

July 4, 2017; page 1

WHO and UNICEF estimates of national immunization coverage - next revision available July  $15,\,2018$ 

BACKGROUND NOTE: Each year WHO and UNICEF jointly review reports submitted by Member States regarding national immunization coverage, finalized survey reports as well as data from the published and grey literature. Based on these data, with due consideration to potential biases and the views of local experts, WHO and UNICEF attempt to distinguish between situations where the available empirical data accurately reflect immunization system performance and those where the data are likely to be compromised and present a misleading view of immunization coverage while jointly estimating the most likely coverage levels for each country.

WHO and UNICEF estimates are country-specific; that is to say, each country's data are reviewed individually, and data are not borrowed from other countries in the absence of data. Estimates are not based on ad hoc adjustments to reported data; in some instances empirical data are available from a single source, usually the nationally reported coverage data. In cases where no data are available for a given country/vaccine/year combination, data are considered from earlier and later years and interpolated to estimate coverage for the missing year(s). In cases where data sources are mixed and show large variation, an attempt is made to identify the most likely estimate with consideration of the possible biases in available data. For methods see:

- \*Burton et al. 2009. WHO and UNICEF estimates of national infant immunization coverage: methods and processes.
- \*Burton et al. 2012. A formal representation of the WHO and UNICEF estimates of national immunization coverage: a computational logic approach.
- \*Brown et al. 2013. An introduction to the grade of confidence used to characterize uncertainty around the WHO and UNICEF estimates of national immunization coverage.

#### DATA SOURCES.

- ADMINISTRATIVE coverage: Reported by national authorities and based on aggregated administrative reports from health service providers on the number of vaccinations administered during a given period (numerator data) and reported target population data (denominator data). May be biased by inaccurate numerator and/or denominator data.
- **OFFICIAL coverage:** Estimated coverage reported by national authorities that reflects their assessment of the most likely coverage based on any combination of administrative coverage, survey-based estimates or other data sources or adjustments. Approaches to determine OFFICIAL coverage may differ across countries.
- SURVEY coverage: Based on estimated coverage from population-based household surveys among children aged 12-23 months or 24-35 months following a review of survey methods and results. Information is based on the combination of vaccination history from documented evidence or caregiver recall. Survey results are considered for the appropriate birth cohort based on the period of data collection.

#### ABBREVIATIONS

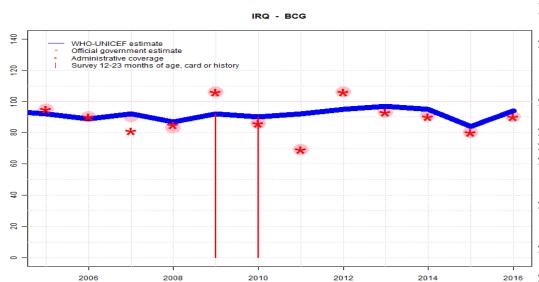
- BCG: percentage of births who received one dose of Bacillus Calmette Guerin vaccine.
- DTP1 / DTP3: percentage of surviving infants who received the 1st / 3rd dose, respectively, of diphtheria and tetanus toxoid with pertussis containing vaccine.
- Pol3: percentage of surviving infants who received the 3rd dose of polio containing vaccine. May be either oral or inactivated polio vaccine.
- IPV1: percentage of surviving infants who received at least one dose of inactivated polio vaccine. In countries utilizing an immunization schedule recommending either (i) a primary series of three doses of oral polio vaccine (OPV) plus at least one dose of IPV where OPV is included in routine

immunization and/or campaign or (ii) a sequential schedule of IPV followed by OPV, WHO and UNICEF estimates for IPV1 reflect coverage with at least one routine dose of IPV among infants <1 year of age among countries. For countries utilizing IPV containing vaccine use only, i.e., no recommended dose of OPV, the WHO and UNICEF estimate for IPV1 corresponds to coverage for the 1st dose of IPV.

Production of IPV coverage estimates, which begins in 2015, results in no change of the estimated coverage levels for the 3rd dose of polio (Pol3). For countries recommending routine immunization with a primary series of three doses of IPV alone, WHO and UNICEF estimated Pol3 coverage is equivalent to estimated coverage with three doses of IPV. For countries with a sequential schedule, estimated Pol3 coverage is based on that for the 3rd dose of polio vaccine regardless of vaccine type.

