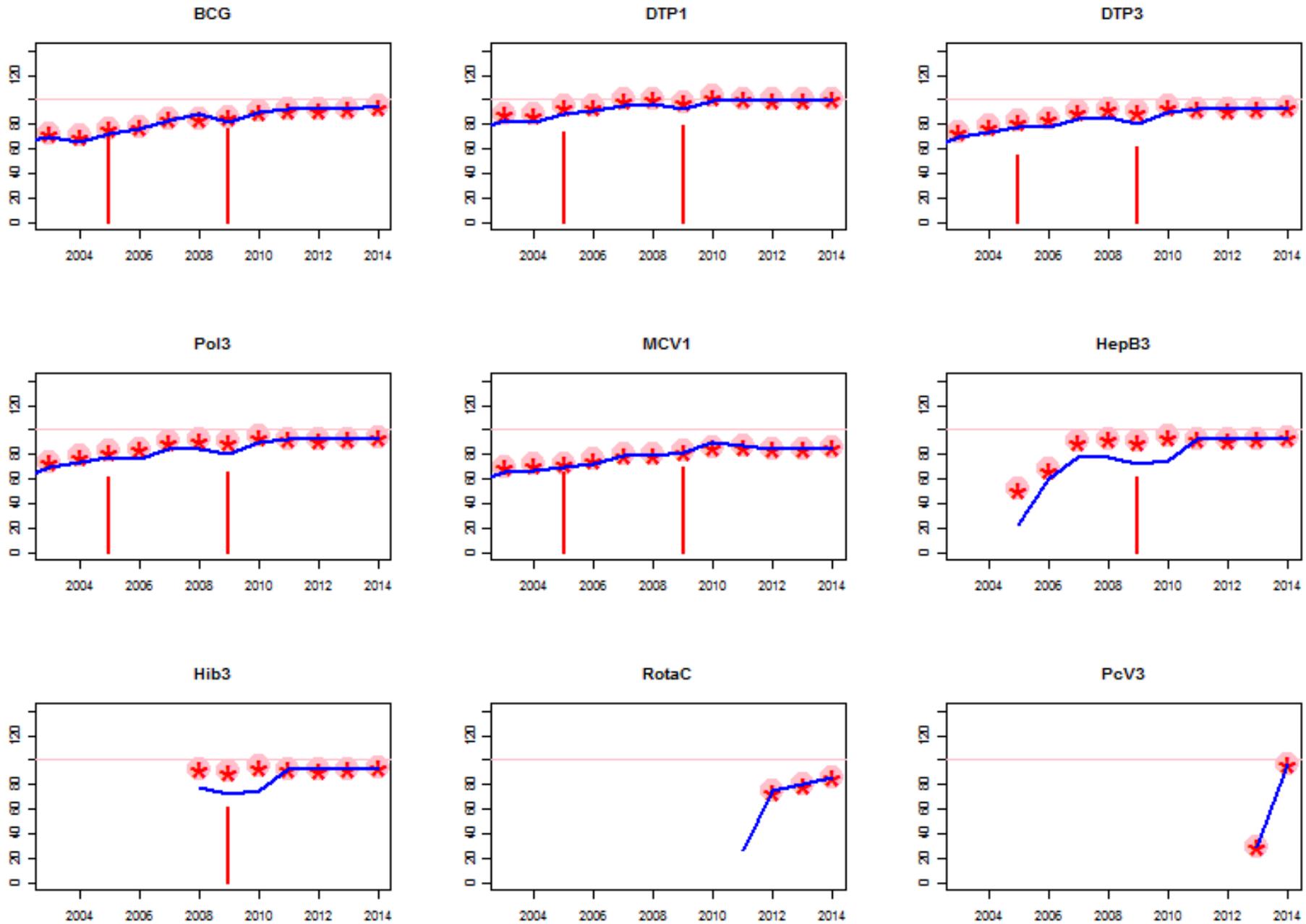
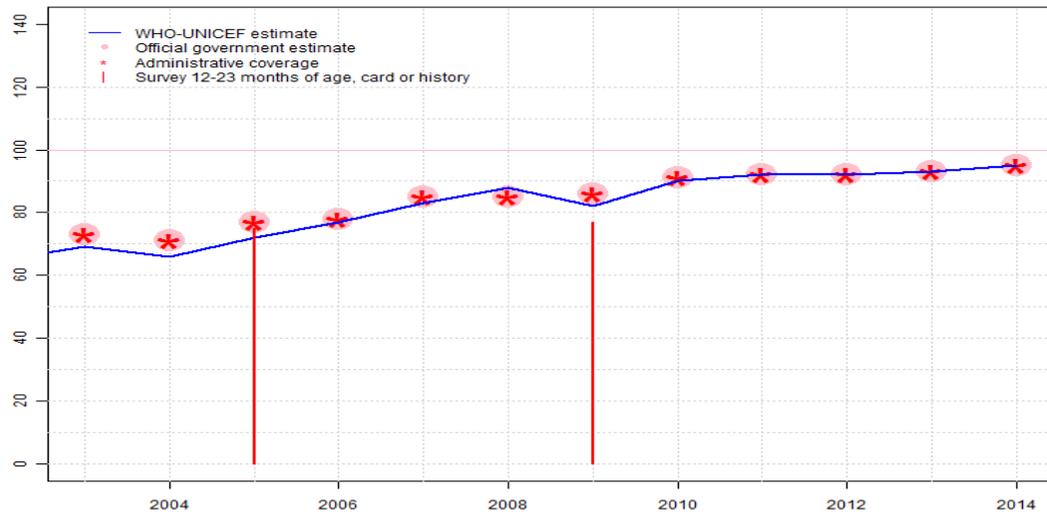


