliveries assumed to have appropriate postnatal care*

APPENDIX I

Tables presenting 2006-7 survey results for key indicators in the ACSD high-impact zones by socio-demographic characteristics of the population

Table I1: Description of households, eligible women and children under five in 2006 DHS/2007 Supplemental survey in PAK and DAA, Benin

Table I1a: Households interviewed

	Percent	Total Households
High impact zones		
PAK (Ouémé)	44	1300
DAA (Zou)	56	1643
Commune		
Adja-Ouere	13	390
Agbangnizoun	21	606
Kétou	17	494
Pobe	14	417
Djidja	18	530
Abomey	17	507
Residence		
Urban	30	892
Rural	70	2051
Total		2943

Table I1b: Eligible women with complete interviews

	Percent	Total Women
High impact zones		
PAK (Ouémé)	42	1154
DAA (Zou)	58	1587
Commune		
Adja-Ouere	14	375
Agbangnizoun	21	573
Kétou	16	442
Pobe	12	337
Djidja	19	506
Abomey	19	508
Residence		
Urban	30	817
Rural	70	1924
Currently pregnant		
Yes	12	328
Not sure	1	21
Mother's education level		
None		
Primary School		
Secondary school+		
Total		2741

Table I1c: Under five Children: from Individual interview

	Percent	Total Children
High impact zones		
PAK (Ouémé)	46	1223
DAA (Zou)	54	1430
Commune		
Adja-Ouere	14	360
Agbangnizoun	20	537
Kétou	18	487
Pobe	14	376
Djidja	19	504
Abomey	15	389
Residence		
Urban	27	706
Rural	73	1947
Mother's education level		
None		
Primary School		
Secondary school+		
Total		2654

Table I2: Vaccination rates by geographic and socio-demographic factors in PAK and DAA in 2006/7, Benin

Children 12-23 months of age vaccinated against mealses and DPT											
		Innoculated against measles					Innoculated against DPT				
	% with EPI card - Seen	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 (%)***	Number of children 12-23m*
High impact zones											
PAK (Oueme)	59	52	76	92	***40***	229	53	93.1	94	***49***	235
DAA (Zou)	74	66	87	126	***57***	254	72	97.6	140	***71***	258
Commune											
Adja-Ouere	50	60	79	20	***48***	48	52	83.9	17	***44***	52
Agbangnizoun	76	67	86	42	***58***	87	76	100.0	51	***76***	87
Ketou	69	44	65	37	***29***	102	51	91.2	43	***47***	103
Pobe	53	57	86	35	***49***	79	55	100.0	34	***55***	80
Djidja	76	62	83	40	***52***	83	61	91.7	40	***56***	83
Abomey	68	68	93	43	***63***	84	79	100.0	48	***79***	87
Residence											
Urban	64	65	82	66	***53***	140	71	98.2	68	***70***	146
Rural	68	57	83	152	***47***	343	60	94.8	165	***57***	347
Sex											
Male	65	57	82	109	***46***	257	59	94.6	113	***55***	263
Female	69	62	84	109	***52***	226	68	96.9	120	***66***	230
Mother's education level											
None	66	57	82	164	***47***	378	59	95.4	174	***57***	387
Primary School	66	62	80	38	***50***	81	75	95.7	43	***72***	82
Secondary school+	78	85	94	17	***80***	24	81	100.0	16	***81***	24
Wealth index quintiles											
Poorest	46	37	78	32	***29***	111	40	93	34	***37***	114
2	73	56	80	44	***45***	97	59	95	46	***56***	98
3	75	62	87	43	***55***	92	68	93	49	***63***	94
4	79	71	81	64	***57***	106	78	99	68	***77***	107
Least Poor	64	75	87	35	***65***	77	74	98	36	***72***	80
Total	67	59	83	218	***49***	483	63	96	233	***60***	493

**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 in previous 6 months by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

Children 6-59 months of age receiving vitamin A supplementation in the previous 6 months		
	Vitamin A supplementation (%)	Number of children 6-59 months of age*
High impact zone		
PAK (Oueme)	***54***	974
DAA (Zou)	***68***	1106
Commune		
Adja-Ouere	***51***	279
Agbangnizoun	***78***	414
Ketou	***58***	400
Pobe	***50***	294
Djidja	***52***	389
Abomey	***73***	304
Residence		
Urban	***63***	558
Rural	***61***	1522
Sex		
Male	***61***	1054
Female	***62***	1026
Age in months		
6-11	***63***	309
12-23	***63***	488
24-35	***63***	418
36-47	***59***	454
48-59	***58***	411
Mother's education level		
None	***58***	1645
Primary School	***70***	329
Secondary school+	***76***	106
Wealth index quintiles		
Poorest	***45***	475
2	***57***	428
3	***65***	429
4	***73***	407
Least Poor	***70***	341
Total	***61***	2080

**n=Children 6-59 months of age, still alive with non-missing data for indicator calculation: weighted*

Table I4: Utilization of bednets by children under age five by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

Children aged 0-59 months sleeping under a mosquito net, a treated net or an ITN* the night preceding the survey				
	Percentage of children who:			
	Slept under mosquito net last night (%)	Slept under an ever-treated mosquito net last night (%)	***Slept under an ITN* last night (%)***	Number of children 0-59 months of age**
High impact zone				
PAK (Oueme)	36	33	***25***	1167
DAA (Zou)	38	32	***25***	1303
Commune				
Adja-Ouere	35	33	***24***	331
Agbangnizoun	35	31	***25***	486
Ketou	35	32	***23***	473
Pobe	37	34	***27***	363
Djidja	37	28	***21***	449
Abomey	44	39	***30***	368
Residence				
Urban	41	37	***28***	685
Rural	36	31	***24***	1785
Sex				
Male	38	34	***26***	1242
Female	36	32	***24***	1228
Mother's education level				
None				
Primary School				
Secondary school+				
Age in months				
0-11	41	36	***28***	580
12-23	43	37	***28***	505
24-35	38	33	***25***	456
36-47	32	28	***22***	488
48-59	30	26	***20***	442
Wealth index quintiles				
Poorest	27	21	***14***	569
2	31	27	***22***	488
3	35	30	***23***	517
4	42	39	***30***	485
Least poor	55	51	***41***	412
Total	37	33	***25***	2470

**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*

As assessed through household questionnaire

Table I5: Utilization of bednets by currently pregnant women by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

	Percentage of pregnant women who:			
	Slept under mosquito net last night (%)	Slept under an ever-treated mosquito net last night (%)	***Slept under an ITN*last night (%)***	Number of pregnant women 15-49 years of age**
High impact zones				
PAK (Oueme)	33	28	***23***	137
DAA (Zou)	35	29	***22***	183
Commune				
Adja-Ouere	38	30	***27***	50
Agbangnizoun	24	23	***17***	68
Ketou	31	28	***20***	55
Pobe	28	25	***23***	31
Djidja	38	30	***21***	67
Abomey	47	38	***28***	47
Residence				
Urban	40	33	***25***	78
Rural	32	27	***22***	242
Mother's education level				
None	33	28	***21***	239
Primary School	37	31	***30***	64
Secondary school+	42	35	***12***	16
Wealth index quintiles				
Poorest	24	19	***12***	74
2	26	20	***19***	53
3	34	29	***21***	64
4	40	33	***25***	77
Least poor	47	44	***37***	52
Total	34	29	***22***	320

**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 I6: Illness case management by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

Care management of fever, suspected pneumonia, and diarrhea for children 0-59 months with illness in the previous 2 weeks														
	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*	*% given any anti-malarial*	Number of children 0-59m with fever*	% with suspected pneumonia	*% taken to health facility*	Number of children 0-59m with pneumonia*	% with diarrhea	ORS (%)	ORS + RHF (%)	ORS/ RHF/ increased fluids (%)	*ORS/ RHF/ increased fluids with continued feeding (%)*	Number of children 0-59m with diarrhoea*
High Impact zone													
PAK (oueme)	19	1122	***64***	208	4	***39***	45	8	18	26	37	***30***	90
DAA (Zou)	35	1242	***69***	425	9	***26***	111	7	13	16	46	***37***	86
Commune													
Adja-Ouere	25	316	***55***	77	7	***19***	23	11	18	30	43	***32***	34
Agbangnizoun	50	458	***69***	227	14	***23***	63	8	8	10	57	***43***	36
Ketou	19	456	***73***	84	4	***66***	15	6	22	28	37	***32***	28
Pobe	14	350	***61***	47	2	***47***	7	8	13	21	30	***24***	28
Djidja	17	442	***69***	72	4	***39***	18	5	17	20	45	***34***	20
Abomey	38	342	***68***	126	9	***24***	31	9	16	19	34	***32***	30
Residence													
Urban	23	640	***72***	142	5	***36***	33	7	22	26	38	***36***	44
Rural	29	1723	***66***	491	7	***28***	123	8	13	20	43	***33***	132
Age in months													
0-5	20	279	***78***	55	10	***24***	27	4	11	11	22	***16***	11
6-11	33	310	***59***	99	9	***26***	29	15	15	20	43	***38***	45
12-23	37	496	***71***	176	8	***36***	40	13	15	21	38	***23***	65
24-59	24	1278	***66***	302	5	***30***	61	4	16	24	49	***45***	55
Sex													
male	28	1199	***68***	331	7	***37***	87	8	14	21	36	***30***	98
female	27	1165	***66***	302	6	***20***	69	7	17	22	49	***38***	78
Mother's education level													
None	26	1867	***65***	476	7	***26***	126	7	14	21	38	***30***	129
Primary School	31	375	***70***	115	6	***33***	22	11	16	20	52	***45***	42
Secondary school+	34	122	***89***	41	7	***71***	9	4	36	36	51	***38***	5
Wealth index quintiles													
Poorest	23	552	***56***	120	5	***26***	28	10	4	13	25	***19***	53
2	27	482	***63***	131	7	***29***	36	6	17	23	43	***25***	27
3	29	475	***67***	131	8	***37***	35	7	14	20	47	***42***	35
4	30	472	***73***	140	9	***29***	45	6	28	30	50	***46***	30
Least Poor	30	383	***78***	111	3	***25***	13	8	22	27	52	***44***	31
Total	28	2363	***67***	633	7	***30***	156	8	15	21	42	***34***	176

Table I7: Reported antimalarials given for fever in the 2 weeks preceding the survey in PAK and DAA zones and comparison areas in 2001, 2003 and 2006/7, Benin