- MCV1: percentage of surviving infants who received the 1st dose of measles containing vaccine. In countries where the national schedule recommends the 1st dose of MCV at 12 months or later based on the epidemiology of disease in the country, coverage estimates reflect the percentage of children who received the 1st dose of MCV as recommended.
- MCV2: percentage of children who received the 2nd dose of measles containing vaccine according to the nationally recommended schedule.
- RCV1: percentage of surviving infants who received the 1st dose of rubella containing vaccine. Co verage estimates are based on WHO and UNICEF estimates of coverage for the dose of measles containing vaccine that corresponds to the first measles-rubella combination vaccine. Nationally reported coverage of RCV is not taken into consideration nor are the data represented in the accompanying graph and data table.
- **HepBB:** percentage of births which received a dose of hepatitis B vaccine within 24 hours of delivery. Estimates of hepatitis B birth dose coverage are producted only for countries with a universal birth dose policy. Estimates are not produced for countries that recommend a birth dose to infants born to HepB virus-infected mothers only or where there is insufficient information to determine whether vaccination is within 24 hours of birth.
- **HepB3:** percentage of surviving infants who received the 3rd dose of hepatitis B containing vaccine following the birth dose.
- **Hib3:** percentage of surviving infants who received the 3rd dose of Haemophilus influenzae type b containing vaccine.
- RotaC: percentage of surviving infants who received the final recommended dose of rotavirus vaccine, which can be either the 2nd or the 3rd dose depending on the vaccine.
- PcV3: percentage of surviving infants who received the 3rd dose of pneumococcal conjugate vaccine. In countries where the national schedule recommends two doses during infancy and a booster dose at 12 months or later based on the epidemiology of disease in the country, coverage estimates may reflect the percentage of surviving infants who received two doses of PcV prior to the 1st birthday.
- **YFV:** percentage of surviving infants who received one dose of yellow fever vaccine in countries where YFV is part of the national immunization schedule for children or is recommended in at risk areas; coverage estimates are annualized for the entire cohort of surviving infants.

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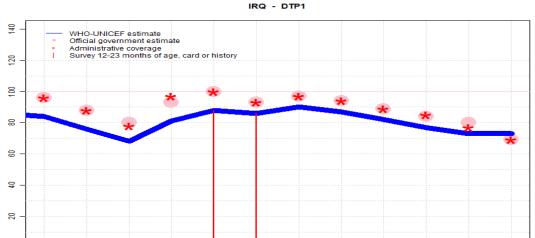
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	92	89	92	87	92	90	92	95	97	95	84	94
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	95	90	90	83	106	86	69	106	93	91	80	90
Administrative	95	90	81	85	106	86	69	106	93	90	80	90
Survey	NA	NA	NA	NA	92	90	NA	NA	NA	NA	NA	NA

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Reported data calibrated to 2010 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports four month vaccine stock-out at national level. Estimate challenged by: D-R-
- 2015: Reported data calibrated to 2010 levels. Estimate of 84 percent changed from previous revision value of 95 percent. Estimate challenged by: R-
- 2014: Reported data calibrated to 2010 levels. Estimate challenged by: R-
- 2013: Reported data calibrated to 2010 levels. Estimate challenged by: R-
- 2012: Reported data calibrated to 2010 levels. Reported data excluded because 106 percent greater than 100 percent. Reported data excluded due to an unexplained increase from 69 percent to 106 percent with decrease 93 percent. Estimate challenged by: D-R-
- 2011: Reported data calibrated to 2010 levels. Reported data excluded due to decline in reported coverage from 86 percent to 69 percent with increase to 106 percent. Estimate challenged by: D-R-
- 2010: Estimate of 90 percent assigned by working group. Estimate is based on survey results. Estimate challenged by: R-
- 2009: Estimate of 92 percent assigned by working group. Estimate is based on survey results. Reported data excluded because 106 percent greater than 100 percent. Reported data excluded due to an unexplained increase from 83 percent to 106 percent with decrease 86 percent. Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: R-
- 2007: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: R-
- 2006: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate of 92 percent assigned by working group. Service and reporting system effected by local situation Estimate challenged by: D-R-

2016



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	84	76	68	81	88	86	90	87	82	77	73	73
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	96	88	80	93	100	93	97	94	89	84	80	69
Administrative	96	88	78	97	100	93	97	94	89	85	77	69
Survey	NA	NA	NA	NA	88	86	NA	NA	NA	NA	NA	NA

2010

2012

2014

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: 2015 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.