Sudan: WHO and UNICEF estimates of immunization coverage: 2014 revision



# Sudan - BCG

SDN - BCG



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	69	66	72	77	83	88	82	90	92	92	93	95
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	73	71	77	78	85	85	86	91	92	92	93	95
Administrative	73	71	77	78	85	85	86	91	92	92	93	95
Survey	NA	NA	75	NA	NA	NA	77	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

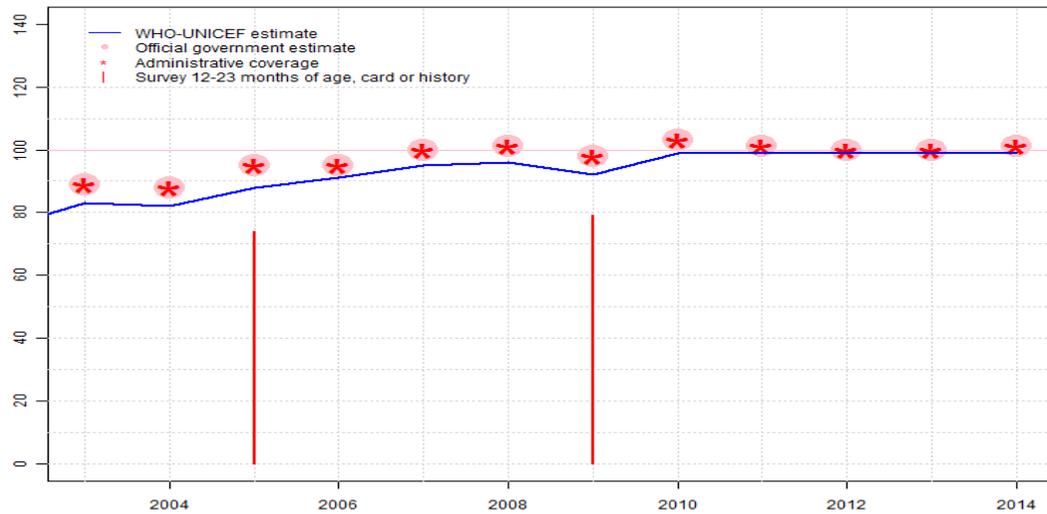
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2003: 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. Estimate challenged by: R-S-
- 2004: See explanation for the previous year. Estimate challenged by: R-S-
- 2005: See explanation for the previous year. Sudan Household Health Survey 2006 results ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported. Estimate challenged by: R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2009: Southern Sudan revised target population. Estimates are based on combined reports from national authorities from southern and northern Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Estimate challenged by: D-R-S-
- 2010: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2011: Estimate based on coverage reported by national government. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. Estimate challenged by: D-
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest coverage of 79 percent. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - DTP1

SDN - DTP1



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	83	82	88	91	95	96	92	99	99	99	99	99
Estimate GoC	•	•	•	•	•	•	•	•	•	••	•	•
Official	89	88	95	95	100	101	98	103	101	100	100	101
Administrative	89	88	95	95	100	101	98	103	101	100	100	101
Survey	NA	NA	74	NA	NA	NA	79	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

