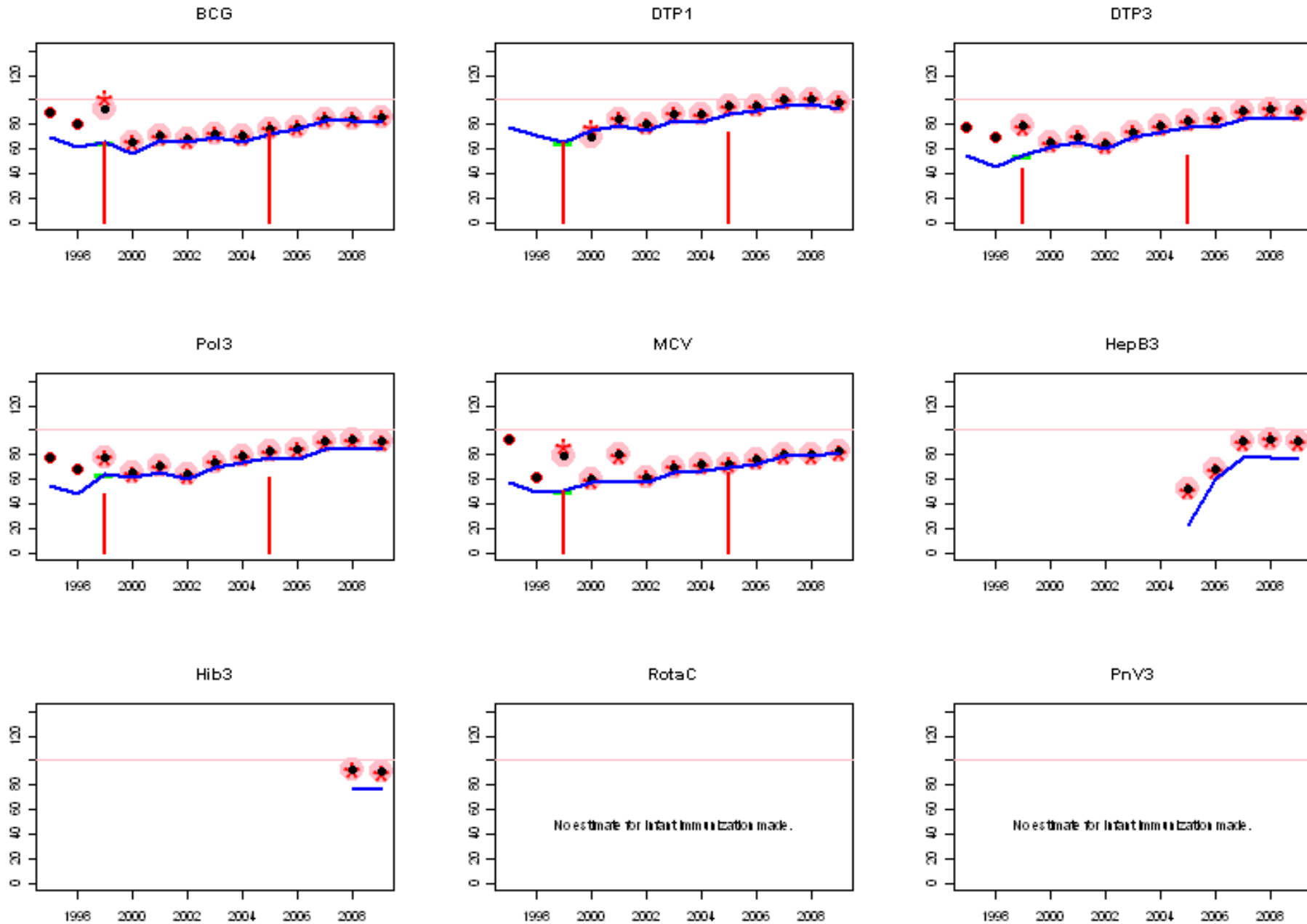
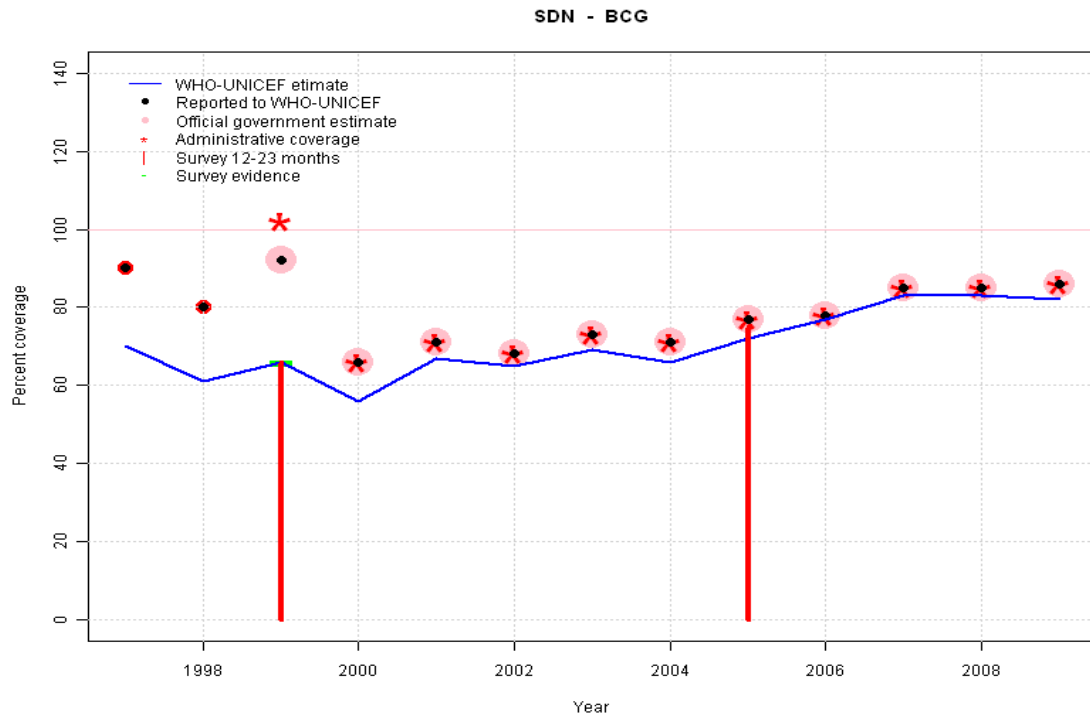