	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**	Any AM w/in 24h	*Any AM treatment*	
DHS 2001									
National comparison	1	59	2	4	0	59	N/A	***66***	1559
High Impact zones	2	63	1	10	0	63	N/A	***70***	151
ACSD-CDC 2003*									
High Impact zones	5	67	0	1	0	67	50	***70***	**617**
ACSD-DHS 2006/07									
National comparison	1	50	0	0	1	1	N/A	***58***	3311
High Impact zones	1	62	0	5	0	0	54	***67***	633

Anti-malarial treatment columns are not mutually exclusive

** See CDC Data quality issues document*

***Appropriate antimalarial treatment defined as Benin policy for first line malaria treatment (CQ in 2001 & 2003; ACT in 2006/7)*

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

Table I8: Reported case management for diarrhoea in the 2 weeks preceding the survey in PAK and DAA zones and comparison areas in 2001, 2003 and 2006/7, Benin

	Children with diarrhoea in the last two weeks who were given:					
	ORS	**ORS and/or ORT**	**ORS, ORT and/or Increased fluids**	**Continued feeding**	***ORS, ORT and/or Increased fluids AND continued feeding***	**Number of children aged 0-59 months with diarrhoea****
DHS 2001						
National comparison	23	32	57	76	***43***	545
High Impact zones	42	49	53	73	***38***	30
ACSD-CDC 2003*						
High Impact zones	15	47	60	71	***46***	245
ACSD-DHS 2006/07						
National comparison	24	32	54	78	***42***	1187
High Impact zones	15	21	42	77	***34***	176

** See CDC Data quality issues document*

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

Table I9: Locations where care was sought for suspected pneumonia in the 2 weeks preceding the survey in PAK and DAA zones and comparison areas in 2001, 2003 and 2006/7, Benin

	Children with suspected pneumonia in the last two weeks who were taken to:					
	Not treated / treated at home / neighbors	Public health center / facility	Private Health center / facility	Private sector drug vendor	Other	Number of children aged 0-59 months with pneumonia**
DHS 2001						
National comparison	50	24	6	12	8	472
High Impact zones	54	27	3	0	16	43
ACSD-CDC 2003 *						
High Impact zones	36	55	8	2	0	236
ACSD-DHS 2006/07						
National comparison	41	26	9	13	13	1198
High Impact zones	42	21	8	22	7	156

** See CDC Data quality issues document*

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

Table I10: Infant feeding behaviours as reported by mothers by socio-demographic characteristics in PAK and DAA zones, Benin 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

	Timely initiation of breastfeeding	Birth within previous 12m*	*Exclusively breastfeed*	Number of children 0-5m**	*Complementary feeding*	Number of children 6-9m**	*Continued breastfeeding*	Number of children 20-23m**
High Impact zones								
PAK (oueme)	***43***	284	***22***	138	***83***	85	***69***	63
DAA (Zou)	***51***	324	***32***	140	***76***	130	***63***	94
Commune								
Adja-Ouere	***35***	80	***27***	34	***87***	32	***72***	12
Agbangnizoun	***44***	136	***26***	45	***80***	62	***86***	37
Ketou	***44***	103	***20***	49	***75***	27	***65***	27
Pobe	***49***	101	***22***	55	***85***	27	***72***	24
Djidja	***54***	115	***37***	56	***73***	44	***66***	29
Abomey	***58***	73	***32***	39	***70***	23	***30***	28
Residence								
Urban	***48***	164	***26***	82	***75***	49	***42***	49
Rural	***47***	444	***28***	196	***79***	166	***76***	108
Age in months								
0-2		-	***39***	136		-		-
3-5		-	***16***	142		-		-
Sex								
male		-	***29***	133	***82***	100	***69***	75
female		-	***26***	145	***75***	115	***62***	82
Mother's education level								
None	***49***	456	***28***	214	***75***	160	***71***	118
Primary School	***47***	104	***19***	47	***85***	32	***47***	27
Secondary school+	***34***	48	***37***	18	***96***	23	***55***	12
Wealth index quintiles								
Poorest	***53***	145	***26***	70	***84***	42	***57***	25
2	***45***	128	***29***	51	***75***	62	***73***	36
3	***46***	120	***27***	50	***76***	47	***81***	28
4	***49***	114	***28***	64	***60***	24	***62***	38
Least Poor	***42***	102	***27***	42	***91***	40	***54***	30
Total	***47***	608	***27***	278	78	215	***66***	157

** 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 I11: Antenatal care among women giving birth in the previous 12 months by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

Characteristics of antenatal care among women who have given birth in the previous 12 months												
	Number of ANC visits* (%)				Percent of pregnant women who had:* (%)							
	1+	2+	3+	Birth within previous 12m**	Blood test taken	Birth within previous 12m**	Blood pressure measured	Birth within previous 12m**	Urine specimen taken	Birth within previous 12m**	Weight measured	Birth within previous 12m**
High Impact Zone												
PAK (oueme)	64	60	***52***	284	22	281	63	284	60	284	63	284
DAA (Zou)	86	81	***74***	322	48	324	85	324	80	324	85	324
Commune												
Adja-Ouere	59	55	***47***	80	14	77	58	80	59	80	59	80
Agbangnizoun	85	79	***72***	136	43	136	85	136	77	136	85	136
Ketou	72	69	***63***	103	30	103	71	103	67	103	71	103
Pobe	59	55	***44***	101	21	101	58	101	52	101	58	101
Djidja	80	76	***67***	115	42	115	78	115	75	115	79	115
Abomey	97	95	***90***	70	67	73	95	73	95	73	97	73
Residence												
Urban	80	75	***64***	163	42	164	79	164	77	164	80	164
Rural	74	70	***63***	443	34	442	73	444	68	444	73	444
Months since birth												
0-5	73	68	***58***	286	34	287	73	287	67	287	73	287
6-11	77	74	***68***	320	39	319	76	321	74	321	77	321
Mother's education level												
None	72	67	***59***	455	32	453	71	456	67	456	72	456
Primary School	84	81	***72***	103	48	104	84	104	82	104	82	104
Secondary school+	91	91	***88***	48	48	48	91	48	84	48	91	48
Wealth index quintiles												
Poorest	56	49	***40***	145	18	143	54	145	50	145	54	145
2	72	69	***66***	128	40	128	71	128	67	128	71	128
3	84	75	***65***	120	34	120	83	120	77	120	84	120
4	78	77	***67***	114	43	114	76	114	77	114	77	114
Least Poor	96	95	***90***	100	53	102	96	102	91	102	96	102
Total	75	71	***64***	606	36	606	75	608	71	608	75	608

** 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: Antenatal interventions among women giving birth in the previous 12 months by socio-demographic characteristics in PAK and DAA zones, Benin 2006/7

Antenatal care (including IPT, TT, Fe) among women who have given birth in the previous 12 months							
	IPT for pregnant women (2 doses SP)	***IPT during pregnancy (any dose SP)***	Birth within previous 12m*	***Neonatal tetanus protection****	Birth within previous 12m*	***Iron supplement-ation for at least 3 months.***	Birth within previous 12m*
High Impact Zones							
PAK (oueme)	1	***1***	282	***38***	275	***57***	270
DAA (Zou)	10	***12***	324	***69***	322	***56***	323
Commune							
Adja-Ouere	3	***3***	78	***32***	75	***56***	75
Agbangnizoun	10	***11***	135	***77***	134	***42***	136
Ketou	0	***0***	103	***45***	102	***66***	103
Pobe	1	***1***	101	***36***	99	***49***	92
Djidja	6	***7***	115	***52***	115	***60***	115
Abomey	15	***20***	73	***79***	73	***77***	72
Residence							
Urban	6	***8***	164	***46***	163	***64***	159
Rural	5	***6***	442	***58***	434	***54***	434
Months since birth							
0-5	5	***6***	286	***48***	282	***54***	281
6-11	6	***8***	320	***61***	315	***59***	312
Mother's education level							
None	4	***4***	454	***50***	445	***53***	445
Primary School	6	***10***	104	***63***	104	***58***	101
Secondary school+	23	***26***	48	***76***	48	***88***	47
Wealth index quintiles							
Poorest	1	***2***	145	***34***	139	***45***	137
2	7	***7***	128	***60***	124	***51***	127
3	3	***3***	119	***63***	120	***53***	120
4	3	***5***	113	***55***	113	***66***	112
Least Poor	16	***18***	102	***65***	102	***72***	97
Total	6	***7***	606	***55***	597	***56***	594

** 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 I13: Assisted delivery and post-natal care among women giving birth in the previous 12 months by socio-demographic characteristics in PAK and DAA zones, Benin 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**
High Impact Zones						
PAK (oueme)	***63***	284	***73***	283	***28***	284
DAA (Zou)	***83***	323	***94***	324	***47***	324
Commune						
Adja-Ouere	***56***	80	***69***	80	***17***	80
Agbangnizoun	***85***	136	***97***	136	***59***	136
Ketou	***76***	103	***85***	103	***34***	103
Pobe	***55***	101	***63***	100	***30***	101
Djidja	***74***	114	***89***	115	***31***	115
Abomey	***93***	73	***96***	73	***51***	73
Residence						
Urban	***85***	164	***90***	163	***38***	164
Rural	***69***	443	***82***	444	***38***	444
Months since birth						
0-5	***72***	286	***81***	286	***34***	287
6-11	***75***	321	***87***	321	***42***	321
Mother's education level						
None	***69***	455	***80***	456	***34***	456
Primary School	***84***	104	***97***	103	***55***	104
Secondary school+	***97***	48	***100***	48	***41***	48
Wealth index quintiles						
Poorest	***48***	145	***59***	145	***21***	145
2	***72***	128	***86***	128	***40***	128
3	***79***	120	***91***	120	***48***	120
4	***82***	112	***96***	114	***43***	114
Least Poor	***96***	102	***98***	101	***44***	102
Total	***74***	607	***84***	607	***38***	608

** 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*

APPENDIX J
Summary of contextual factors

This section is comprised of narrative and tables concerning contextual factors that may be associated with ACSD coverage and impact 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. The contextual factors considered in the evaluation were based on previous work by Victora et al.[65] We examine other activities taking place in the ACSD high impact zones, changes in health care provision, changes in national policies. Other factors, such as changes in national policies and pricing, which may influence intervention coverage, are also considered. Socio-economic and demographic factors in 2001 and 2006 are presented in the body of the report.