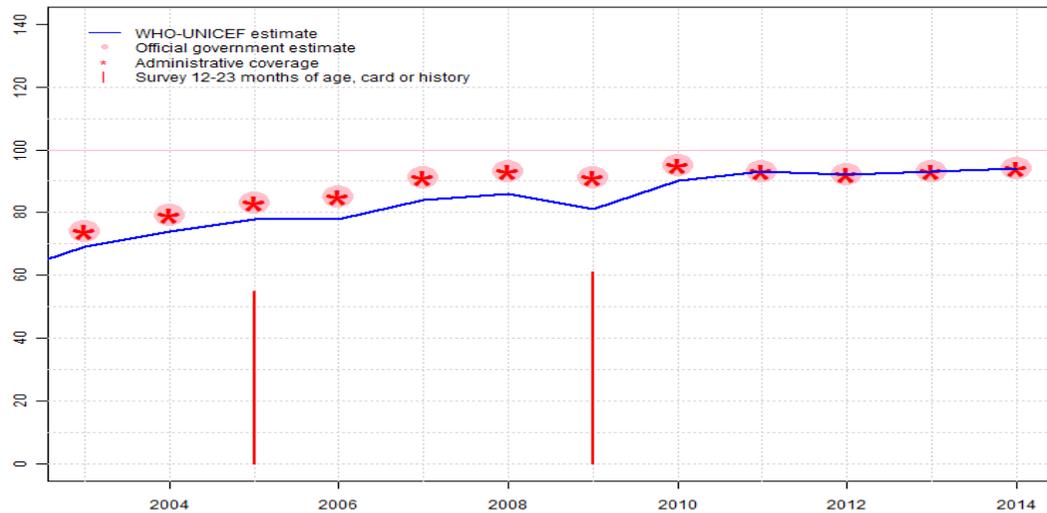
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2003: 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. Estimate challenged by: D-R-S-
- 2004: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2005: See explanation for the previous year. Sudan Household Health Survey 2006 results ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported. Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: See explanation for the previous year. Reported data excluded. 101 percent greater than 100 percent. Estimate challenged by: D-R-S-
- 2009: Southern Sudan revised target population. Estimates are based on combined reports from national authorities from southern and northern Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Estimate challenged by: D-R-S-
- 2010: See explanation for the previous year. Reported data excluded. 103 percent greater than 100 percent. Estimate challenged by: D-R-S-
- 2011: Estimate based on interpolation between data reported by national government. Reported data excluded. 101 percent greater than 100 percent. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. GoC=R+D+
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest coverage of 81 percent. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on extrapolation from data reported by national government. Reported data excluded. 101 percent greater than 100 percent. Estimate challenged by: D-

# Sudan - DTP3

SDN - DTP3



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	69	74	78	78	84	86	81	90	93	92	93	94
Estimate GoC	•	•	•	•	•	•	•	•	•	••	•	•
Official	74	79	83	85	91	93	91	95	93	92	93	94
Administrative	74	79	83	85	91	93	91	95	93	92	93	94
Survey	NA	NA	55	NA	NA	NA	61	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

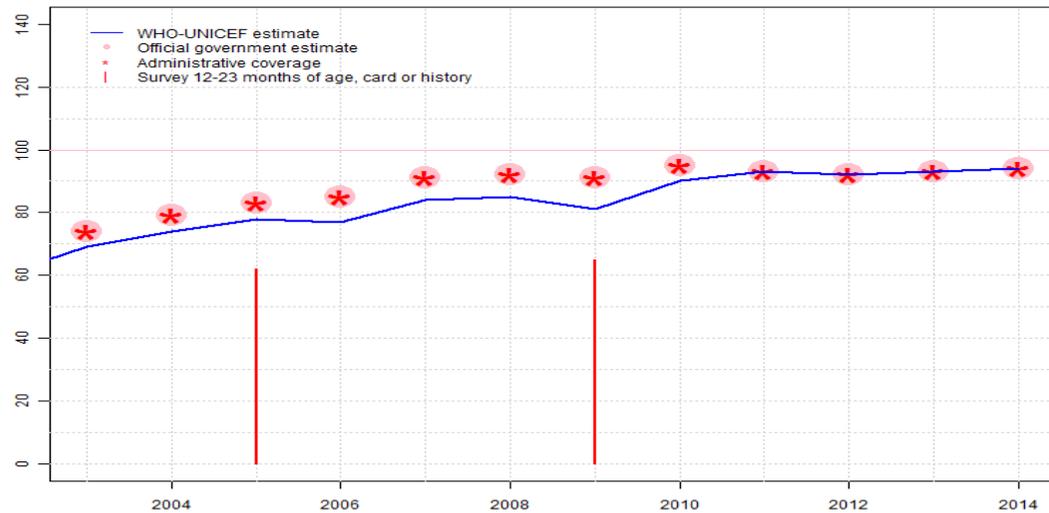
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2003: 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. Estimate challenged by: D-R-S-
- 2004: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2005: See explanation for the previous year. Sudan Household Health Survey 2006 results ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported. Sudan Household Health Survey 2006 card or history results of 55 percent modified for recall bias to 67 percent based on 1st dose card or history coverage of 74 percent, 1st dose card only coverage of 33 percent and 3d dose card only coverage of 30 percent. Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2009: Southern Sudan revised target population. Estimates are based on combined reports from national authorities from southern and northern Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 card or history results of 61 percent modified for recall bias to 73 percent based on 1st dose card or history coverage of 79 percent, 1st dose card only coverage of 40 percent and 3d dose card only coverage of 37 percent. Estimate challenged by: R-S-
- 2010: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2011: Estimate is based on reported data. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. GoC=R+D+
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest lower coverage than the reported data. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - Pol3