Sudan: WHO and UNICEF estimates of immunization coverage, 1997 - 2009



# Sudan - BCG



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	70	61	66	56	67	65	69	66	72	77	83	83	82
Reported	90	80	92	66	71	68	73	71	77	78	85	85	86
Official	NA	NA	92	66	71	68	73	71	77	78	85	85	86
Administrative	NA	NA	102	66	71	68	73	71	77	78	85	85	86
Survey	NA	NA	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## Description:

1997: Legacy estimate.

1998: Estimate assigned by working group. The estimated BCG coverage is based on the estimated DPT3 coverage adjusted for 15 percent drop out observed in the 1990 survey.

1999: Estimate assigned by working group. 1999 estimate is based on MICS 2000 results including both northern and southern sections of the country. 1999 reported data (92 percent) inconsistent with data from other years.

2000: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reports by the Ministry of Health. Estimates from 2000 onward are based on data reported by the Ministry of Health, Sudan supplemented with information on coverage levels in southern Sudan.

2001: Estimate assigned by working group. See explanation for the previous year.

2002: Estimate assigned by working group. See explanation for the previous year.

2003: Estimate assigned by working group. See explanation for the previous year.

2004: Estimate assigned by working group. See explanation for the previous year.

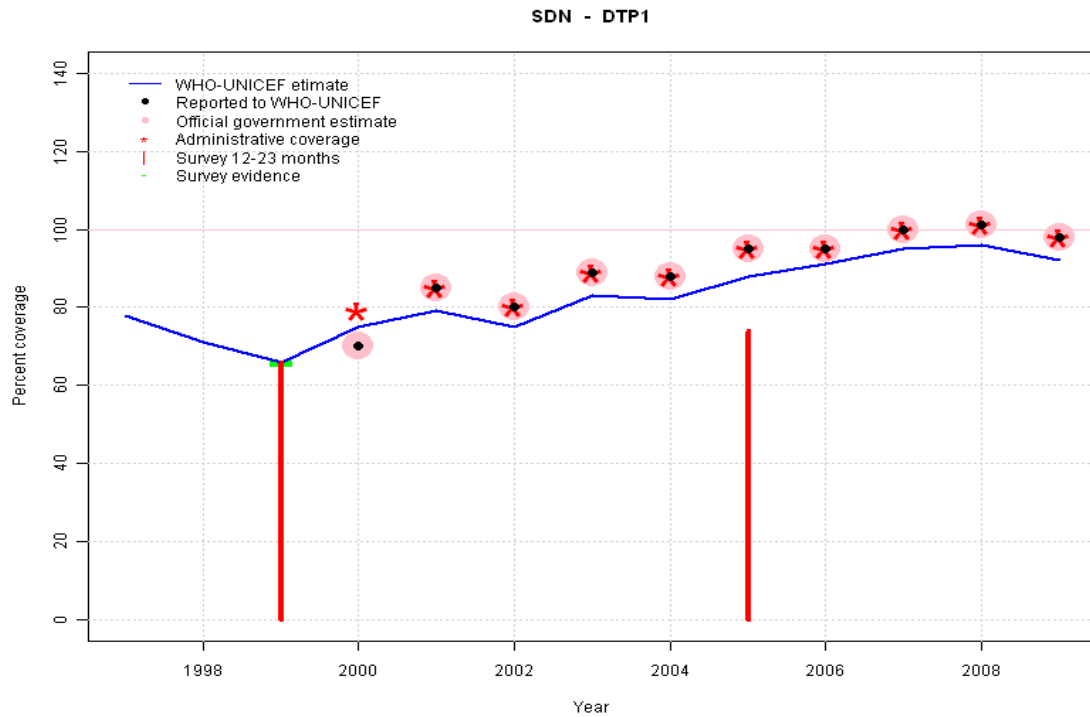
2005: Estimate assigned by working group. See explanation for the previous year. Survey results of 75 percent ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported.