The ACSD strategy emphasized working with national and local partners. Table J1a shows activities carried out by UNICEF's national and local partners in the period between 2002 and present. ACSD worked most closely with activities supported by the Benin national ministries, although in the DAA health zone, Population Services International, an international NGO specializing in social marketing, promoted and distributed ITNs.

Table J1a: Child health and nutrition activities implemented by UNICEF partners in DAA and PAK health zones in 2002-present, Benin

DEVELOPMENT ACTIVITIES	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING	DESCRIPTION OF COLLABORATIONS WITH UNICEF
Maternal and child health; nutrition; family planning; youth and AIDS	MOH Family Health Department (Direction de la Santé Familiale)	National-level; PAK & DAA: on-going	Strong collaboration with UNICEF on all aspects of ACSD, also collaboration with UNFPA
Prevention and treatment of malaria; Distribution of ITNs as part of Roll Back Malaria Initiative	National Programme against Malaria (PNLP)	National-level; PAK & DAA: on-going	Collaborate with UNICEF on ITN distribution
IMCI training & supervision; monitoring systems, including PBT; BCC for malaria treatment & prevention; C-IMCI & mother's groups	PROPLIPO (MOH-led malaria control project in Ouémé-Plateau region in Benin, implemented by CDC with support from USAID)	Oeume-Plateau: PAK; 2000-2005	Collaborate with UNICEF on malaria BCC, ITN distribution & promotion, mother's groups,
Prevention and treatment of HIV/AIDS including PMTCT	National Plan against HIV/AIDS (PNLS), with local NGOs	National level; PAK & DAA; on-going	Collaborate with UNICEF in PMTCT
Distribution of ITNs	Population Services International (PSI)	Zou-Collines; DAA: 2002-present	Funded by UNICEF/ACSD to distribute & promote ITNs

Many of the other project activities taking place in 2002 to the present in the HIZs focused on clinical improvements, especially in maternal and neonatal health (table J1b). Many of these smaller projects focused on support and care for AIDS orphans and vulnerable children, as well as prevention of mother-to-child transmission of HIV (PMTCT). Local and international NGOs in DAA also carried out nutritional rehabilitation and education in selected communes. Table J1b presents other development project activities taking place in the "high impact" zones.

Table J2 presents other contextual factors possibly associated with levels of coverage in the HIZs and the rest of Benin. To our knowledge, there were no natural disasters, famines or other emergencies in the HIZs or comparison areas from 2000 to present. In 2005, the regions of Aribori and Atakora in the north of Benin did experience food insecurity, associated with the famine in neighboring Niger.[66] There were a number of important national policy changes during this period, which are also reviewed in the table, notably:

- Introduction of pentavalent vaccination in June 2005
- Change in first-line antimalarial policy from chloroquine to ACTs, with implementation not generalized
- Importation of polio from Nigeria to Benin, with 2 cases in late 2003,and 6 cases in early 2004[5] necessitating the organization of national immunization days (2 campaigns/year in 2004, 4 campaigns/year in 2005 and 2006, and 1 campaign in April 2007)
- Distribution of Vitamin A supplementation twice a year, coupled with polio campaigns when they were organized, starting in 2002
- Changes in policies concerning the price of ITNs

Available information about changes in health services over the study period is presented in further details in table J3. Finally, table J4 describes the evolution of antimalarial resistance, policies and availability in Benin.

Table J1b: Health and development project activities in PAK and DAA zones, Benin

ACSD ELEMENT	OTHER DEVELOPMENT ACTIVITIES WITH POSSIBLE INFLUENCE	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING	NOTES
IMCI+ **ITNs, Case management & feeding practices**	Quality assurance through accompanied strengthening of medical capacities by Tutorat* method.	USAID/URC (University Research Corporation)	PAK; 2004-2005	In Tutoral, a team integrates into an existing team and helps them to strenghten their quality of care and services.
	Nutritional rehabilitation and home training	Ministère de la Famille et de l'Enfant (Child and Family): Centre de Promotion Sociale in collaboration with CRS	PAK; 2005	
	Orasel (ORS) advocacy;	Population Services International (PSI)	DAA; 1993 - Present	
	Maternal & child health through MOH support; ITNs & antimalarial treatment	Integrated Family Health Project (PISAF)	DAA; late 2006-2007	Inaugurated in mid-2006, only ITN distribution in Feb 2007; Collaborated with UNICEF on ITNs
	Financial and nutritional care and support for children & advanced strategy plan	Bornn Fonden (German NGO)	Agbangnizoun; 2005-2006	Collaboration with the Child Protection Division of UNICEF
	Care, support, and consultation for orphans and vulnerable children. IMCI centre and curative care.	Centre de Santé St Enfants Jesus	Abomey	
	Care and support to pedetric centre in Abomey, especially children with severe malnutrition. Built Sedogoho centre and trained personel.	Terres des Hommes	Abomey; 2000 to present	
	Care and support for orphans and vulnerable children; malaria, HIV/AIDS, and/or TB patients; and children with a Buruli ulcer.	Centre de Sante de Davougon	Abomey: 1980s - present	
	Nutritional, pschycological, and medical care and support for 360 Orphans and Vulnerable Children due to HIV/AIDS	Catholic Relief Services (CRS)	Abomey; 2001 to present	

ACSD ELEMENT	OTHER DEVELOPMENT ACTIVITIES WITH POSSIBLE INFLUENCE	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING	NOTES
Antenatal, delivery and postnatal care	Training of quality maternity health providers in postpartum hemorrage prevention	USAID	PAK & DAA; 2004	
	Maternal and neonatal mortality reduction: Technical strenghtening on: (1) Medico-technical equipment; (2) information technology; (3) provision of emergency obstetrical kits, and contraceptives; (4) vehicle and motorcycle provision.	UNFPA	PAK: 1988-present	
	Maternal and child health; Family Planning consultations	ABPF (Association Béninoise de Planning Familial) - Family Planning	Abomey; on-going	
	Care and support for OVC (Orphans and Vulnerable Children) due to HIV/AIDS; PMTCT follow-up	GADMIR/Action Social	PAK; 2000-present	
Other activities (without likely short-term influence on coverage)	HIV awareness for sexually-active adults, young adults, women of reproductive age, pregnant women and mothers with children under five years of age; Ditribution of contraceptives incl. condoms.	Population Service International (PSI)	DAA; 1993 - Present	
	Promotion of formal and non-formal education for children and youth (cantines scolaires)	WFP	DAA; Present	
	Hygiene and sanitation: latrine building and increase provision of potable water; promoting proper hygiene and sanitation methods (ie. washing-hands)	MoH: PADSEA (Program d'Appui au Developpement du Secteur Eau et Assainissement) with support/funding from DANIDA	DAA (Project is applied to the dept); 1993-2009	

ACSD ELEMENT	OTHER DEVELOPMENT ACTIVITIES WITH POSSIBLE INFLUENCE	LEAD AGENCY	GEOGRAPHICAL COVERAGE & TIMING	NOTES
	Prevention and treatment of HIV/AIDS including Prevention of Mother-to-Child Transmission. Have CIPEC (Centre d'Information de Prospective d'Education et de Conseils pour le SIDA)	PNLS National Plan against HIV/AIDS in collaboration with local NGOs. In Abomey, particularly with Peace Benin. And CNLS (National AIDS Committee)	DAA & PAK; late 1980s-present	
	Agriculture and health	CIRAPIP	Djidja: present	
	Maternal mortality reduction: Personnel training on:(1) organizing audits of maternal deaths; (2) Family planning and STI/HIV/AIDS integrated care and management protocols.	UNFPA	PAK	
	Water and sanitation	Ministère de l'Eau et des Ressources Hydrologiques: Direction Hydraulique Villageoise in collaboration with GTZ	PAK	

Table J2: Contextual factors and possible associations with ACSD implementation packages, Benin.

	CONTEXTUAL FACTOR	TIMING	POSSIBLE ASSOCIATION WITH COVERAGE OUTCOME(S)
Cross-cutting	Introduction & set up of additional health centers (HC) in DAA	2003- Outo HC in DAA; 2004-Monsourou HC in DAA;[28] 2005- Lobeta HC & Sahè maternity in DAA;[34, 40] 2006- Honhou HC in DAA	Possible links to interventions delivered through outreach (vaccination) and through facilities (IMCI & ANC)
	Road construction in Ouémé-Plateau (PAK)	Periodically	Possible increased access to health services & economic activity
EPI+	Introduction of Hepatitis B vaccine	2003	?
	Introduction of de-worming with campaigns	2003- Ouémé/Plateau and Zou/Collines including DAA and PAK 2005- national level	Possible better attendance at campaigns due to de-worming
	Introduction of pentavalent vaccine into national policy & EPI	June 2005	Hib vaccination
	Wild poliovirus found in Benin[5]	2003 and 2004	Sizable investments of time & resources to combat polio
	Measles campaigns	2003 and 2005	Increase coverage in measles and decrease in measles cases
	Polio campaigns	on-going	Vitamin A distributed during campaigns
ITNs	Pricing changes in ITNs	**2002** - CFA 3500 (~7 USD); **2003** - official price reduced to cfa1500 (~ 3 USD) for pregnant women and children under 5 years of age. **2005** -- CFA 500 (~ 1 USD) for targeted populations	Possible changes in demand (& supply) due to pricing
	ITN stock-outs	late 2005 to mid-2007	Few ITNs available in HIZs
IMCI+ Case management & feeding practices	Increasing levels of chloroquine resistance	Since 2001-present (see appendix table J4)	Decrease in use of chloroquine
	ACTs (CoArtem) as national 1st line antimalarial policy	2004	No availability of 1st line antimalarial in most of Benin at present

Table J3: Evolution of health service factors in PAK, DAA and comparison areas, Benin

Health services factors over time (source: Annuaire statistique 2003, 2005)	2003	2005
Number of health zones		
PAK	1	1
DAA	1	1
Benin, exclude Cotonou & HIZ	28	28
Functional Hospital per zone		
PAK	1/1	1/1
DAA	0/1	0/1
Benin, exclude Cotonou & HIZ	23/28	24/28
Commune health center per zone (2ndary)		
PAK	3	3
DAA	3	3
Benin, exclude Cotonou & HIZ	2.2	2.3
Arrondissement health center per zone (1ery)		
PAK	13	14
DAA	17	21
Benin, exclude Cotonou & HIZ	14	19
% arrondisements covered in CSA or CSC		
PAK	94%	100%
DAA	69%	72%
Benin, exclude Cotonou & HIZ	87%	91%
Population per public health center		
PAK	17,056	17,116
DAA	11,224	9,902
Benin, exclude Cotonou & HIZ	13,406	14,217
Population per Public Doctor		
Zou (DAA+COZ+BZZ)	19,313	23,266
Plateau (PAK + SI)	27,288	29,813
Benin, exclude Cotonou, Zou, Plateau	28,696	23,679
Population per Public Nurse		
Zou (DAA+COZ+BZZ)	4,383	3,071
Plateau (PAK + SI)	13,528	5,024
Benin, exclude Cotonou, Zou, Plateau	6,106	3,770