SDN - Pol3



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	69	74	78	77	84	85	81	90	93	92	93	94
Estimate GoC	•	•	•	•	•	•	•	•	•	••	•	•
Official	74	79	83	85	91	92	91	95	93	92	93	94
Administrative	74	79	83	85	91	92	91	95	93	92	93	94
Survey	NA	NA	62	NA	NA	NA	65	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2003: 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. Estimate challenged by: D-R-S-
- 2004: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2005: See explanation for the previous year. Sudan Household Health Survey 2006 results ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported. Sudan Household Health Survey 2006 card or history results of 62 percent modified for recall bias to 73 percent based on 1st dose card or history coverage of 83 percent, 1st dose card only coverage of 33 percent and 3d dose card only coverage of 29 percent. Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2009: Southern Sudan revised target population. Estimates are based on combined reports from national authorities from southern and northern Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 card or history results of 65 percent modified for recall bias to 80 percent based on 1st dose card or history coverage of 86 percent, 1st dose card only cov-

# Sudan - Pol3

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erage of 40 percent and 3d dose card only coverage of 37 percent. Estimate challenged by: R-S-

2010: See explanation for the previous year. Estimate challenged by: D-R-S-

2011: Estimate is based on reported data. Estimate challenged by: S-

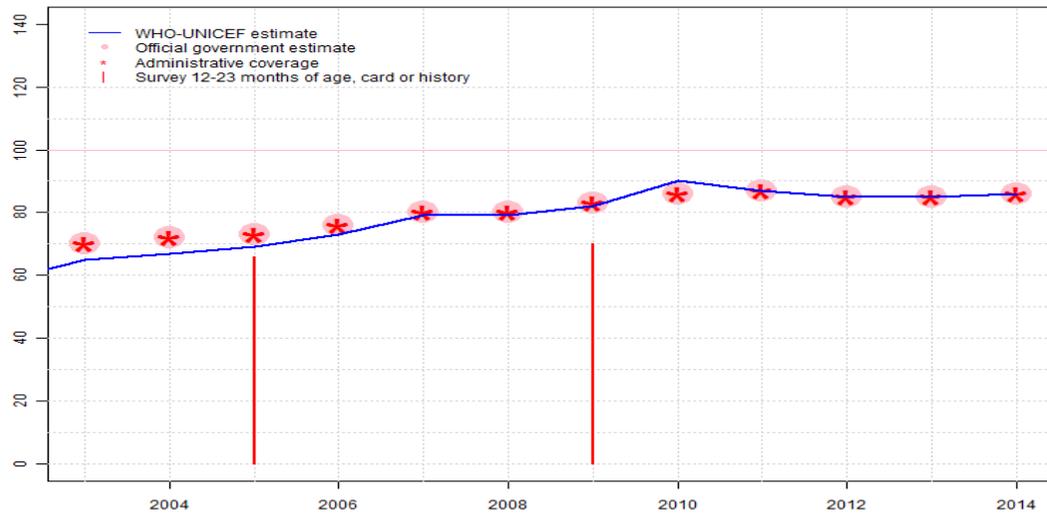
2012: Estimate based on coverage reported by national government. GoC=R+  
D+

2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest lower coverage than the reported data. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.

2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - MCV1

SDN - MCV1



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	65	67	69	73	79	79	82	90	87	85	85	86
Estimate GoC	•	•	•	•	•	•	•	•	•	••	•	•
Official	70	72	73	76	80	80	83	86	87	85	85	86
Administrative	70	72	73	76	80	80	83	86	87	85	85	86
Survey	NA	NA	66	NA	NA	NA	70	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

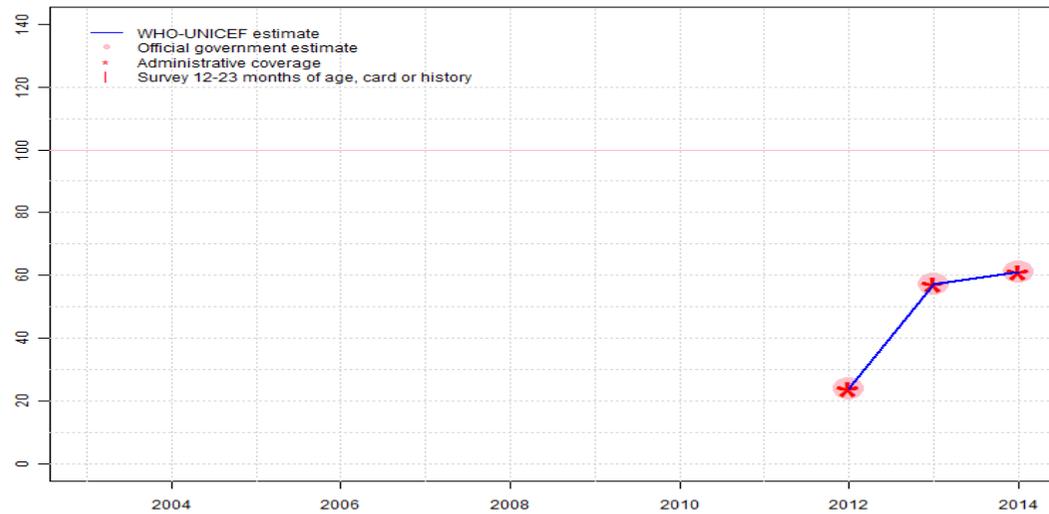
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2003: 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. Estimate challenged by: D-R-S-
- 2004: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2005: See explanation for the previous year. Sudan Household Health Survey 2006 results ignored by working group. 2005 survey results are not considered; sample size of children 12-23 months of age not reported. Estimate challenged by: D-R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2009: Southern Sudan revised target population. Estimates are based on combined reports from national authorities from southern and northern Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Estimate challenged by: D-R-S-
- 2010: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2011: Estimate is based on reported data. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. GoC=R+D+
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest coverage of 61 percent. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - MCV2