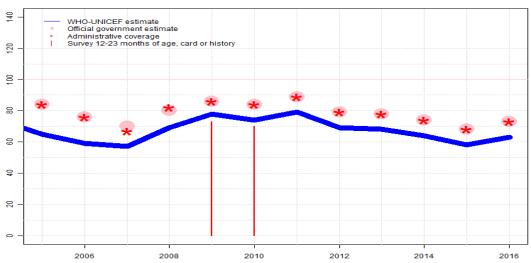
## Description:

- 2016: Reported data calibrated to 2010 levels. Reported data excluded due to unexplained sudden change in coverage from 80 level to 69 percent. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports five month vaccine stock-out at national level. Estimate challenged by: D-R-
- 2015: Reported data calibrated to 2010 levels. Programme reports a 5 month national level stock-out of DTP-HepB-Hib vaccine. Estimate challenged by: R-
- 2014: Reported data calibrated to 2010 levels. Programme reports four months stock-out at national level. Reported number of children vaccinated is increasing since 2012 but continues to fall short of the reported number of children vaccinated with DTP containing vaccines during 2011. Estimate challenged by: D-R-
- 2013: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2010 levels. DTP-HepB-Hib pentavalent and DTP-Hib tetravalent vaccines introduced in 2012. Estimate challenged by: D-R-
- 2011: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2010: Estimate of 86 percent assigned by working group. Estimate is based on survey results. Estimate challenged by: D-R-
- 2009: Estimate of 88 percent assigned by working group. Estimate is based on survey results. Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2007: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-S-
- 2006: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate of 84 percent assigned by working group. Service and reporting system effected by local situation Estimate challenged by: D-R-

2006

2008



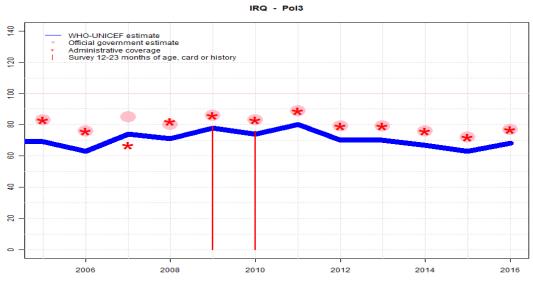


	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	65	59	57	69	78	74	79	69	68	64	58	63
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	84	76	70	80	86	84	89	79	78	74	68	73
Administrative	84	76	67	82	86	84	89	79	78	74	68	73
Survey	NA	NA	NA	NA	73	70	NA	NA	NA	NA	NA	NA

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Reported data calibrated to 2010 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports five month vaccine stock-out at national level. Estimate challenged by: R-
- 2015: Reported data calibrated to 2010 levels. Programme reports a 5 month national level stock-out of DTP-HepB-Hib vaccine. Estimate challenged by: D-R-
- 2014: Reported data calibrated to 2010 levels. Programme reports four months stock-out at national level. Reported number of children vaccinated is increasing since 2012 but continues to fall short of the reported number of children vaccinated with DTP containing vaccines during 2011. Estimate challenged by: D-R-
- 2013: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2010 levels. DTP-HepB-Hib pentavalent and DTP-Hib tetravalent vaccines introduced in 2012. Estimate challenged by: D-R-
- 2011: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2010: Estimate of 74 percent assigned by working group. Estimate is based on survey results. Iraq Multiple Indicator Cluster Survey 2011 card or history results of 70 percent modified for recall bias to 74 percent based on 1st dose card or history coverage of 86 percent, 1st dose card only coverage of 66 percent and 3d dose card only coverage of 57 percent. Estimate challenged by: D-R-
- 2009: Estimate of 78 percent assigned by working group. Estimate is based on survey results. Iraq Multiple Indicator Cluster Survey 2011 card or history results of 73 percent modified for recall bias to 78 percent based on 1st dose card or history coverage of 88 percent, 1st dose card only coverage of 63 percent and 3d dose card only coverage of 56 percent. Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2007: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-S-
- 2006: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate of 65 percent assigned by working group. Service and reporting system effected by local situation Estimate challenged by: D-R-