Table J4: Cholorquine resistance patterns in southern and central Benin and first line treatment availability and policies in Benin 2000 to 2007

1st line antimalarial policy													
Chloroquine													
ACTs													
Availability of:													
Chloroquine													
ACTs											Ltd availability in Mono-Couffo*		
Year	**2000**	**2001**		**2002**					**2003**	**2004**	**2005**	**2006**	**2007**
Chloroquine Resistance in South & Central Benin													
% treatment failure	**14%**	**21%**	**14%**	**18%**	**39%**	**61%**	**28%**	**35%**			**86%**		
N of patients	42	42	43	40	63	65	62	315			14		
Area of study	Sèmè-Podji – Ouémé	Lokossa-Mono	Parakou-Borgou	Adjarra-Ouémé	Abomey-Zou	Dassa-Zoumé-Collines	Lokossa-Mono	"National reported by PNLP			Ouidah Atlantique		
Source	PNLP[67]	PNLP[67]	PNLP[67]	PNLP[67]	PNLP, World Bank[68, 69]	PNLP, World Bank[68, 69]	PNLP, World Bank[68, 69]	PNLP, World Bank[68]	No data	No data	Aubouy, et al[70]	No data	No data

*Starting in 2005, ACTs were available at a very limited scale in Mono-Couffo departments through Global Fund support.

NOTE: *Chloroquine resistance data adapted from review prepared and shared by Alex Rowe of CDC-Atlanta*

APPENDIX K
Description of methodological challenges

This section discusses the methodological challenges faced by the evaluation team. These are related 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.[71] This section first discusses 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, appendix E provides a list of the questions utilized for indicator calculation from each survey, and appendix Q compiles the questions from each survey.

General methodological challenges.

The principal 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 subgroups, 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 HIZs and do not introduce a bias into the estimations, they are much less precise than later estimates based on larger sample sizes. Confidence limits for the point estimates are presented in appendices G and H. 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 used in 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. Some differences, however, are worth noting. The 2006 DHS was conducted in conjunction with an economic survey that was representative at the commune level; thus its sample size was three times larger than in 2001. Interviewer training, especially for the vaccination and bed-net modules, was also more intensive in 2006. It is unlikely that these differences would have greatly biased the measured levels of coverage or the differences between districts.

The data from the supplemental surveys carried out in the HIZs in May of 2007 were merged with the data from households surveyed during the DHS 2006. These surveys were methodologically similar in almost all aspects. If anything the quality of the 2007 supplemental survey may have been superior 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. In the DHS 2006, supervision occurred once every two weeks for three months, while in the supplemental survey; supervisors remained in the field for the entire month of data collection.

The period of data collection in the 2001 and 2006 DHS surveys was between August and September, spanning the end of the rainy season and the beginning of the dry season. The supplemental survey was carried out in May of 2007, which was the start of the rainy season. This difference in seasonality did not appear to influence estimates of ITN use or malarial treatment, which were not statistically different between the 2006 and 2007 surveys (table K1).

Table K1: Comparison of coverage indicator estimates from the DHS 2006 and Supplemental DHS 2007 in PAK and DAA zones, Benin

ACSD Indicator	Indicator (%)			Combined Estimate
	2006	2007	Chi2 (p)	
EPI+				
Any measles vaccination (12-23m)	60	59	NS	59
Any 3x DPT vaccination (12-23m)	64	62	NS	63
Any 3x HIB vaccination (12-23m)	8	31	**<0.01**	18
Percentage of children 6 - 59 who received at least one high dose vitamin A supplement within the last 6 months	56	67	**0.01**	61
Percentage of children aged 0-59 months sleeping under an insecticide treated mosquito net (ITN: trt'd <=12m) (woman quest.)	28	24	NS	26
Percentage of pregnant women sleeping under an insecticide treated mosquito net (ITN: <=12) (household quest)	22	23	NS	22
IMCI+				
Percentage of children aged 0-59 months with suspected pneumonia taken to an appropriate health provider	26	36	NS	30
Percentage of children aged 0-59 months with fever receiving antimalarial drugs*	68	66	NS	67
Percentage of children aged 0-59 months with diarrhoea receiving ORS, RHF or increased fluids and continued feeding	38	31	NS	34
Percentage of newborns put to the breast within one hour of birth	47	48	NS	47
Percentage of infants aged 0-5 months who are exclusively breastfed	31	22	NS	27
Percentage of infants aged 6-9 months who are breastfed and receive complementary food	70	91	**<0.01**	78
Percentage of children aged 20-23 months who are currently breastfeeding	67	64	NS	66
ANC+				
Percentage of pregnant women who report at least 3 prenatal visits to a trained worker (doctor, nurse or midwife)	64	63	NS	64
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 received postnatal care)	89	78	**0.03**	84
Percentage of newborns protected against tetanus (2+ doses TT during pregnancy)	59	49	**0.07**	55
Percentage of pregnant women receiving 3 months of iron supplementation.	51	64	**0.01**	56
Percentage of births attended by skilled health personnel (doctor, nurse or midwife)	78	68	**0.06**	74
Percentage of women receiving vitamin A supplementation within 2 months of birth	35	43	NS	38
Percentage of pregnant women receiving intermittent preventative treatment for malaria during pregnancy in previous year (any SP)	4	11	**0.04**	7

Challenges in measuring EPI+ coverage.

Because of the recent introduction of the pentavelent vaccine, there have also been changes in the way that vaccination cards are filled in, which might influence the vaccination coverage estimate. In 2006/7, interviewers received more intensive training on how to extract vaccination dates from the vaccination cards than in 2001. Vaccinations were recorded separately if the child was given the pentavalent vaccine, because some children who got the DTP without the other 2 antigens (Hib & Hep B). Thus, there were possible differences in the way vaccination responses were collected in 2001 versus 2006/7.

Samples of vitamin A were given to interviewers at the start of the 2001 DHS and the 2006 DHS; however, samples were only available for the second part of the supplementary DHS survey, which could have led to a possible reduction in coverage in the 2007 supplemental sample relative to the main 2006 survey. This is assuming that mothers in 2006 may have reported different medications as being vitamin A, and by showing them the capsule in 2007 there would be fewer false positives. On the other hand, vitamin A mass distribution, coupled with the national polio campaign, took place in April 2007, just before the supplemental survey. We would expect better recall of more recent vitamin A supplementation. The finding that vitamin A coverage estimates from the supplemental survey in 2007 were higher than those from the original 2006 survey suggests an effect of the campaign (table K1).

Challenges in measuring ITN coverage.

Technical staff at the Benin national statistical offices reported few differences in the collection of ITN information between 2001 and 2006. Training in 2006/7 was more detailed than in 2001, with demonstrations of types of bed-nets and retreatment kits. In 2001 bed-net use was reported by women in the individual questionnaire, while in 2006/7, bed-net use was collected in both the household and women's questionnaire. The respondent for the household questionnaire is often the head of the household, and it was found that the information about use of ITNs was statistically lower if assessed through the household versus women's questionnaire. In order to maintain comparability of indicators between 2001 and 2006/7, we utilized the information collected in the women's question for ITN indicator calculation, except ITNs among pregnant women where treatment status had not been assessed in the women's questionnaire.

In the 2001 DHS survey, the questions pertaining to bed-net use among pregnant women did not assess the treatment status of the bed-net. Thus it was not possible to calculate ITN use among pregnant women in 2001, and bed-net use—irrespective of treatment status—is utilized as a proxy indicator.

Challenges in measuring case management and feeding practices.

The preferred indicator for treatment of fever is "treatment with an appropriate antimalarial within 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 ANC+

The measurement of IPT with SP among pregnant women presented many challenges. The DHS 2001 contained no information on the number of doses of SP. Also, IPT with SP during pregnancy was not available or implemented in 2001, yet over one-fourth of women reported receiving SP during pregnancy. The question concerning SP use during pregnancy asks about treatments taken to avoid (*eviter)* malaria in pregnancy and it is possible that women interpreted this as malaria treatment. There is also a possible bias in this indicator because there were no antimalarial samples until the 2nd week of the supplemental survey in 2007. Pregnant women that had received SP for IPT, may have reported use of chloroquine—another white, commonly known antimalarial tablet—if the health agent did not tell women the name of the tablet.

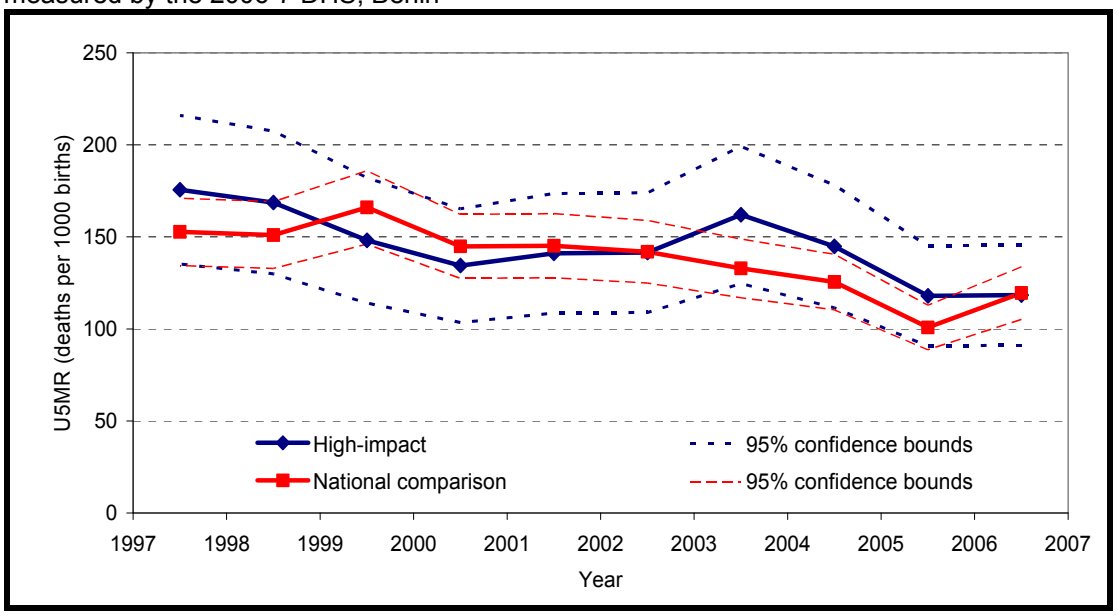
In 2001, only women who had delivered outside a facility were questioned about postnatal consultation, and it was assumed that women who had delivered in a facility received a postnatal visit. In the 2006 DHS and 2007 supplemental survey, ***all*** women were questioned about postnatal consultation, 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.