2006: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reported immunizations from the northern section of Sudan (approximately 852007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. See explanation for the previous year.

2009: Estimate assigned by working group. See explanation for the previous year.

# Sudan - DTP1



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	78	71	66	75	79	75	83	82	88	91	95	96	92
Reported	NA	NA	NA	70	85	80	89	88	95	95	100	101	98
Official	NA	NA	NA	70	85	80	89	88	95	95	100	101	98
Administrative	NA	NA	NA	79	85	80	89	88	95	95	100	101	98
Survey	NA	NA	66	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## Description:

1997: Legacy estimate.

1998: Estimate assigned by working group. The estimates are derived from the WHO UNICEF estimates of DTP3 and the relationship between the levels of DTP3 coverage and the dropout between DTP1 and DTP3.

1999: Estimate assigned by working group. 1999 estimate is based on MICS 2000 results including both northern and southern sections of the country.

2000: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reports by the Ministry of Health. Estimates from 2000 onward are based on data reported by the Ministry of Health, Sudan supplemented with information on coverage levels in southern Sudan.

2001: Estimate assigned by working group. See explanation for the previous year.

2002: Estimate assigned by working group. See explanation for the previous year.

2003: Estimate assigned by working group. See explanation for the previous year.

2004: Estimate assigned by working group. See explanation for the previous year.

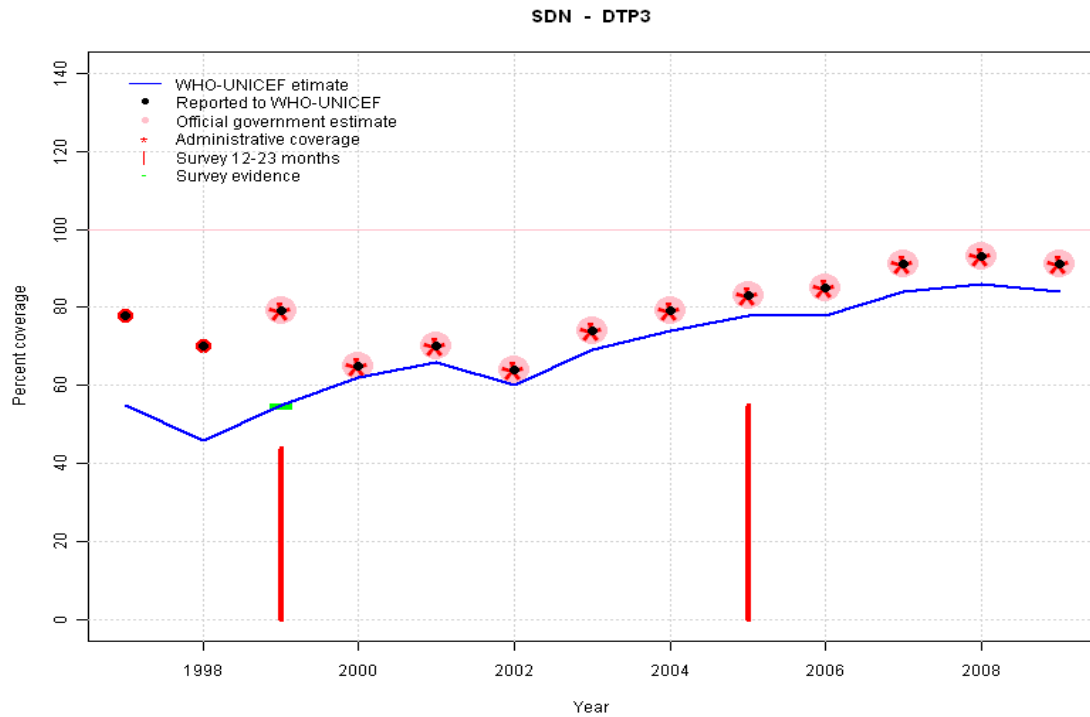
2005: Estimate assigned by working group. See explanation for the previous year. Survey results of 74 percent ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported.

2006: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reported immunizations from the northern section of Sudan (approximately 852007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. See explanation for the previous year. 2008 reported data (101 percent) ignored; greater than 100 percent.

2009: Estimate assigned by working group. See explanation for the previous year.

# Sudan - DTP3



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	55	46	55	62	66	60	69	74	78	78	84	86	84
Reported	78	70	79	65	70	64	74	79	83	85	91	93	91
Official	NA	NA	79	65	70	64	74	79	83	85	91	93	91
Administrative	NA	NA	79	65	70	64	74	79	83	85	91	93	91
Survey	NA	NA	55	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## Description:

1997: Legacy estimate.

1998: Estimate assigned by working group. The estimate follows reported data but with level calibrated with reference to the results of the 1994 survey.

1999: Estimate assigned by working group. 1999 estimate is based on MICS 2000 results including both northern and southern sections of the country. Survey results (44 percent) adjusted for recall bias to 55 percent based on first dose card or history coverage (66 percent) and documented drop-out between first (24 percent) and third (20 percent) doses.

2000: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reports by the Ministry of Health. Estimates from 2000 onward are based on data reported by the Ministry of Health, Sudan supplemented with information on coverage levels in southern Sudan.