SDN - MCV2



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA	24	57	61								
Estimate GoC	NA	•	•	•								
Official	NA	24	57	61								
Administrative	NA	24	57	61								
Survey	NA											

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

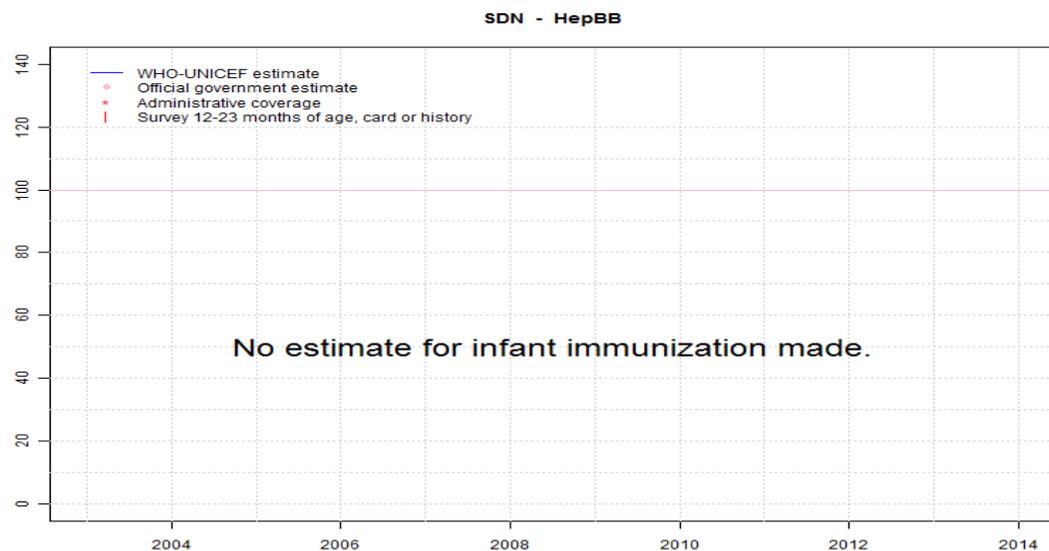
Coverage estimates for the second dose of measles containing vaccine are for children by the nationally recommended age.

2012: Estimate based on coverage reported by national government. Measles second dose introduced in 2012 and recommended for administration at 18 months of age. Estimate challenged by: D-

2013: Estimate based on coverage reported by national government. Expansion of second dose of measles vaccine. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.

2014: Estimate based on coverage reported by national government. GoC=Assigned by working group. Consistency across vaccines.

# Sudan - HepBB



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA											
Estimate GoC	NA											
Official	NA											
Administrative	NA											
Survey	NA											

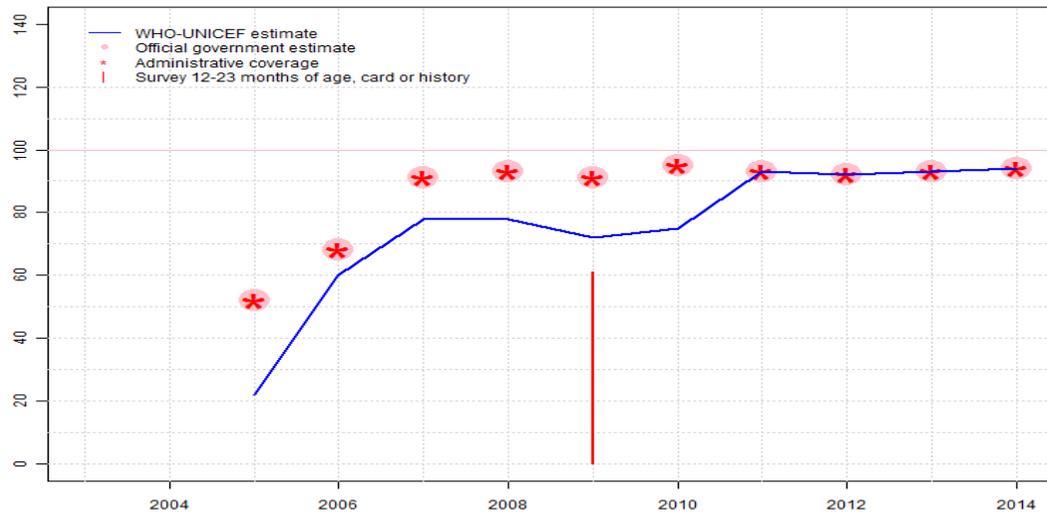
The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