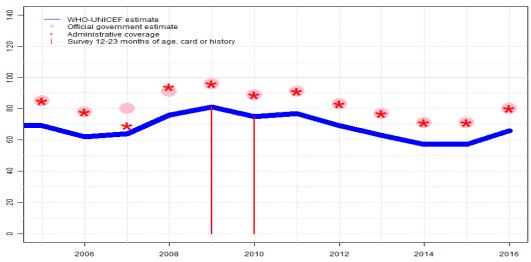
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	69	63	74	71	78	74	80	70	70	67	63	68
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	83	76	85	80	86	83	89	79	79	76	72	77
Administrative	83	76	67	82	86	83	89	79	79	76	72	77
Survey	NA	NA	NA	NA	79	76	NA	NA	NA	NA	NA	NA

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Reported data calibrated to 2010 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports one month vaccine stock-out at national level. Estimate challenged by: R-
- 2015: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2014: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- $2013{:}$  Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2011: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2010: Estimate of 74 percent assigned by working group. Card-based evidence from the 2010 MICS results shows identical coverage levels for Pol3 and DTP3. Estimate follows estimated DTP3 coverage. Iraq Multiple Indicator Cluster Survey 2011 results ignored by working group. Recall-based survey results likely include campaign doses. Survey results ignored. Iraq Multiple Indicator Cluster Survey 2011 card or history results of 76 percent modifed for recall bias to 77 percent based on 1st dose card or history coverage of 91 percent, 1st dose card only coverage of 67 percent and 3d dose card only coverage of 57 percent. Estimate challenged by: D-R-
- 2009: Estimate of 78 percent assigned by working group. Card-based evidence from the 2010 MICS results shows identical coverage levels for Pol3 and DTP3. Estimate follows estimated DTP3 coverage. Iraq Multiple Indicator Cluster Survey 2011 card or history results of 79 percent modified for recall bias to 82 percent based on 1st dose card or history coverage of 92 percent, 1st dose card only coverage of 63 percent and 3d dose card only coverage of 56 percent. Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-S-
- 2007: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: R-
- 2006: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate of 69 percent assigned by working group. Service and reporting system effected by local situation Estimate challenged by: D-R-





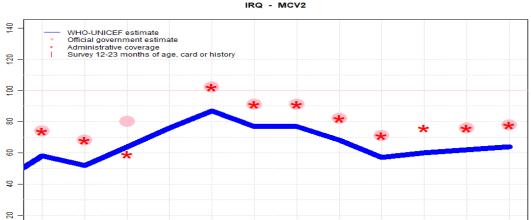
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	69	62	64	76	81	75	77	69	63	57	57	66
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	85	78	80	91	96	89	91	83	77	71	71	80
Administrative	85	78	69	94	96	89	91	83	77	71	71	80
Survey	NA	NA	NA	NA	81	75	NA	NA	NA	NA	NA	NA

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Reported data calibrated to 2010 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports three month vaccine stock-out at national level. Estimate challenged by: R-
- 2015: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2014: Reported data calibrated to 2010 levels. Programme reports five months stock-out of measles containing vaccine at national level. Estimate challenged by: D-R-
- 2013: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2011: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2010: Survey evidence does not support reported data. Estimate based on survey results. Survey evidence of 75 percent based on 1 survey(s). Estimate challenged by: D-R-
- 2009: Survey evidence does not support reported data. Estimate based on survey results. Survey evidence of 81 percent based on 1 survey(s). Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2007: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-S-
- 2006: Reported data calibrated to 2005 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate of 69 percent assigned by working group. Service and reporting system effected by local situation Estimate challenged by: D-R-

2016



	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	58	52	64	76	87	77	77	68	57	60	62	64
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	74	68	80	NA	102	91	91	82	71	NA	76	78
Administrative	74	68	59	NA	102	91	91	82	71	76	76	78
Survey	NA											

2010

2012

2014

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: 2015 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.