2001: Estimate assigned by working group. See explanation for the previous year.

2002: Estimate assigned by working group. See explanation for the previous year.

2003: Estimate assigned by working group. See explanation for the previous year.

2004: Estimate assigned by working group. See explanation for the previous year.

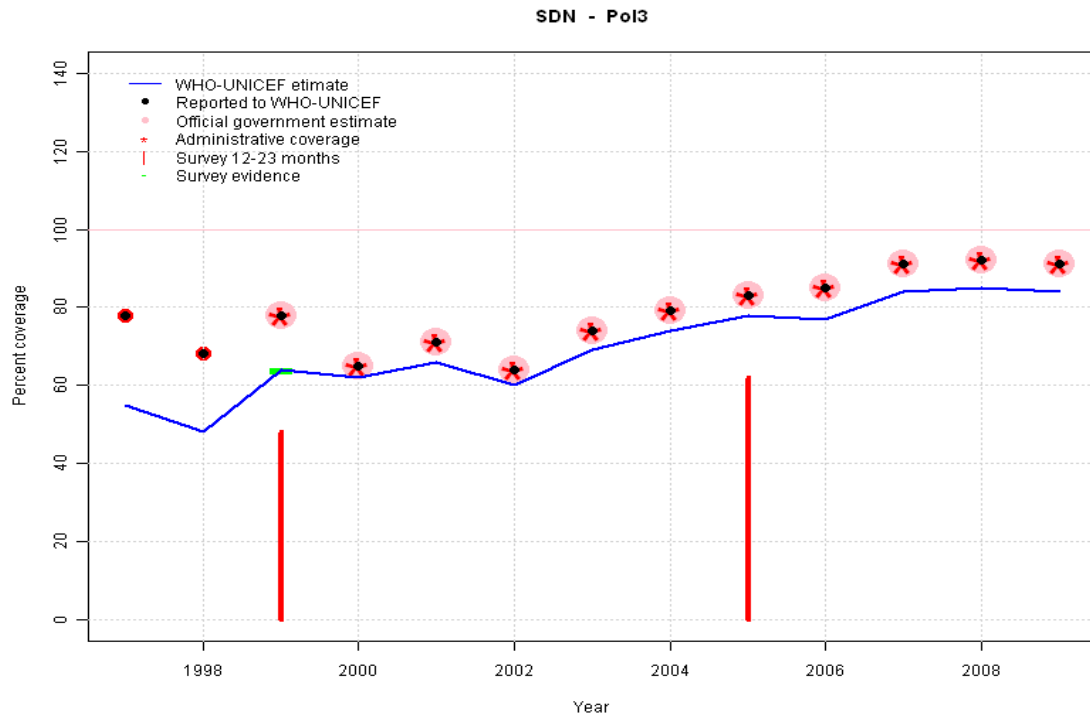
2005: Estimate assigned by working group. See explanation for the previous year. Survey results of 55 percent ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported.

2006: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reported immunizations from the northern section of Sudan (approximately 852007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. See explanation for the previous year.

2009: Estimate assigned by working group. See explanation for the previous year.

# Sudan - Pol3



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	55	48	64	62	66	60	69	74	78	77	84	85	84
Reported	78	68	78	65	71	64	74	79	83	85	91	92	91
Official	NA	NA	78	65	71	64	74	79	83	85	91	92	91
Administrative	NA	NA	78	65	71	64	74	79	83	85	91	92	91
Survey	NA	NA	64	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## Description:

1997: Legacy estimate.

1998: Estimate assigned by working group. The estimate follows reported data but with level calibrated with reference to the results of the 1994 survey.

1999: Estimate assigned by working group. 1999 estimate is based on MICS 2000 results including both northern and southern sections of the country. Survey results (48 percent) adjusted for recall bias to 64 percent based on first dose card or history coverage (75 percent) and documented drop-out between first (21 percent) and third (18 percent) doses.

2000: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reports by the Ministry of Health. Estimates from 2000 onward are based on data reported by the Ministry of Health, Sudan supplemented with information on coverage levels in southern Sudan.

2001: Estimate assigned by working group. See explanation for the previous year.

2002: Estimate assigned by working group. See explanation for the previous year.

2003: Estimate assigned by working group. See explanation for the previous year.

2004: Estimate assigned by working group. See explanation for the previous year.