# Sudan - HepB3

SDN - HepB3



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA	NA	22	60	78	78	72	75	93	92	93	94
Estimate GoC	NA	NA	•	•	•	•	•	•	•	••	•	•
Official	NA	NA	52	68	91	93	91	95	93	92	93	94
Administrative	NA	NA	52	68	91	93	91	95	93	92	93	94
Survey	NA	NA	NA	NA	NA	NA	61	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

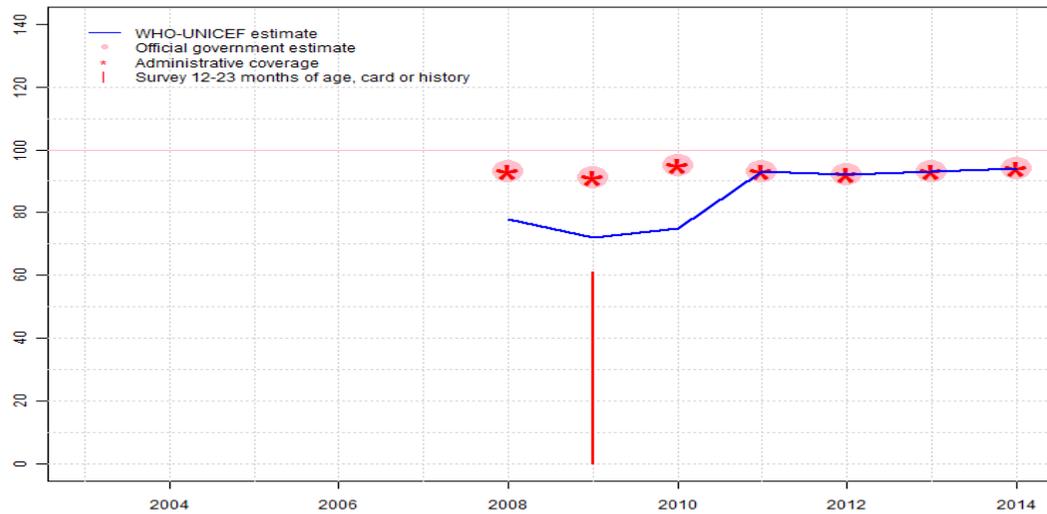
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2005: 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 introduction started in 2004 in North Sudan reporting started in 2005. Estimate challenged by: R-S-
- 2006: 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 se Estimate challenged by: D-R-S-
- 2007: See explanation for the previous year. Estimate challenged by: D-R-S-
- 2008: 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. Estimate challenged by: R-S-
- 2009: 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. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 card or history results of 61 percent modified for recall bias to 73 percent based on 1st dose card or history coverage of 79 percent, 1st dose card only coverage of 40 percent and 3d dose card only coverage of 37 percent. Estimate challenged by: R-S-
- 2010: See explanation for the previous year. Estimate challenged by: R-S-
- 2011: Estimate based on coverage reported by national government. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest lower coverage than the reported data. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - Hib3

SDN - Hib3



	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA	NA	NA	NA	NA	78	72	75	93	92	93	94
Estimate GoC	NA	NA	NA	NA	NA	•	•	•	•	••	•	•
Official	NA	NA	NA	NA	NA	93	91	95	93	92	93	94
Administrative	NA	NA	NA	NA	NA	93	91	95	93	92	93	94
Survey	NA	NA	NA	NA	NA	NA	61	NA	NA	NA	NA	NA

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

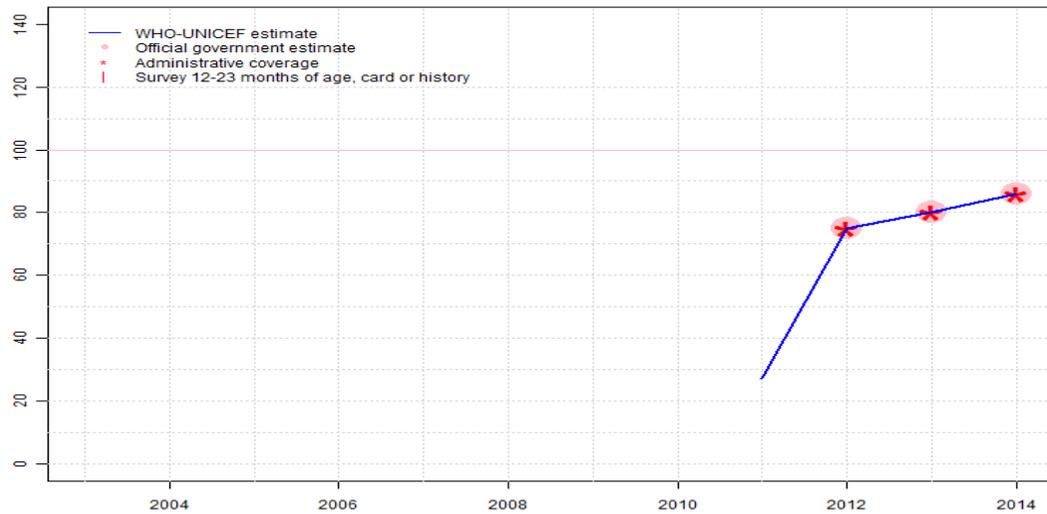
In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