2016: Reported data calibrated to 2013 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Estimate challenged by: R-

2015: Reported data calibrated to 2013 levels. Estimate challenged by: D-R-

2014: Reported data calibrated to 2013 levels. Reported data excluded. Programme reports five months stock-out of measles containing vaccine at national level. There is no apparent impact of the stock-out on reported coverage. In fact, counterintuitively the reported administrative coverage increased. Estimate challenged by: D-R-

2013: Estimate of 57 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2012: Estimate of 68 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2011: Estimate of 77 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2010: Estimate of 77 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2009: Estimate follows reported data calibrated based on MCV adjustment factor. Reported data excluded because 102 percent greater than 100 percent. Estimate challenged by: D-

2008: Reported data calibrated to 2007 and 2009 levels. GoC=No accepted empirical data

2007: Estimate of 64 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: R-

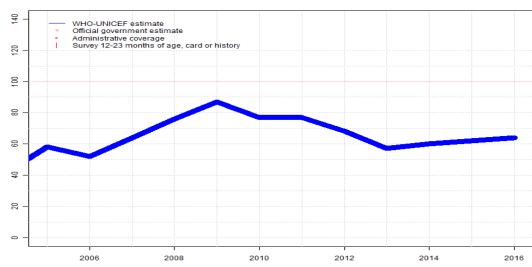
2006: Estimate of 52 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2005: Estimate of 58 percent assigned by working group. Estimate follows reported data calibrated based on MCV adjustment factor. Estimate challenged by: D-R-

2006

2008





	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	58	52	64	76	87	77	77	68	57	60	62	64
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	NA											
Administrative	NA											
Survey	NA											

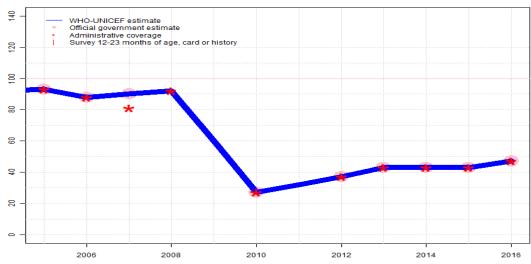
- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 revision from the UN Population Division (D+), and at least one supporting survey within 2 years [S+]. While well supported, the estimate still carries a 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.

- For this revision, coverage estimates for the first dose of rubella containing vaccine are based on WHO and UNICEF estimates of coverage of measles containing vaccine. Nationally reported coverage of rubella containing vaccine is not taken into consideration nor are they represented in the the accompanying graph and data table.
- 2016: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Estimate challenged by: R-
- 2015: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2014: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2013: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2012: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2011: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2010: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2009: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-
- 2008: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate GoC=No accepted empirical data
- 2007: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: R-
- 2006: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-
- 2005: First dose of rubella vaccine given with second dose of measles containing vaccine. Estimate based on MCV2 estimate Estimate challenged by: D-R-

## Iraq - HepBB





	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	93	88	90	92	60	27	32	37	43	43	43	47
Estimate GoC	•	•	••	•	•	••	•	••	••	••	••	••
Official	93	88	90	NA	NA	27	NA	37	43	43	43	47
Administrative	93	88	81	92	NA	27	NA	37	43	43	43	47
Survey	NA											

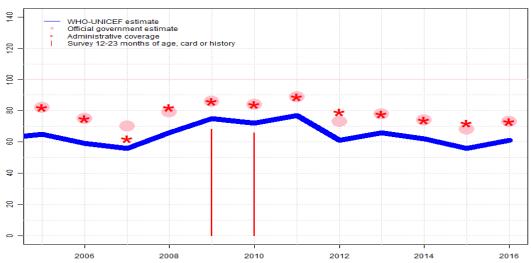
The WHO and UNICEF estimates of national immunization coverage (wuenic) are based on data and information that are of varying, and, in some instances, unknown quality. Beginning with the 2011 revision we describe the grade of confidence (GoC) we have in these estimates. As there is no underlying probability 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: 2015 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.