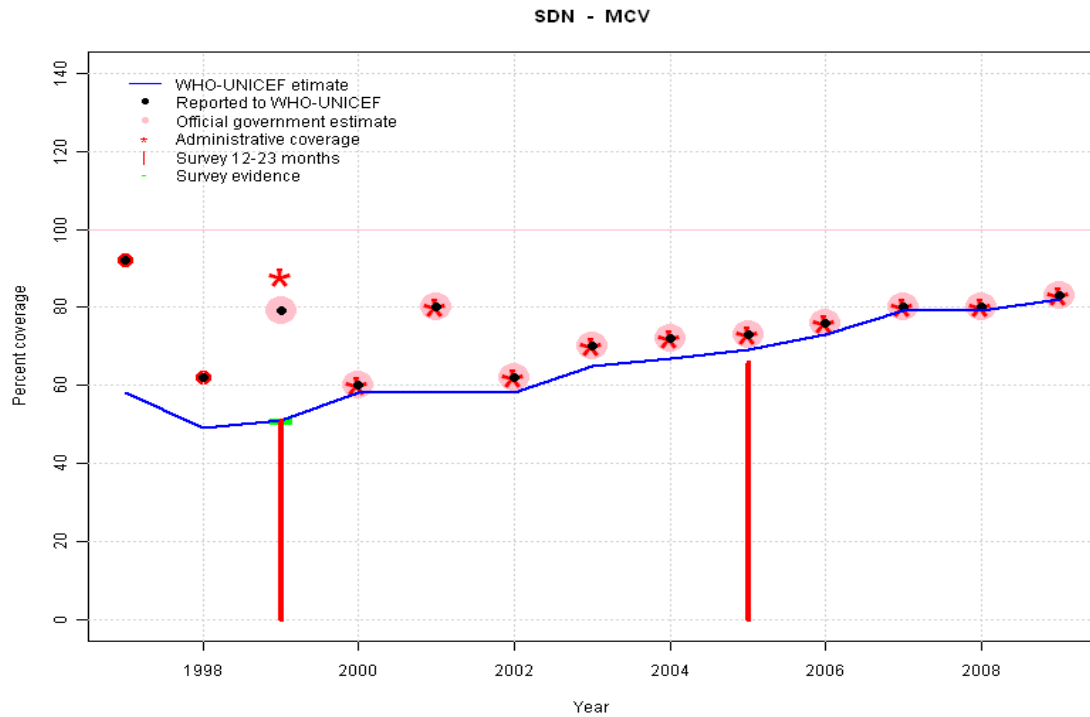
2005: Estimate assigned by working group. See explanation for the previous year. Survey results of 62 percent ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported.

2006: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reported immunizations from the northern section of Sudan (approximately 852007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. See explanation for the previous year.

2009: Estimate assigned by working group. See explanation for the previous year.

# Sudan - MCV



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	58	49	51	58	58	58	65	67	69	73	79	79	82
Reported	92	62	79	60	80	62	70	72	73	76	80	80	83
Official	NA	NA	79	60	80	62	70	72	73	76	80	80	83
Administrative	NA	NA	88	60	80	62	70	72	73	76	80	80	83
Survey	NA	NA	51	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

## Description:

1997: Legacy estimate.

1998: Estimate assigned by working group. The estimate follows reported data but with level calibrated with reference to the results of the 1994 survey. 1998 reported data (62 percent) inconsistent with data from other years.

1999: Estimate assigned by working group. 1999 estimate is based on MICS 2000 results including both northern and southern sections of the country. 1999 reported data (79 percent) inconsistent with data from other years.

2000: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reports by the Ministry of Health. 2000 reported data (60 percent) inconsistent with data from other years. Estimates from 2000 onward are based on data reported by the Ministry of Health, Sudan supplemented with information on coverage levels in southern Sudan.

2001: Estimate assigned by working group. See explanation for the previous year. 2001 reported data (80 percent) inconsistent with data from other years.

2002: Estimate assigned by working group. See explanation for the previous year.

2003: Estimate assigned by working group. See explanation for the previous year.

2004: Estimate assigned by working group. See explanation for the previous year.

2005: Estimate assigned by working group. See explanation for the previous year. Survey results of 66 percent ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported.

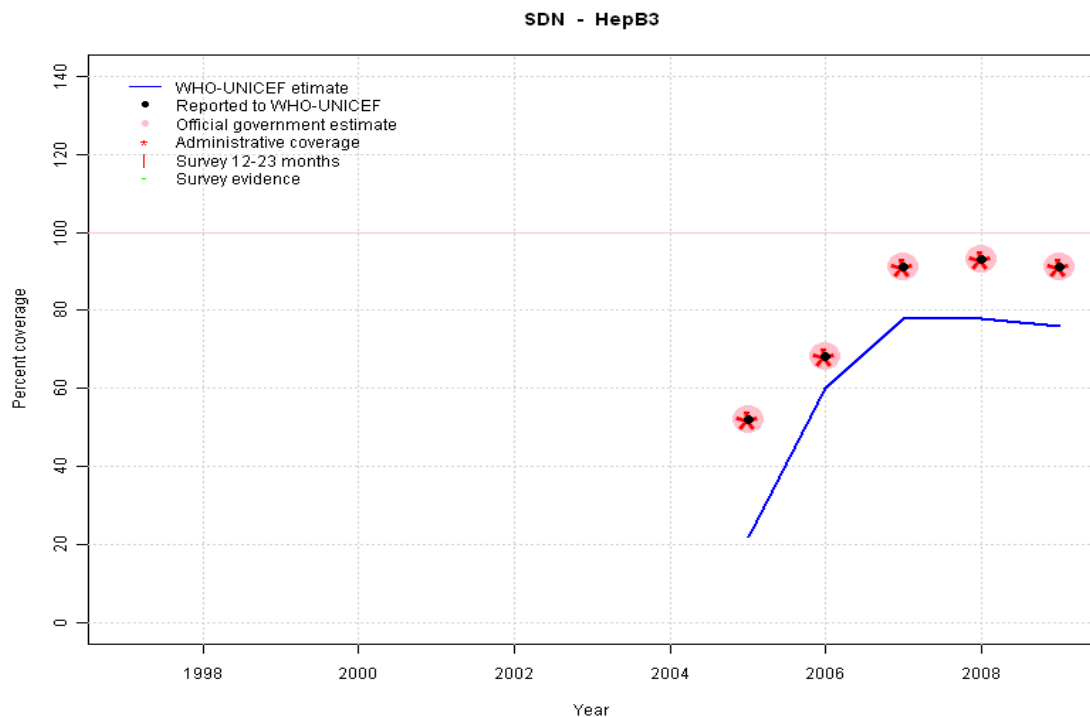
2006: Estimate assigned by working group. Estimates of the target population are based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. Estimated number of children vaccinated is based on reported immunizations from the northern section of Sudan (approximately 852007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. See explanation for the previous year.