## Description:

- 2008: 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. Estimate challenged by: R-S-
- 2009: 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. Sudan Household Health Survey - Second Round SHHS2 2010 results ignored by working group. While survey results reflect coverage for the Republic of Sudan, prior to 2011 WHO and UNICEF estimates of coverage were based on the combined coverage for the Republic of Sudan and Republic of South Sudan. Sudan Household Health Survey - Second Round SHHS2 2010 card or history results of 61 percent modified for recall bias to 73 percent based on 1st dose card or history coverage of 79 percent, 1st dose card only coverage of 40 percent and 3d dose card only coverage of 37 percent. Estimate challenged by: R-S-
- 2010: See explanation for the previous year. Estimate challenged by: R-S-
- 2011: Estimate based on coverage reported by national government. Estimate challenged by: S-
- 2012: Estimate based on coverage reported by national government. GoC=R+D+
- 2013: Estimate based on coverage reported by national government. Preliminary results from the 2014 Multiple Indicator Cluster Survey suggest lower coverage than the reported data. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

# Sudan - RotaC

SDN - RotaC



## Description:

- 2011: Rotavirus vaccine introduced in 2011. Coverage of 64 percent reached in 42 percent of the population. GoC=Assigned by working group. Introduction period.
- 2012: Estimate based on coverage reported by national government. GoC=R+D+
- 2013: Estimate based on coverage reported by national government. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. GoC=Assigned by working group. Consistency across vaccines.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA	27	75	80	86							
Estimate GoC	NA	•	••	•	•							
Official	NA	75	80	86								
Administrative	NA	75	80	86								
Survey	NA											

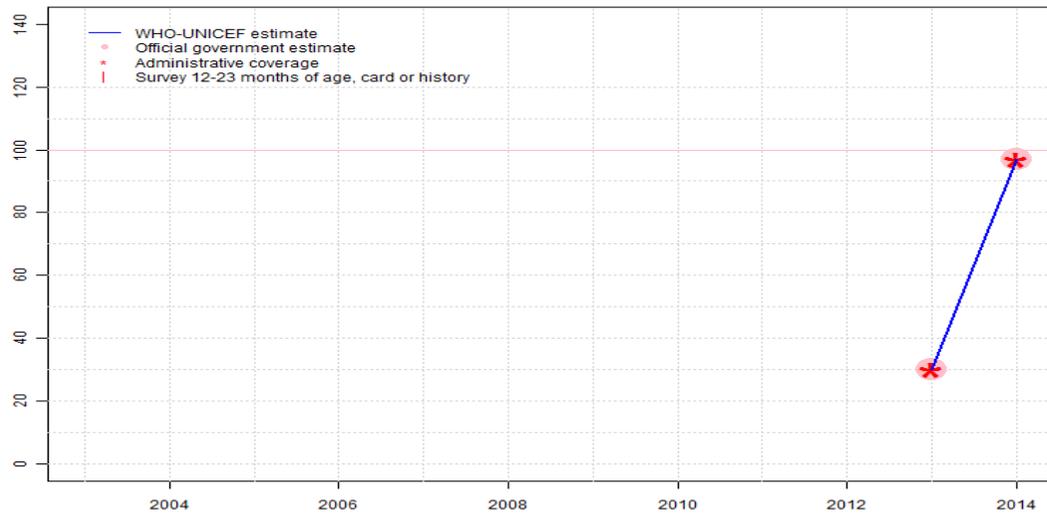
The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

# Sudan - PcV3

SDN - PcV3



## Description:

- 2013: Estimate based on coverage reported by national government. Pneumococcal conjugate vaccine introduced in August 2013. GoC=Assigned by working group. Based on conflicting information suggested by preliminary survey results.
- 2014: Estimate based on coverage reported by national government. Estimate challenged by: D-

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Estimate	NA	30	97									
Estimate GoC	NA	●	●									
Official	NA	30	97									
Administrative	NA	30	97									
Survey	NA											

The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability model upon which the estimates are based, we are unable to present classical measures of uncertainty, e.g., confidence intervals. Moreover, we have chosen not to make subjective estimates of plausibility/certainty ranges around the coverage. The GoC reflects the degree of empirical support upon which the estimates are based. It is not a judgment of the quality of data reported by national authorities.

- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2012 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a risk of being wrong.
- Estimate is supported by at least one data source; [R+], [S+], or [D+]; and no data source, [R-], [D-], or [S-], challenges the estimate.
- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

In all cases these estimates should be used with caution and should be assessed in light of the objective for which they are being used.