- 2016: Estimate based on coverage reported by national government. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. GoC=R+D+
- 2015: Estimate based on coverage reported by national government. GoC=R+ D+
- 2014: Estimate based on coverage reported by national government. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+ D+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on interpolation between reported values. GoC=No accepted empirical data
- 2010: Estimate based on coverage reported by national government. Decline in coverage is unexplained. GoC=R+ D+
- 2009: Estimate based on interpolation between reported values. GoC=No accepted empirical data
- 2008: Estimate based on reported administrative estimate. Estimate challenged by: D-
- 2007: Estimate based on coverage reported by national government. GoC=R+ D+
- 2006: Estimate based on coverage reported by national government. Estimate challenged by: D-
- 2005: Estimate based on coverage reported by national government. Estimate challenged by: D-





	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	65	59	56	66	75	72	77	61	66	62	56	61
Estimate GoC	•	•	•	•	•	•	•	•	•	•	•	•
Official	82	75	70	79	86	84	89	73	78	74	68	73
Administrative	82	75	62	82	86	84	89	79	78	74	72	73
Survey	NA	NA	NA	NA	68	66	NA	NA	NA	NA	NA	NA

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Reported data calibrated to 2010 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports five month vaccine stock-out at national level. Estimate challenged by: R-
- 2015: Reported data calibrated to 2010 levels. Programme reports a 5 month national level stock-out of DTP-HepB-Hib vaccine. Estimate challenged by: D-R-
- 2014: Reported data calibrated to 2010 levels. Programme reports four months stock-out at national level. Estimate challenged by: D-R-
- 2013: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2010 levels. DTP-HepB-Hib pentavalent vaccine introduced in 2012. Estimate challenged by: D-R-S-
- 2011: Reported data calibrated to 2010 levels. Estimate challenged by: D-R-
- 2010: Survey evidence does not support reported data. Estimate based on survey results. Survey evidence of 72 percent based on 1 survey(s). Iraq Multiple Indicator Cluster Survey 2011 card or history results of 66 percent modified for recall bias to 72 percent based on 1st dose card or history coverage of 89 percent, 1st dose card only coverage of 70 percent and 3d dose card only coverage of 57 percent. Estimate challenged by: D-R-
- 2009: Survey evidence does not support reported data. Estimate based on survey results. Survey evidence of 75 percent based on 1 survey(s). Iraq Multiple Indicator Cluster Survey 2011 card or history results of 68 percent modified for recall bias to 75 percent based on 1st dose card or history coverage of 90 percent, 1st dose card only coverage of 66 percent and 3d dose card only coverage of 55 percent. Estimate challenged by: D-R-
- 2008: Reported data calibrated to 2004 and 2009 levels. Estimate challenged by: D-R-
- 2007: Reported data calibrated to 2004 and 2009 levels. Estimate challenged by: D-R-S-
- 2006: Reported data calibrated to 2004 and 2009 levels. Estimate challenged by: D-R-
- 2005: Estimate based on interpolation between 2004 and 2009 levels. Service and reporting system effected by local situation Estimate challenged by: D-R-

2016



2012

2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	NA	36	68	64	58	63						
Estimate GoC	NA	•	•	•	•	•						
Official	NA	46	78	74	68	73						
Administrative	NA	46	78	74	72	73						
Survey	NA											

2010

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: 2015 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:

- 2016: Reported data calibrated to 2013 levels. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports five month vaccine stock-out at national level. Estimate challenged by: R-
- 2015: Reported data calibrated to 2013 levels. Programme reports a 5 month national level stock-out of DTP-HepB-Hib vaccine. Estimate challenged by: D-R-
- 2014: Reported data calibrated to 2013 levels. Programme reports four months stock-out at national level. Estimate challenged by: D-R-
- 2013: Estimate of 68 percent assigned by working group. Estimate is based on DTP3 coverage level. Estimate challenged by: D-R-
- 2012: Reported data calibrated to 2013 levels. Hib vaccine introduced in 2012. The presentations are DTP-Hib and DTP-HepB-Hib. Estimate challenged by: D-R-

120

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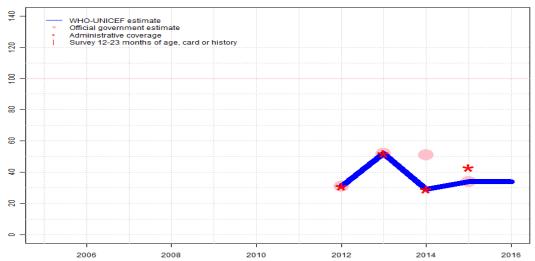
9