2009: Estimate assigned by working group. See explanation for the previous year.

# Sudan - HepB3

## Description:



2005: Estimate assigned by working group. Estimates are based on reports by the Ministry of Health using estimates of surviving infants based on data from the United Nations Fund for Population Activities (UNFPA) and the Central Bureau of Statistics/Sudan. HepB partially introduced in 2004; nationally in 2006; reporting started in 2005.

2006: Estimate assigned by working group. See explanation for the previous year.

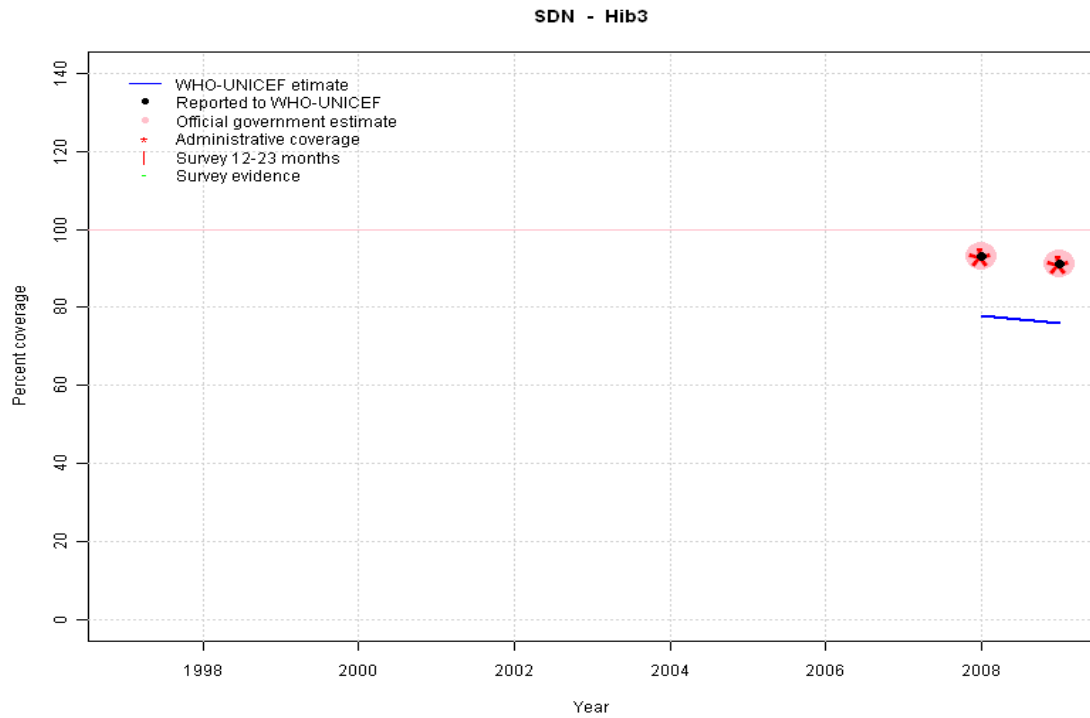
2007: Estimate assigned by working group. See explanation for the previous year.

2008: Estimate assigned by working group. DTP-HepB-Hib combination vaccine used in Northern Sudan. HepB vaccine not introduced in Southern Sudan. Estimate adjusted to reflect the difference in vaccine availability. DTP-HepB-Hib pentavalent vaccine introduced in Northern Sudan in 2008.

2009: Estimate assigned by working group. See explanation for the previous year.