Challenges in measuring mortality

The aim of this section is to provide more detail on child mortality data in Benin "high-impact" zones (HIZs), 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 annex is on under-five mortality rate (U5MR) data from a single survey that collected data in 2006 and 2007. Figure K1 shows mortality decline by year for the HIZs 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 HIZs, 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 rates of under-five mortality in "high-impact" zones and comparison areas as measured by the 2006-7 DHS, Benin



Mortality data - overall quality assessment

A first step in the data quality assessment is to focus on the elements included in table K2. This table is used extensively in the DHS final reports to provide an assessment of data quality (see for example the Benin DHS 2006 report, page 351). 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 K2 shows a wide variation around 100 – from 68 to 137.

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 K2 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 dips in births for 2001 and 2002 are 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 generally 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 major dips and peak.

Figure K2: Births and deaths by calendar year for "high-impact" zones, combined 2006 and 2007 DHS data, Benin

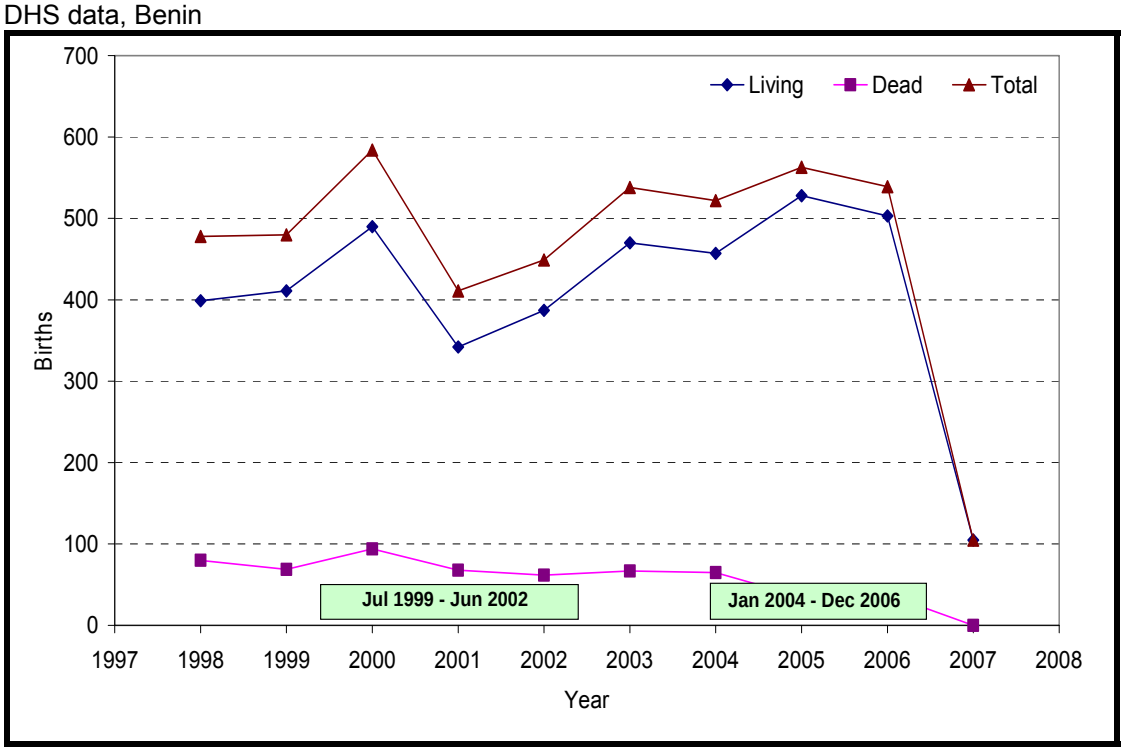


Table K2: Births by calendar year in "high-impact" zones for combined 2006 and 2007 DHS, Benin

Calendar year	Number of births			Percentage with complete birth			Sex ratio at birth			Calendar year ratio		
	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total
2007	105	0	105	-	-	-	-	-	-	-	-	-
2006	503	38	539	98.0	95.7	97.8	101.8	115.9	102.7	-	-	-
2005	528	35	563	96.8	93.1	96.6	101.2	119.3	102.3	110.0	68.0	106.1
2004	457	65	522	94.3	95.2	94.5	116.9	125.3	117.9	91.6	127.5	94.8
2003	470	67	538	93.8	85.0	92.6	93.8	110.3	95.7	111.4	105.5	110.8
2002	387	62	449	94.7	85.0	93.4	96.1	105.2	97.3	95.3	91.9	94.6
2001	342	68	411	87.4	77.1	85.7	87.3	77.3	85.4	78.0	87.2	79.6
2000	490	94	584	83.7	72.6	81.9	92.3	100.2	93.5	130.1	137.2	131.1
1999	411	69	480	83.8	62.1	80.7	105.1	147.0	110.2	92.5	79.3	90.4
1998	399	80	478	80.1	67.6	78.0	101.1	110.9	102.7			
2003-2007	2063	204	2267	90.9	91.6	91.0	102.7	117.4	104.0	-	-	-
1998-2002	2029	373	2403	85.7	72.5	83.6	96.3	105.5	97.7	-	-	-
1993-1997	1540	314	1854	74.8	70.9	74.2	102.4	123.1	105.6	-	-	-
1988-1992	1004	273	1277	74.0	66.4	72.4	108.8	127.9	112.6	-	-	-
<= 1991	893	316	1209	71.6	65.0	69.9	97.8	115.7	102.2	-	-	-
All	7529	1481	9010	81.7	72.1	80.1	101.1	116.9	103.5	-	-	-

[1] Both year and month of birth given

[2] (Bm/Bf)x100, where Bm and Bf are the numbers of male and female births, respectively

[3] [2Bx/(Bx-1+Bx+1)]x100, where Bx is the number of births in calendar year x

The second part of table K2 is the three sets of columns headed *Percentage with complete birth date*. This shows that births with a complete birth date vary from 98% down to 62% 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. However, respondents in Benin and other countries in West Africa have difficulty in providing complete birth dates, as can be see from a review of the comparable table in DHS reports in Mali and Senegal. Indeed, the previous DHS in Benin in 2001 had incomplete birth dates ranging from 99% down to 26% in the ten-year period before the survey.

However, month is the major missing part of the birth date. For example, the 2006 DHS had 13.5% of birth dates with missing month and only 0.1% with missing year. The 2001 DHS had 38.9% missing month and 0.1% missing year. The implication is that mortality estimates for multiple year periods should reduce the impact of missing month.

The third part of table K2 is the three columns headed *Sex ratio at birth*. These ratios 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 77, and a peak around 1999 to147. 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 K3 shows that the periods used for calculating mortality (as delineated in figure A2) provide an averaging of births and deaths data across the low and high sex-ratios. Hence the periods used in the ACSD evaluation in Benin for estimating endline and, particularly, baseline mortality, reduce the impact of these sex-ratio variations.

Table K3: Sex ratio at birth by calendar year in the "high-impact" zones for combined 2006 and 2007 DHS, Benin

	Sex ratio at birth*		
Calendar year	Living	Dead	Total
2007	-	-	-
2006	101.8	115.9	102.7
2005	101.2	119.3	102.3
2004	116.9	125.3	117.9
2003	93.8	110.3	95.7
2002	96.1	105.2	97.3
2001	87.3	77.3	85.4
2000	92.3	100.2	93.5
1999	105.1	147.0	110.2
1998	101.1	110.9	102.7
All	101.1	116.9	103.5

Multi-year sex ratio		
Living	Dead	Total
106.0	121.1	107.2
95.2	104.2	96.5

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

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

Mortality data – quality assessment by sub-samples

The following focuses on disaggregation of the mortality estimates in terms of male-female, HIZs and survey data collection period.

First, the HIZs (PAK and DAA).are located in two different regions with somewhat different situations. Additionally, there were two survey data collection periods, with the first in late 2006 as part of the DHS 2006. However, this produced too small a sample for assessing mortality for the ACSD project, so an additional sample was selected and interviewed in early 2007 in the HIZs only. The questionnaires for both survey periods used the same full birth history set of questions for estimating child mortality, and included many of the same questionnaire modules as the DHS 2006.

Table K4 presents these disaggregated by survey year (2006 versus 2007), child's sex and health zone. Most striking is the difference between the 2006 survey in HIZs versus the 2007 survey. These two sets of estimates should be the same, within sampling error, since they use the same questions and were sampled from the same population. However, when one calculates the difference between the two baseline estimates (for period July 1999 – June 2002), which is 60, and then the standard error (SE) of this difference, one obtains 95% confidence limits for the difference of 23 to 97; even the 99% confidence limits do not include zero. Hence, while there is a chance that this difference is due to sampling error, the likelihood of this is very small, at less than 1 in 100.

Table K4: Disaggregated under-five mortality rates in "high-impact" zones and comparison area zone as measured in the 2006-7 DHS, Benin

	Jan 2004 - Dec 2006		July 1999 - Jun 2002		% reduction
Area	U5MR	SE	U5MR	SE	from baseline
High impact (2006+2007)	123	8.0	141	9.7	13
High impact 2007	120	10.0	174	14.2	31
High impact 2006	125	12.4	114	11.8	-10
Male	122	12.7	159	14.4	23
Female	123	10.0	123	13.6	0
PAK	101	10.0	133	12.2	24
DAA	142	10.8	148	14.9	4
National comparison	109	4.1	145	4.9	25
Male	110	5.5	154	6.2	29
Female	108	5.4	136	6.3	21

What are the implications from such a finding? If one could identify data from one of the survey components to be considerably better than the other, then it would be appropriate to weight the survey estimates so as to favor the better quality data. However, given the wide differences between the baseline estimates of mortality from the two survey components, this can have a very major impact, varying from a 10% increase in mortality over the ACSD project period (from the 2006 component) to a 31% decrease in mortality (from the 2007 component).