# Sudan - survey details

## 2009 Sudan Household Health Survey - Second Round SHHS2 2010

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	75	12-23 m	2612	41
BCG	Card	39	12-23 m	-	41
BCG	Card or History	77	12-23 m	2612	41
BCG	History	37	12-23 m	-	41
DTP1	C or H <12 months	75	12-23 m	2612	41
DTP1	Card	40	12-23 m	-	41
DTP1	Card or History	79	12-23 m	2612	41
DTP1	History	38	12-23 m	-	41
DTP3	C or H <12 months	58	12-23 m	2612	41
DTP3	Card	37	12-23 m	-	41
DTP3	Card or History	61	12-23 m	2612	41
DTP3	History	24	12-23 m	-	41
HepB1	C or H <12 months	75	12-23 m	2612	41
HepB1	Card	40	12-23 m	-	41
HepB1	Card or History	79	12-23 m	2612	41
HepB1	History	38	12-23 m	-	41
HepB3	C or H <12 months	58	12-23 m	2612	41
HepB3	Card	37	12-23 m	-	41
HepB3	Card or History	61	12-23 m	2612	41
HepB3	History	24	12-23 m	-	41
Hib1	C or H <12 months	75	12-23 m	2612	41
Hib1	Card	40	12-23 m	-	41
Hib1	Card or History	79	12-23 m	2612	41
Hib1	History	38	12-23 m	-	41
Hib3	C or H <12 months	58	12-23 m	2612	41
Hib3	Card	37	12-23 m	-	41
Hib3	Card or History	61	12-23 m	2612	41
Hib3	History	24	12-23 m	-	41
MCV1	C or H <12 months	62	12-23 m	2612	41
MCV1	Card	38	12-23 m	-	41
MCV1	Card or History	70	12-23 m	2612	41
MCV1	History	32	12-23 m	-	41
Pol1	C or H <12 months	83	12-23 m	2612	41
Pol1	Card	40	12-23 m	-	41
Pol1	Card or History	86	12-23 m	2612	41

Pol1	History	46	12-23 m	-	41
Pol3	C or H <12 months	62	12-23 m	2612	41
Pol3	Card	37	12-23 m	-	41
Pol3	Card or History	65	12-23 m	2612	41
Pol3	History	28	12-23 m	-	41

## 2005 Sudan Household Health Survey 2006

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	73	12-23 m	1165621	35
BCG	Card	32	12-23 m	1165621	35
BCG	Card or History	75	12-23 m	1165621	35
BCG	History	42	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
DTP1	History	41	12-23 m	1165621	35
DTP3	C or H <12 months	53	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
MCV1	C or H <12 months	59	12-23 m	1165621	35
MCV1	Card	28	12-23 m	1165621	35
MCV1	Card or History	66	12-23 m	1165621	35
MCV1	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	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
Pol3	History	32	12-23 m	1165621	35

## 1999 Sudan Multiple Indicator Cluster Survey 2001

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
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## Sudan - survey details

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BCG	C or H <12 months	65	12-23 m	3720	27	MCV1	Card	18	12-23 m	3720	27
BCG	Card	25	12-23 m	3720	27	MCV1	Card or history	51	12-23 m	3720	27
BCG	Card or history	66	12-23 m	3720	27	MCV1	History	34	12-23 m	3720	27
BCG	History	42	12-23 m	3720	27	Pol1	C or H <12 months	73	12-23 m	3720	27
DTP1	C or H <12 months	65	12-23 m	3720	27	Pol1	Card	21	12-23 m	3720	27
DTP1	Card	24	12-23 m	3720	27	Pol1	Card or history	75	12-23 m	3720	27
DTP1	Card or history	66	12-23 m	3720	27	Pol1	History	53	12-23 m	3720	27
DTP1	History	42	12-23 m	3720	27	Pol3	C or H <12 months	44	12-23 m	3720	27
DTP3	C or H <12 months	42	12-23 m	3720	27	Pol3	Card	18	12-23 m	3720	27
DTP3	Card	20	12-23 m	3720	27	Pol3	Card or history	48	12-23 m	3720	27
DTP3	Card or history	44	12-23 m	3720	27	Pol3	History	27	12-23 m	3720	27
DTP3	History	24	12-23 m	3720	27						
MCV1	C or H <12 months	45	12-23 m	3720	27						

Further information and estimates for previous years are available at:

<http://www.data.unicef.org/child-health/immunization>

[http://www.who.int/immunization/monitoring\\_surveillance/routine/coverage/en/index4.html](http://www.who.int/immunization/monitoring_surveillance/routine/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 receives 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.

The model was used in the mid to late 2000. Currently, the coverage series developed by the model is used as the baseline, and efforts are made to obtain data from all sources that include the JRF and reported trend over the years, routine PAB reporting and its trend over the years, data from surveys (DHS, MICS, EPI), whether countries have been validated for the attainment of maternal and neonatal tetanus elimination and what the TT coverage figures are from the survey etc and all the information is used to arrive at an estimate of the protection-at-birth from TT vaccination.

Year	PAB coverage estimate (%)
2003	65
2004	68
2005	68
2006	70
2007	72
2008	70
2009	74
2010	74
2011	74
2012	74
2013	74
2014	74

<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.