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	22	60	78	78	76
Reported	NA	NA	NA	NA	NA	NA	NA	NA	52	68	91	93	91
Official	NA	NA	NA	NA	NA	NA	NA	NA	52	68	91	93	91
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	52	68	91	93	91
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# Sudan - Hib3



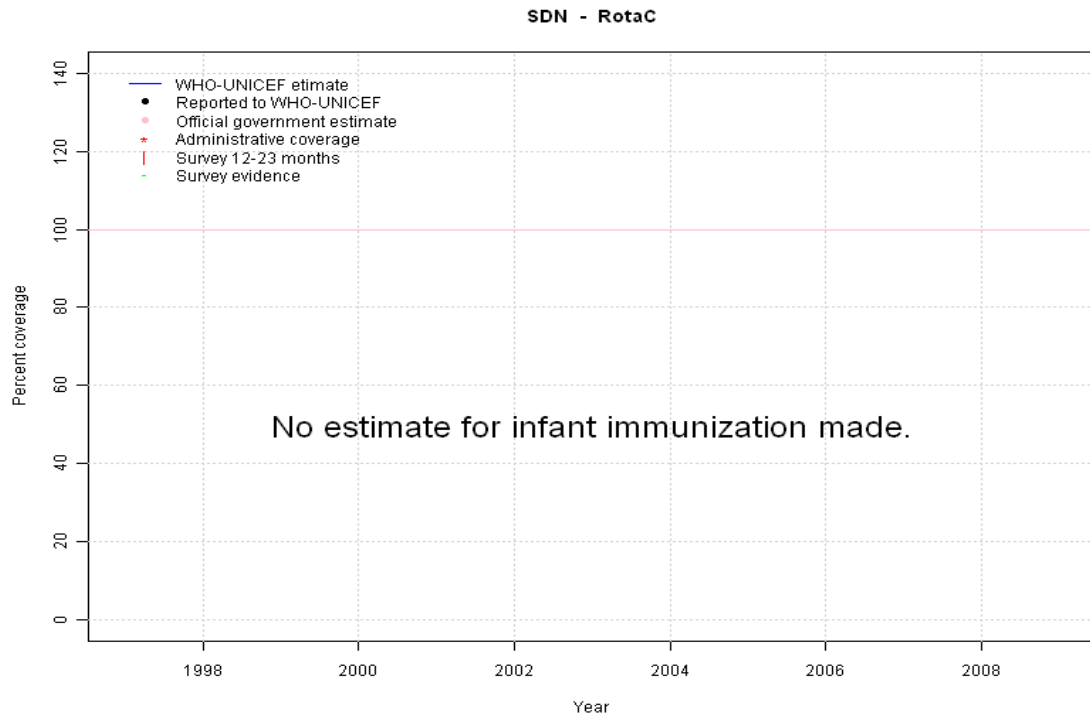
## Description:

2008: Estimate assigned by working group. DTP-HepB-Hib combination vaccine used in Northern Sudan. Hib vaccine not introduced in Southern Sudan, Estimate adjusted to reflect the difference in vaccine availability. Hib partially introduced in 2008. Reporting started in 2008 Vaccine presentation is DTP-HepB-Hib.

2009: Estimate assigned by working group. See explanation for the previous year.

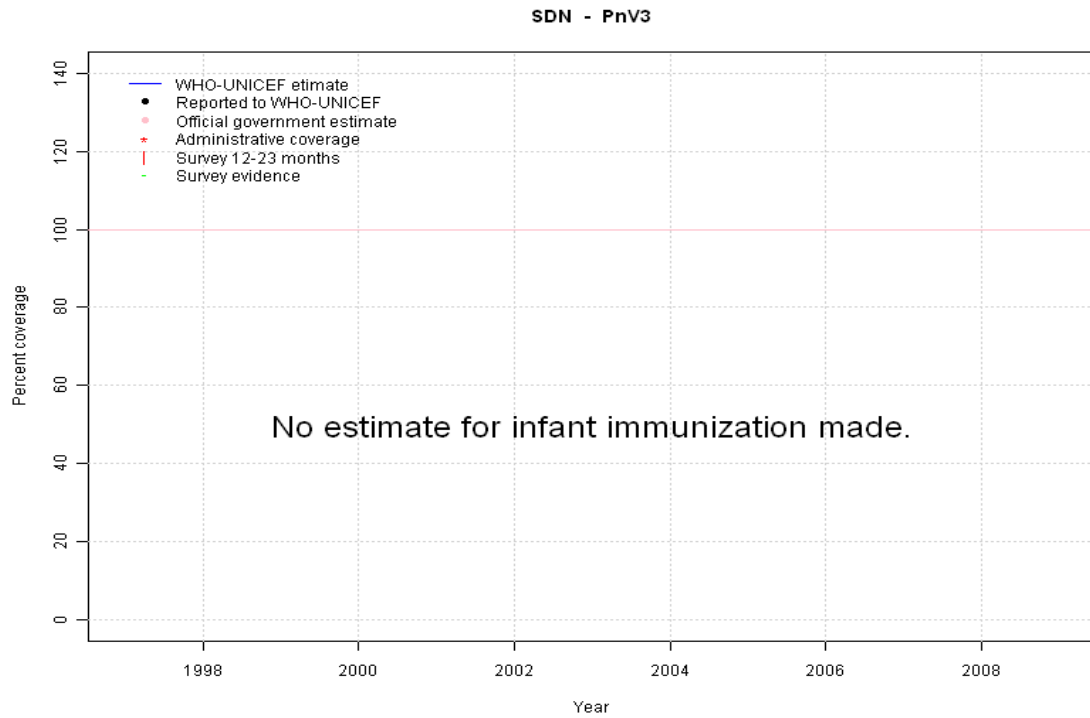
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	78	76
Reported	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93	91
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93	91
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	93	91
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# Sudan - RotaC