Table K5 provides a basis for assessing data quality between the two surveys. For the most recent ten years the *calendar year ratio* has 2007 survey extremes of 65 to 126, whereas the 2006 survey extremes are 60 to 156; for the *sex ratio at birth* the 2007 extremes are 87 to 136, whereas the 2006 extremes are 40 to 163. However, the *percentage with complete birth date* has extremes of 54 to 100

for 2007 and a lower range of 73 to 100 for 2006. A conclusion from this is that the 2007 data may be better than the 2006 data, but the evidence is not strong.

Table K5: Births by calendar year for living and dead children by survey sample year in the "high-impact" zones, Benin

Calendar year	Number of births			Percentage with complete birth date[1]			Sex ratio at birth[2]			Calendar year ratio[3]		
	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total	Living	Dead	Total
HIGH IMPACT AREAS (2007)												
2007	105	0	105	-	-	-	99	-	99	-	-	-
2006	244	24	267	97	93	97	113	87	110	-	-	-
2005	237	20	257	96	93	96	115	134	116	101	79	99
2004	226	27	253	93	88	93	112	188	119	102	126	104
2003	207	23	231	93	71	91	89	108	91	105	95	104
2002	169	22	191	96	69	93	91	88	91	86	65	83
2001	184	44	228	79	65	76	102	108	103	100	118	103
2000	201	52	253	81	57	76	112	101	110	112	126	115
1999	175	39	214	78	54	73	104	136	109	98	84	95
1998	155	41	196	74	59	71	84	93	86	90	99	92
2003-2007	1,019	94	1,113	85	86	85	106	125	108	-	-	-
1998-2002	884	198	1,083	82	60	78	99	105	100	-	-	-
1993-1997	652	150	802	65	48	62	90	150	99	-	-	-
1988-1992	395	99	494	60	40	56	111	128	114	-	-	-
<= 1991	310	121	431	52	38	48	80	132	92	-	-	-
All	3,260	663	3,923	74	54	71	99	125	103	-	-	-
HIGH IMPACT AREAS (2006)												
2007	-	-	-	-	-	-	-	-	-	-	-	-
2006	259	14	272	99	100	99	93	195	96	-	-	-
2005	291	15	306	98	93	98	91	103	92	119	56	113
2004	231	38	269	96	100	96	122	95	117	83	130	88
2003	263	44	307	94	92	94	98	112	100	117	112	117
2002	218	40	258	94	94	94	100	117	103	103	117	105
2001	158	24	183	97	100	97	73	40	67	62	60	62
2000	289	42	331	86	92	86	81	99	83	147	156	148
1999	236	30	266	88	73	87	106	163	111	89	74	87
1998	244	39	282	84	76	83	114	134	117	117	114	116
2003-2007	1,044	110	1,154	97	96	97	99	112	100	-	-	-
1998-2002	1,145	175	1,320	89	87	89	94	106	96	-	-	-
1993-1997	888	164	1,052	82	92	84	112	103	111	-	-	-
1988-1992	609	174	783	83	82	83	108	128	112	-	-	-
<= 1991	583	195	778	82	82	82	109	107	109	-	-	-
All	4,269	818	5,087	88	87	88	103	111	104	-	-	-

[1] Both year and month of birth given

[2] (Bm/Bf)x100, where Bm and Bf are the numbers of male and female births, respectively

[3] [2Bx/(Bx-1+Bx+1)]x100, where Bx is the number of births in calendar year x

Further disaggregation of the data in table K4 may also be informative and specifics are shown in table K6. As can be clearly seen, the difference between the 2006 and 2007 surveys continues even when disaggregated by male and female and by high-impact area (PAK and DAA). The largest difference is for DAA where the 2007 survey estimates a 28% reduction in mortality, whereas the 2006 estimates a 25% increase over the period of the ACSD project. While it is difficult to accept a 25% increase in U5MR in the face of a widespread decline in mortality in Benin, this increase is not statistically significant.

In summary, while the difference between the mortality estimates from the 2006 and 2007 surveys has only a small chance of being due to sampling error, it is difficult to attribute this difference to one survey being of better quality than another. At the same time an increase in mortality over the period of the ACSD project goes against the overall trend of a reduction in mortality in Benin. Hence, while

one is tempted to give greater weight to the 2007 survey data, there is insufficient strength of evidence to support a change in weight. The conclusion from this is that the reduction of 13% in U5MR reported in the main section should stay as is, but with a strong caveat that the quality of the mortality data is problematic, due to evidence of sizeable non-sampling errors in addition to sampling errors.

Table K6: Under-five mortality rates disaggregated by survey sample year, child sex, and health zone in the "high-impact" zones, Benin

		U5MR		
Area		Jan 2004 - Dec 2006	July 1999 - Jun 2002	% reduction from baseline
Male				
	2007	111	199	44
	2006	132	127	-4
Female				
	2007	128	148	14
	2006	118	103	-15
PAK				
	2007	98	149	34
	2006	104	118	12
DAA				
	2007	146	204	28
	2006	140	112	-25

APPENDIX L

Tables presenting additional nutritional analyses

Figure L1 : Protocol for inclusion and exclusion of cases for nutrition analyses in "high-impact" zones and national comparison as measured in 2001 DHS, Benin

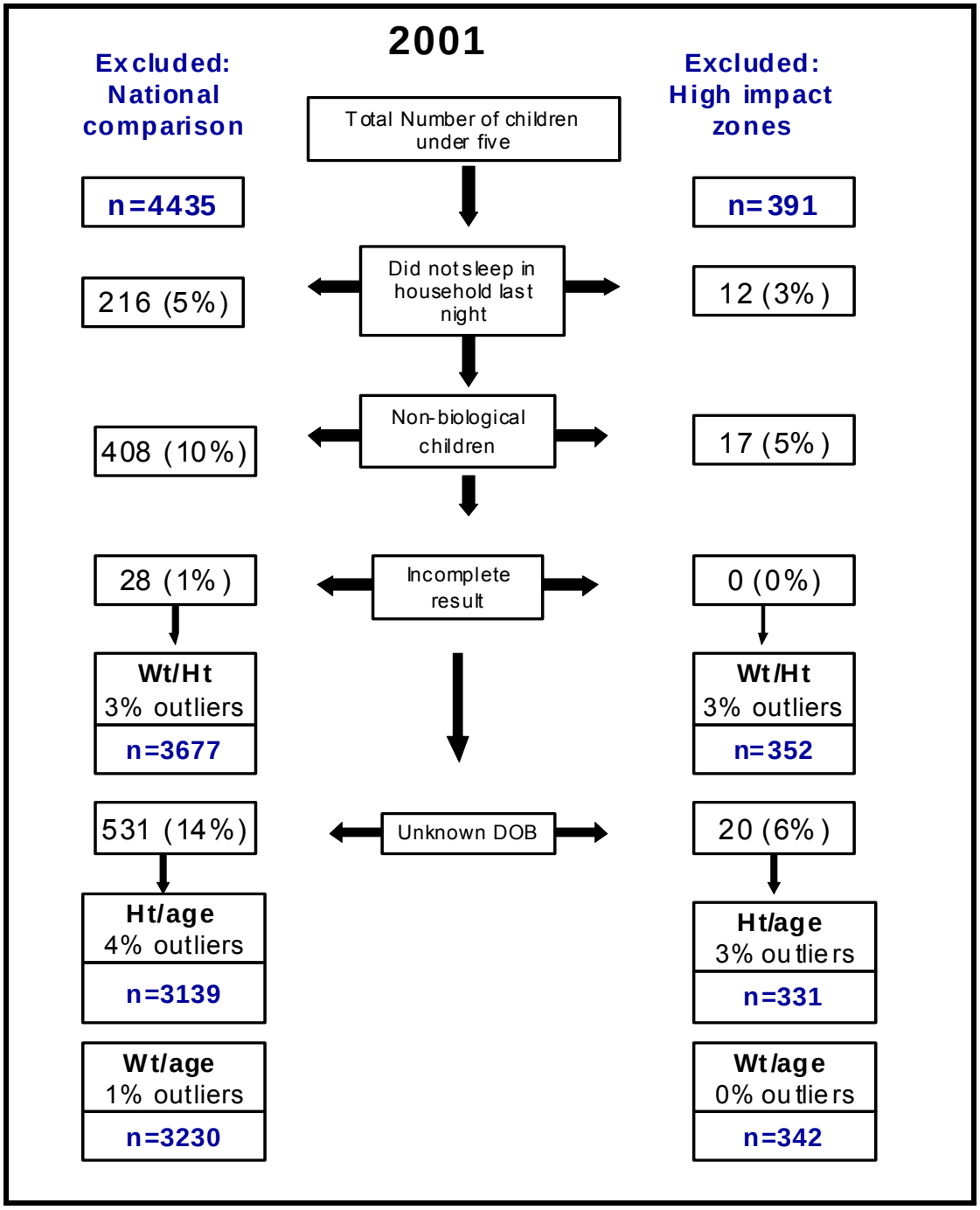


Figure L2 : Protocol for inclusion and exclusion of cases for nutrition analyses in "high-impact" zones and national comparison as measured in 2006-7 DHS, Benin