20

2006

2008





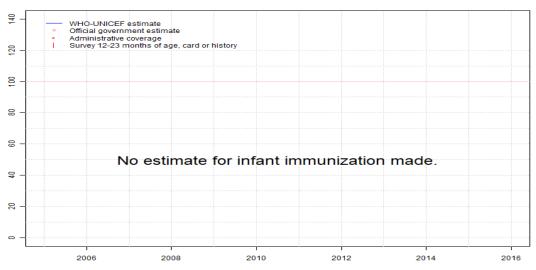
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	NA	31	52	29	34	34						
Estimate GoC	NA	••	••	••	•	•						
Official	NA	31	52	51	34	NA						
Administrative	NA	31	52	29	43	NA						
Survey	NA											

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

- 2016: Estimate based on extrapolation from data reported by national government. Programme reports an unexplained decline in the target population of 15 percent from that reported in 2015. WHO and UNICEF are aware of the preparations for the MICS 2017 and await the results. Programme reports two month vaccine stock-out at national level. GoC=No accepted empirical data
- 2015: Estimate based on coverage reported by national government. Estimate challenged by: D-
- 2014: Estimate based on reported administrative estimate. Estimate is based on reported data. Programme reports five months stock-out at national level. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. Estimate is based on reported data. GoC=R+ D+
- 2012: Estimate based on coverage reported by national government. Rotavirus vaccine introduced in 2012. GoC=R+ D+





	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Estimate	NA											
Estimate GoC	NA											
Official	NA											
Administrative	NA											
Survey	NA											

- ••• Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2015 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.

# Iraq - survey details

2010 Ir	aq Multiple	Indicator	Cluster	Survey	2011
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BCG C or H < 12 months 90 12-23 m - 70   BCG Card 68 12-23 m - 70   BCG Card or History 90 12-23 m 7487 70   BCG History 22 12-23 m - 70	
BCG Card or History 90 $12-23 \text{ m}$ $7487$ $70$	
v	
BCG History 22 12-23 m - 70	
DTP1 C or H <12 months 85 12-23 m - 70	
DTP1 Card 66 12-23 m - 70	
DTP1 Card or History 86 12-23 m 7487 70	
DTP1 History 20 12-23 m - 70	
DTP3 C or H $<$ 12 months 65 12-23 m - 70	
DTP3 Card 57 12-23 m - 70	
DTP3 Card or History 70 12-23 m 7487 70	
DTP3 History 13 12-23 m - 70	
HepB1 C or H $<$ 12 months 88 12-23 m - 70	
HepB1 Card 70 12-23 m - 70	
HepB1 Card or History 89 12-23 m 7487 70	
HepB1 History 19 12-23 m - 70	
HepB3 C or H $<$ 12 months 61 12-23 m - 70	
HepB3 Card 57 12-23 m - 70	
HepB3 Card or History 66 12-23 m 7487 70	
HepB3 History 9 12-23 m - 70	
MCV1 C or H <12 months 66 12-23 m - 70	
MCV1 Card 54 12-23 m - 70	
MCV1 Card or History 75 12-23 m 7487 70	
MCV1 History 21 12-23 m - 70	
Pol1 C or H <12 months 90 12-23 m - 70	
Pol1 Card 67 12-23 m - 70	
Pol1 Card or History 91 12-23 m 7487 70	
Pol1 History 24 12-23 m - 70	
Pol3 C or H <12 months 71 12-23 m - 70	
Pol3 Card 57 12-23 m - 70	
Pol3 Card or History 76 12-23 m 7487 70	
Pol3 History 19 12-23 m - 70	