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# Sudan - PnV3



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Reported	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

# Sudan - survey details

## 2005 Sudan Household Health Survey 2006

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	Card or History	75	12-23 m	1165621	35
BCG	Card	32	12-23 m	1165621	35
BCG	C or H <12 months	73	12-23 m	1165621	35
BCG	History	42	12-23 m	1165621	35
DTP1	History	41	12-23 m	1165621	35
DTP1	C or H <12 months	71	12-23 m	1165621	35
DTP1	Card	33	12-23 m	1165621	35
DTP1	Card or History	74	12-23 m	1165621	35
DTP3	Card	30	12-23 m	1165621	35
DTP3	Card or History	55	12-23 m	1165621	35
DTP3	History	25	12-23 m	1165621	35
DTP3	C or H <12 months	53	12-23 m	1165621	35
MCV	C or H <12 months	59	12-23 m	1165621	35
MCV	Card	28	12-23 m	1165621	35
MCV	Card or History	66	12-23 m	1165621	35
MCV	History	38	12-23 m	1165621	35
Pol1	C or H <12 months	80	12-23 m	1165621	35
Pol1	Card	33	12-23 m	1165621	35
Pol1	Card or History	83	12-23 m	1165621	35
Pol1	History	49	12-23 m	1165621	35
Pol3	History	32	12-23 m	1165621	35
Pol3	C or H <12 months	60	12-23 m	1165621	35
Pol3	Card	29	12-23 m	1165621	35
Pol3	Card or History	62	12-23 m	1165621	35

## 1999 Sudan Multiple Indicator Cluster Survey 2001

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	Card	25	12-23 m	3720	27
BCG	History	42	12-23 m	3720	27
BCG	C or H <12 months	65	12-23 m	3720	27
BCG	Card or history	66	12-23 m	3720	27
DTP1	Card	24	12-23 m	3720	27
DTP1	Card or history	66	12-23 m	3720	27
DTP1	History	42	12-23 m	3720	27
DTP1	C or H <12 months	65	12-23 m	3720	27
DTP3	History	24	12-23 m	3720	27
DTP3	C or H <12 months	42	12-23 m	3720	27
DTP3	Card	20	12-23 m	3720	27
DTP3	Card or history	44	12-23 m	3720	27
MCV	Card	18	12-23 m	3720	27
MCV	Card or history	51	12-23 m	3720	27
MCV	History	34	12-23 m	3720	27
MCV	C or H <12 months	45	12-23 m	3720	27
Pol1	C or H <12 months	73	12-23 m	3720	27
Pol1	Card	21	12-23 m	3720	27
Pol1	Card or history	75	12-23 m	3720	27
Pol1	History	53	12-23 m	3720	27
Pol3	C or H <12 months	44	12-23 m	3720	27
Pol3	Card	18	12-23 m	3720	27
Pol3	History	27	12-23 m	3720	27
Pol3	Card or history	48	12-23 m	3720	27

Further information and estimates for 1980-1996 are available at:

[http://www.childinfo.org/immunization\\_countryreports.html](http://www.childinfo.org/immunization_countryreports.html)

[http://www.who.int/immunization\\_monitoring/routine/immunization\\_coverage/en/index4.html](http://www.who.int/immunization_monitoring/routine/immunization_coverage/en/index4.html)

## Sudan

### WHO/UNICEF Estimates of Protection at Birth (PAB) against tetanus

In countries where tetanus is recommended for girls and women coverage is usually reported as "TT2+", i.e. the proportion of (pregnant) women who have received their second or superior TT dose in a given year. TT2 + coverage, however, can under-represent the actual proportion of births that are protected against tetanus as it does not include women who have previously received protective doses, women who received one dose without documentation of previous doses, and women who received doses in TT (or Td) supplemental immunization activities (SIA). In addition, girls who have received DTP in their childhood and are entering childbearing age, may be protected with TT booster doses.

WHO and UNICEF have developed a model that takes into account the above scenarios, and calculates the proportion of births in a given year that can be considered as having been protected against tetanus - "Protection at Birth".

In this model, annual cohorts of women are followed from infancy through their life. A proportion receive DTP in infancy (estimated based on the WHO-UNICEF estimates of DTP3 coverage). In addition some of these women also receive TT through routine services when they are pregnant and may also receive TT during SIAs. The model also adjusts reported data, taking into account coverage patterns in other years, and/or results available through surveys. The duration of protection is then calculated, based on WHO estimates of the duration of protection by doses ever received. The proportion of births that are protected against tetanus as a result of maternal immunization reflects the tetanus immunization received by the mother throughout her life rather than simply the TT immunizations received during the current pregnancy.

Year	PAB coverage estimate (%)
1997	69
1998	71
1999	76
2000	61
2001	63
2002	62
2003	65
2004	68
2005	68
2006	70
2007	72
2008	70
2009	74

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<sup>1</sup> This model is described in: Griffiths U., Wolfson L., Quddus A., Younus M., Hafiz R.. Incremental cost-effectiveness of supplementary immunization activities to prevent neo-natal tetanus in Pakistan. Bulletin of the World Health Organization 2004; 82:643-651.