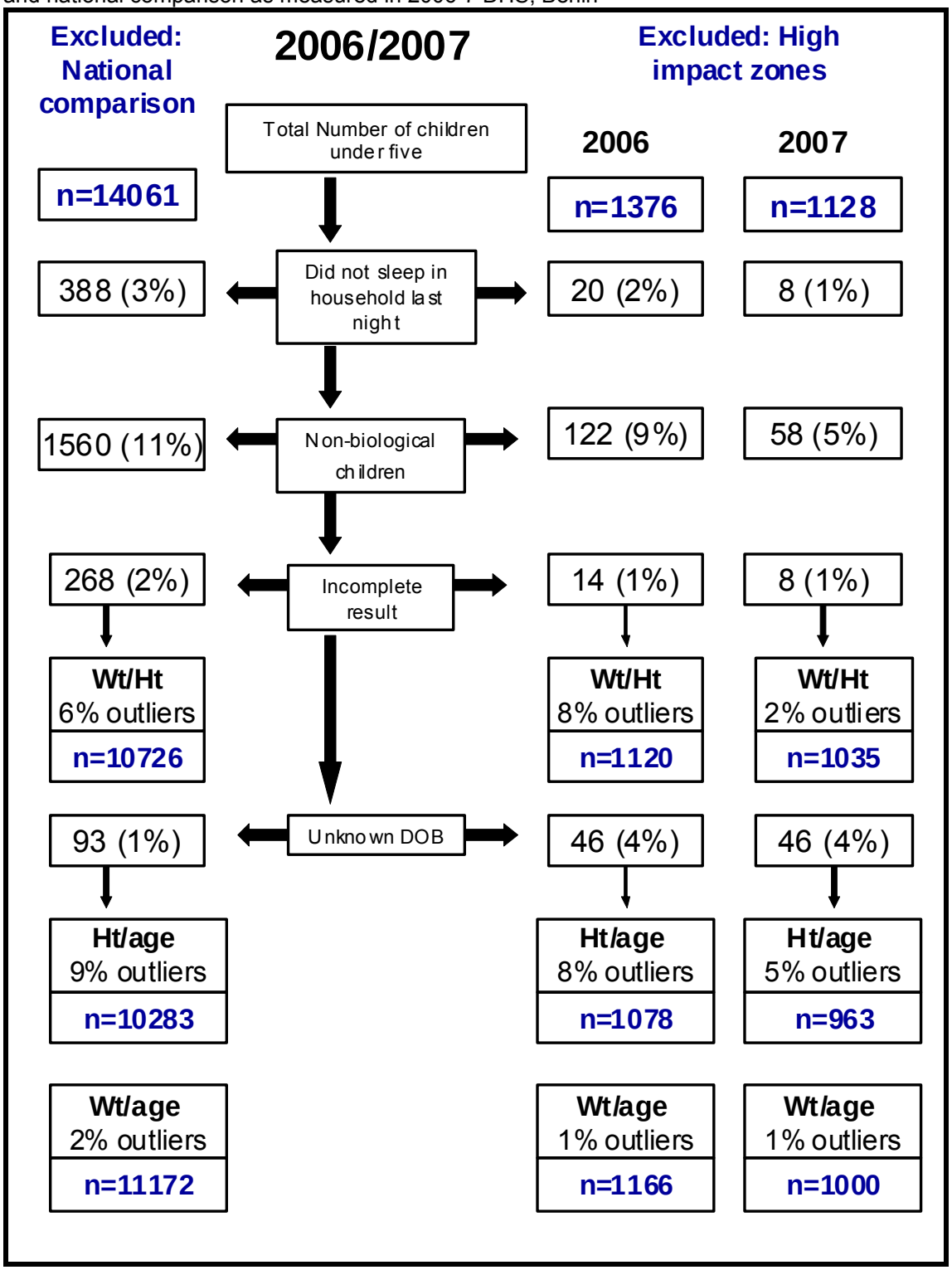


Table L1: Prevalence of stunting among children 0-59 months of age by sub-groups of the population in the "high impact" zones and comparison area as measured by the 2001 and 2006-7 DHS, Benin

	2001 DHS						2006/2007 DHS					
	HIGH IMPACT ZONES			COMPARISON AREA			HIGH IMPACT ZONES			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
Residence												
Urban	30%	8%	72	32%	12%	820	37%	16%	554	39%	20%	3162
Rural	43%	20%	259	40%	16%	2320	48%	23%	1487	48%	26%	7118
Sex												
Male	39%	16%	183	39%	16%	1556	49%	23%	1024	49%	27%	5180
Female	43%	19%	148	36%	14%	1583	41%	19%	1017	42%	22%	5099
Mother's education level												
None	45%	20%	239	40%	17%	2392	49%	23%	1588	48%	26%	7958
Any formal education	29%	10%	92	30%	10%	748	30%	12%	453	36%	18%	2322
Age												
0-11	12%	6%	78	14%	5%	805	27%	12%	520	31%	18%	2300
12-23	44%	19%	65	44%	17%	688	46%	20%	444	47%	26%	2167
24-35	46%	20%	67	49%	23%	637	54%	26%	367	53%	29%	1932
36-47	63%	20%	56	45%	18%	533	52%	25%	374	52%	28%	2079
48-59	47%	24%	65	44%	16%	477	53%	26%	337	46%	21%	1802
Wealth index quintiles												
Poorest	52%	22%	35	41%	17%	648	53%	26%	494	51%	28%	2147
2	45%	23%	79	43%	19%	639	47%	25%	412	49%	28%	2117
3	40%	16%	64	39%	15%	647	50%	24%	419	49%	25%	2038
4	49%	22%	80	37%	17%	636	41%	16%	406	44%	23%	2055
Least Poor	21%	5%	73	27%	8%	570	26%	10%	310	34%	17%	1923

Table L2: Prevalence of wasting among children 0-59 months of age by sub-groups of the population in the "high impact" zones and comparison area as measured by the 2001 and 2006-7 DHS, Benin

	2001 DHS						2006/2007 DHS					
	HIGH IMPACT ZONES			COMPARISON AREA			HIGH IMPACT ZONES			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
Residence												
Urban	12%	3%	78	9%	3%	944	8%	2%	586	8%	2%	3296
Rural	11%	3%	273	9%	2%	2734	8%	2%	1570	8%	3%	7426
Sex												
Male	12%	3%	192	10%	3%	1829	9%	3%	1078	9%	3%	5402
Female	11%	3%	159	8%	2%	1848	7%	1%	1078	8%	2%	5320
Mother's education level												
None	11%	3%	259	10%	3%	2885	9%	2%	1692	9%	3%	8316
Any formal education	13%	3%	93	7%	2%	792	6%	2%	464	7%	2%	2406
Age												
0-11	23%	5%	82	18%	5%	842	15%	4%	540	12%	4%	2395
12-23	15%	5%	66	14%	4%	740	11%	4%	457	10%	3%	2299
24-35	7%	3%	69	5%	1%	741	3%	0%	386	8%	3%	2019
36-47	6%	0%	59	4%	1%	702	5%	1%	404	5%	1%	2162
48-59	5%	2%	75	3%	1%	652	3%	0%	368	5%	1%	1847
Wealth index quintiles												
Poorest	19%	3%	42	11%	4%	835	9%	2%	542	9%	3%	2252
2	11%	5%	85	11%	3%	772	10%	2%	441	9%	3%	2217
3	13%	1%	69	9%	3%	781	8%	1%	432	8%	2%	2140
4	7%	1%	82	8%	2%	701	7%	2%	414	9%	3%	2122
Least Poor	11%	5%	74	5%	0%	588	5%	2%	327	6%	2%	1991

Table L3: Prevalence of underweight among children 0-59 months of age by sub-groups of the population in the "high impact" zones and comparison area as measured by the 2001 and 2006-7 DHS, Benin

	2001 DHS						2006/2007 DHS					
	HIGH IMPACT ZONES			COMPARISON AREA			HIGH IMPACT ZONES			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
Residence												
Urban	21%	8%	74	16%	6%	854	18%	3%	580.6	16%	5%	3389
Rural	28%	9%	268	21%	6%	2376	21%	5%	1585.0	22%	7%	7779
Sex												
Male	29%	9%	190	22%	7%	1599	23%	4%	1094	22%	7%	5638
Female	23%	8%	152	18%	5%	1631	17%	5%	1071	18%	5%	5531
Mother's education level												
None	30%	10%	249	22%	7%	2465	22%	5%	1695	22%	7%	8674
Any formal education	16%	6%	93	13%	4%	765	14%	2%	470.3	14%	4%	2495
Age												
0-11	22%	10%	87	19%	6%	858	16%	5%	566.9	17%	6%	2540
12-23	30%	14%	66	25%	9%	712	22%	5%	468.4	21%	7%	2387
24-35	26%	8%	69	20%	6%	647	22%	4%	384.7	22%	6%	2126
36-47	31%	6%	56	15%	3%	535	19%	3%	397.9	22%	7%	2231
48-59	25%	5%	65	21%	4%	479	24%	5%	347.3	20%	5%	1884
Wealth index quintiles												
Poorest	32%	12%	36	24%	8%	665	23%	7%	530.1	26%	9%	2343
2	32%	14%	82	26%	7%	655	23%	6%	440.9	25%	8%	2298
3	28%	3%	66	23%	9%	669	23%	4%	442.8	20%	6%	2246
4	24%	9%	81	17%	4%	657	18%	2%	429.5	18%	5%	2207
Least Poor	18%	6%	76	9%	1%	583	11%	2%	321.9	11%	3%	2074

Table L4: Prevalence of stunting, wasting and underweight among children 0-59 months of age in 2006-7 in the "high impact" zones and regions in the comparison area as measured by the 2006-7 DHS, Benin

	Height/age		Weight/height		Weight/age	
	% stunted (< -2 SD)	% severely stunted (< -3 SD)	% wasted (< -2 SD)	% severely wasted (< -3 SD)	% underweight (< -2 SD)	% severely underweight (< -3 SD)
High Impact Zones	44.7	20.9	8.2	2.1	20.2	4.6
Total National Comparison area	45.5	24.3	8.2	2.5	20.4	6.3
Sub-groups of NC (exclude Cotonou & HIDs)						
Far North Regions (Alibori, Atakora)	51.3	32.3	11.8	3.9	33.0	12.0
Central Regions (Borgou, Donga, & Collines)	46.6	24.4	9.5	3.3	19.4	6.1
Southern Regions (Couffo, Mono, Atlantique, Plateau, Oeume, Zou)	43.1	21.8	6.3	1.6	16.4	4.4
p-value	**p<0.01**	**p<0.01**	**p<0.01**	**p<0.01**	**p<0.01**	**p<0.01**
Regions						
Alibori	62.1	43.8	10.0	3.3	35.4	14.0
Atacora	40.2	20.4	14.0	4.6	30.2	9.6
Atlantiq	41.7	19.7	9.8	2.8	19.3	5.0
Borgou	48.9	26.3	9.5	3.2	19.8	5.6
Collines	45.0	23.7	6.4	2.3	17.3	6.1
Couffo	37.3	14.2	3.7	1.0	15.7	4.0
Donga	43.8	20.8	15.2	5.3	22.2	7.4
Mono	46.8	25.9	5.0	0.4	15.1	3.3
Quémé	38.0	17.9	6.3	1.7	16.3	4.6
Plateau	47.8	21.2	7.7	1.7	19.6	7.8
Zou	57.1	37.5	3.7	0.8	12.9	3.7

APPENDIX M

Tables presenting additional equity analyses

Table M1: Selected coverage indicators by wealth quintile, and concentration indices, in the "high impact" zones and comparison area as measured by 2006-7 DHS, Benin.