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	91	18-29 m	-	70
BCG	Card	65	18-29 m	_	70
BCG	Card or History	92	18-29 m	7524	70
BCG	History	27	18-29 m	-	70
DTP1	C or H <12 months	86	18-29 m	_	70
DTP1	Card	63	18-29 m	_	70
DTP1	Card or History	88	18-29 m	7524	70
DTP1	History	25	$18-29 \mathrm{\ m}$	_	70
DTP3	C or $\dot{H}$ <12 months	65	$18-29 \mathrm{\ m}$	-	70
DTP3	Card	56	$18-29 \mathrm{\ m}$	-	70
DTP3	Card or History	73	$18-29~\mathrm{m}$	7524	70
DTP3	History	18	$18-29~\mathrm{m}$	-	70
HepB1	C or H <12 months	89	$18-29~\mathrm{m}$	-	70
HepB1	Card	66	$18-29~\mathrm{m}$	-	70
HepB1	Card or History	90	$18-29~\mathrm{m}$	7524	70
HepB1	History	24	$18\text{-}29~\mathrm{m}$	_	70
HepB3	C or H <12 months	60	$18\text{-}29~\mathrm{m}$	-	70
HepB3	Card	55	$18\text{-}29~\mathrm{m}$	-	70
HepB3	Card or History	68	$18\text{-}29~\mathrm{m}$	7524	70
HepB3	History	13	$18\text{-}29~\mathrm{m}$	-	70
MCV1	C  or  H < 18  months	77	$18\text{-}29~\mathrm{m}$	-	70
MCV1	Card	55	$18\text{-}29~\mathrm{m}$	-	70
MCV1	Card or History	81	$18\text{-}29~\mathrm{m}$	7524	70
MCV1	History	26	$18\text{-}29~\mathrm{m}$	-	70
Pol1	C or H $<$ 12 months	90	$18\text{-}29~\mathrm{m}$	-	70
Pol1	Card	63	$18\text{-}29~\mathrm{m}$	-	70
Pol1	Card or History	92	$18\text{-}29~\mathrm{m}$	7524	70
Pol1	History	29	$18\text{-}29~\mathrm{m}$	-	70
Pol3	C  or  H < 12  months	70	$18\text{-}29~\mathrm{m}$	-	70
Pol3	Card	56	$18\text{-}29~\mathrm{m}$	-	70
Pol3	Card or History	79	$18\text{-}29~\mathrm{m}$	7524	70
Pol3	History	23	$18\text{-}29~\mathrm{m}$	-	70

2004 Iraq Multiple Indicator Cluster Survey 2006

2009 Iraq Multiple Indicator Cluster Survey 2011

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H $<$ 12 months	91	$18\text{-}29~\mathrm{m}$	3329	55
BCG	Card	54	18-29 m	3329	55

# Iraq - survey details

BCG	Card or History	92	$18-29~\mathrm{m}$	3329	55	Pol	l1	C or H <12 months	88	18-29 m	3329	55
BCG	History	39	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l1	Card	49	18-29 m	3329	55
DTP1	C or H $<$ 12 months	82	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l1	Card or History	91	18-29 m	3329	55
DTP1	Card	49	$18-29~\mathrm{m}$	3329	55	Pol	l1	History	42	18-29 m	3329	55
DTP1	Card or History	84	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l3	C or H $<$ 12 months	57	$18-29 \mathrm{\ m}$	3329	55
DTP1	History	36	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l3	Card	37	18-29 m	3329	55
DTP3	C or H $<$ 12 months	53	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l3	Card or History	66	18-29 m	3329	55
DTP3	Card	38	$18\text{-}29~\mathrm{m}$	3329	55	Pol	l3	History	28	18-29 m	3329	55
DTP3	Card or History	62	$18\text{-}29~\mathrm{m}$	3329	55							
DTP3	History	24	$18\text{-}29~\mathrm{m}$	3329	55							
HepB1	C or H $<$ 12 months	87	$18\text{-}29~\mathrm{m}$	3329	55	1999	9 Irac	4 Multiple Indicator	r Cluster	Survey 2	000	
HepB1	Card	54	$18\text{-}29~\mathrm{m}$	3329	55							
HepB1	Card or History	88	$18\text{-}29~\mathrm{m}$	3329	55	17		G C 11 1	<u> </u>		G 1	G 1
HepB1	History	34	$18\text{-}29~\mathrm{m}$	3329	55			Confirmation method	_	_	_	
HepB3	C or H $<$ 12 months	49	$18\text{-}29~\mathrm{m}$	3329	55	BC		Card or History		12-23 m	434	78
HepB3	Card	38	$18\text{-}29~\mathrm{m}$	3329	55	DT		Card or History		12-23 m	434	78
HepB3	Card or History	58	$18\text{-}29~\mathrm{m}$	3329	55			Card or History		12-23 m	434	78
HepB3	History	19	$18\text{-}29~\mathrm{m}$	3329	55			Card or History		12-23 m	434	78
MCV1	Card	39	$18\text{-}29~\mathrm{m}$	3329	55	Pol		Card or History		12-23 m	434	78
MCV1	Card or History	69	$18\text{-}29~\mathrm{m}$	3329	55	Pol	13	Card or History	87	12-23 m	434	78
MCV1	History	31	$18-29~\mathrm{m}$	3329	55							

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