ACSD coverage indicator	2006/7 DHS				
	High Impact Zones		Geographic comparison area**		
	n	%	n	%	p
Any measles innoculation (12-23m)		59		68	
Wealth Index Quintiles					
Poorest	122	39.4	503	59.9	
2	92	55.2	501	61.9	
3	103	59.2	513	65.3	
4	90	76.5	502	70.3	
Least Poor	76	76.1	499	80.7	
Concentration Index		0.132		0.059	0.13
ITN use for under five children		26		28	
Wealth Index Quintiles					
Poorest	590	15.3	2544	13.4	
2	486	20.4	2414	20.3	
3	487	26.5	2353	25.8	
4	450	32.9	2302	34.1	
Least Poor	337	45.6	2167	50.2	
Concentration Index		0.207		0.245	0.61
Vitamin A supplementation of children (6-59m)		61		63	
Wealth Index Quintiles					
Poorest	512	46.7	2263	52.8	
2	433	56.3	2174	58.4	
3	437	65.2	2147	63.2	
4	392	75.7	2071	67.8	
Least Poor	305	68.0	1957	76.6	
Concentration Index		0.088		0.071	0.60
ORT for diarrhea		33		42	
Wealth Index Quintiles					
Poorest	46	19.9	304	42.0	
2	36	27.4	284	42.8	
3	41	34.3	264	41.4	
4	24	55.8	196	39.3	
Least Poor	29	42.7	139	44.5	
Concentration Index		0.176		-0.002	0.03
Skilled birth attendant		73		75	
Wealth Index Quintiles					
Poorest	150	51.2	596	53.8	
2	137	71.2	566	65.4	
3	115	78.4	588	74.4	
4	115	83.4	572	87.0	
Least Poor	90	94.9	522	95.8	
Concentration Index		0.110		0.112	0.96
3+ visits ANC care		63		67	
Wealth Index Quintiles					
Poorest	150	41.6	589	46.2	
2	137	63.5	559	57.2	
3	115	66.8	579	67.3	
4	116	68.7	560	76.3	
Least Poor	88	89.4	512	92.7	
Concentration Index		0.125		0.131	0.91

Table M2: Selected impact indicators by wealth quintile, and concentration indices, in the "high impact" zones and comparison area as measured by 2006-7 DHS, Benin.

	Baseline					Endline				
	High Impact Zones		Geographic comparison area¥			High Impact Zones		Geographic comparison area¥		
Moderate stunting (24-59m)	**n**	**%**	**n**	**%**	**p**	**n**	**%**	**n**	**%**	**p**
Wealth Index Quintiles										
Poorest						255	62.7	1246	57.5	
2						211	58.8	1219	55.8	
3						230	60.8	1145	52.9	
4						224	46.7	1144	47.7	
Least Poor						158	25.9	1058	36.9	
Concentration Index						1078	-0.114695	5812	-0.075	0.62
Under-five mortality	**births**	**U5MR**	**births**	**U5MR**		**births**	**U5MR**	**births**	**U5MR**	
Wealth Index Quintiles										
Poorest	359	155	1705	157		407.4	120.6	1613	113.9	
2	300	142	1801	161		332.2	133.2	1576	125.5	
3	291	182	1687	155		312.7	154.0	1598	122.8	
4	226	88	1495	139		263.2	98.2	1559	107.4	
Least Poor	160	122	1196	101		165.4	100.9	1455	68.6	
Concentration Index		-0.058046		-0.064	0.94		-0.028118		-0.077	0.53

¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou

Table M3: Selected child health coverage indicators by gender, residence and ethnicity, in the "high impact" zones and comparison area as measured by 2001 and 2006-7 DHS, Benin.

ACSD coverage indicator	2001 DHS						2006/7 DHS						NC v. HIZ	NC v. HIZ
	High Impact Zones			Geographic comparison area¥			High Impact Zones			Geographic comparison area¥				
	n	%	p	n	%	p	n	%	p	n	%	p	2001	2006/7
Any measles Innoculation (12-23m)		71.4			66.9			59.3			67.6			
Gender														
male	47	69.3		359	68.7		257	57.0		1283	66.4			
female	19	76.6	0.57	389	65.2	0.23	228	62.0	0.28	1237	68.8	0.23	0.41	0.59
Urban	16	78.7		204	71.4		140	64.0		787	75.7			
Rural	50	69.0	0.65	544	65.2	0.20	343	57.1	0.23	1733	63.9	<0.001	0.85	0.40
Ethnicity														
Adja				112	63.7		19	84.7		468	68.9			
Fon	52	78.4		279	70.5		270	65.4		1005	68.5			
Yoruba				73	75.2		179	49.5		214	77.4			
Other	14	46.0	0.09	284	62.5	0.24	5	45.3	0.01	755	62.7	0.01	-	0.01
ITN use for under five children		6.4			4.7			26.4			28.0			
Gender														
male	198	7.0		1865	4.4		1187	27.4		5925	28.6			
female	162	5.6	0.69	1859	5.1	0.44	1163	25.3	0.28	5860	27.6	0.25	0.528	0.574
Urban	78	18.2		938	8.3		625	30.1		3587	36.2			
Rural	282	3.2	0.02	2786	3.5	0.00	1724	25.0	0.16	8197	24.5	<0.001	0.156	0.133
Ethnicity														
Adja				550	5.7		55	40.1		2083	31.4			
Fon	292	6.7		1443	4.9		1330	27.1		4461	30.9			
Yoruba				347	6.7		893	24.5		980	36.9			
Other	67	5.0	0.59	1383	3.6	0.17	27	36.2	0.42	3860	20.8	<0.001	-	0.814
Vitamin A supplementation of children (6-59m)		10.4			17.3			61.2			63.0			
Gender														
male	177	11.2		1634	17.4		1054	61.0		5345	64.0			
female	146	9.5	0.59	1649	17.1	0.83	1026	62.0	0.81	5272	62.7	0.22	0.66	0.50
Urban	69	10.4		834	25.6		558	63.0		3257	70.2			
Rural	254	10.4	1.00	2450	14.4	0.00	1522	61.0	0.58	7360	60.3	<0.001	0.47	0.10
Ethnicity														
Adja				476	15.8		59	69.9		1873	66.1			
Fon	259	13.0		1301	17.6		1177	67.3		3921	63.4			
Yoruba				312	16.3		784	52.7		903	80.4			
Other	64	0.0	0.37	1194	17.7	0.89	24	63.7	0.00	3571	57.3	<0.001	-	0.01
ORT for diarrhea		38			43.0			33.5			41.9			
Gender														
male				274	49.3		98	30.0		631	45.3			
female				271	36.7	0.01	78	38.0	0.39	556	38.0	0.01	-	0.123
Urban				125	51.8		44	36.0		311	44.0			
Rural	n=30; too small			420	40.4	0.10	132	33.0	0.70	876	41.2	0.41	-	0.926
Ethnicity														
Adja				73	27.5		3	20.9		140	37.9			
Fon				160	42.9		84	35.9		387	33.8			
Yoruba				29	33.1		80	30.7		108	48.8			
Other				282	48.1	0.05	6	61.3	0.57	510	47.7	<0.001	-	0.597

¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou

Table M4: Selected ANC+ coverage indicators by gender, residence and ethnicity, in the "high impact" zones and comparison area as measured by 2001 and 2006-7 DHS, Benin.

ACSD coverage indicator	2001 DHS						2006/7 DHS						NC v. HIZ	NC v. HIZ
	High Impact Zones			Geographic comparison area¥			High Impact Zones			Geographic comparison area¥				
	n	%	p	n	%	p	n	%	p	n	%	p	2001	2006/7
Skilled birth attendant		75.6			63.1			73.5			74.8			
Urban	15	84.9		227	73.4		164	85.0		862	83.2			
Rural	73	73.6	0.56	693	59.8	0.037	443	69.0	0.01	1983	71.1	<0.001	0.95	0.602
Ethnicity														
Adja				124	64.0		17	83.1		481	82.2			
Fon	73	77.8		389	74.1		347	83.4		1073	90.4			
Yoruba				73	79.8		227	58.5		217	81.4			
Other	15	64.8	0.34	334	46.5	<0.001	5	100.0	0.00	961	52.5	<0.001	-	0.273
3+ visits ANC care		71.0			64.6			63.5			67.3			
Urban	15	92.4		223	73.4		163	64.0		851	75.8			
Rural	73	66.5	0.13	684	61.8	0.012	443	63.0	0.91	1948	63.6	<0.001	0.227	0.049
Ethnicity														
Adja				122	67.0		17	79.4		472	72.6			
Fon	73	68.0		386	74.8		346	73.4		1063	79.1			
Yoruba				73	78.9		227	47.8		214	78.7			
Other	15	85.6	0.21	326	48.5	<0.001	5	85.3	0.00	940	49.2	<0.001	-	0.057

¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou

Table M5: Selected impact indicators by gender, residence and ethnicity, in the "high impact" zones and comparison area as measured by 2001 and 2006-7 DHS, Benin.

ACSD Impact measure	Baseline						Endline						NC v. HIZ	NC v. HIZ
	High Impact Zones			Geographic comparison area¥			High Impact Zones			Geographic comparison area¥				
	n	%	p	n	%	p	n	%	p	n	%	p	2001	2006/7
Moderate stunting (24-59m)		51.1			46.3			52.8			50.6			
Gender														
male	95	46.9		824	47.7		552	56.1		2964	52.7			
female	93	55.5	0.22	823	44.9	0.23	526	49.4	0.01	2849	48.4	0.001	0.10	0.37
Urban	40	42.2		441	36.0		285	44.0		1776	42.2			
Rural	148	53.5	0.10	1206	50.0	<0.001	793	56.0	0.00	4038	54.2	<0.001	0.69	0.97
Ethnicity														
Adja				236	49.6		20	42.5		1008	45.4			
Fon	154.0	50.0		724	45.1		637	53.7		2197	52.0			
Yoruba				186	35.5		393	52.4		498	43.4			
Other	35	56	0.66	492	50.5	0.02	14	46.6	0.75	1923	53.9	<0.001	-	0.35
Under-five mortality:	**births**	**U5MR**		**births**	**U5MR**		**births**	**U5MR**		**births**	**U5MR**			
Gender														
male	653	159		4067	154		756	122		3937	110			
female	683	123		3818	136		725	123		3864	108			
Urban	299	153		2245	126		343	106		2378	95			
Rural	1036	137		5640	153		1138	129		5423	115			

¥ Comparison area is Benin – national level, excluding the HIZs and Cotonou

APPENDIX N

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