

**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. Coverage 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 produced 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.

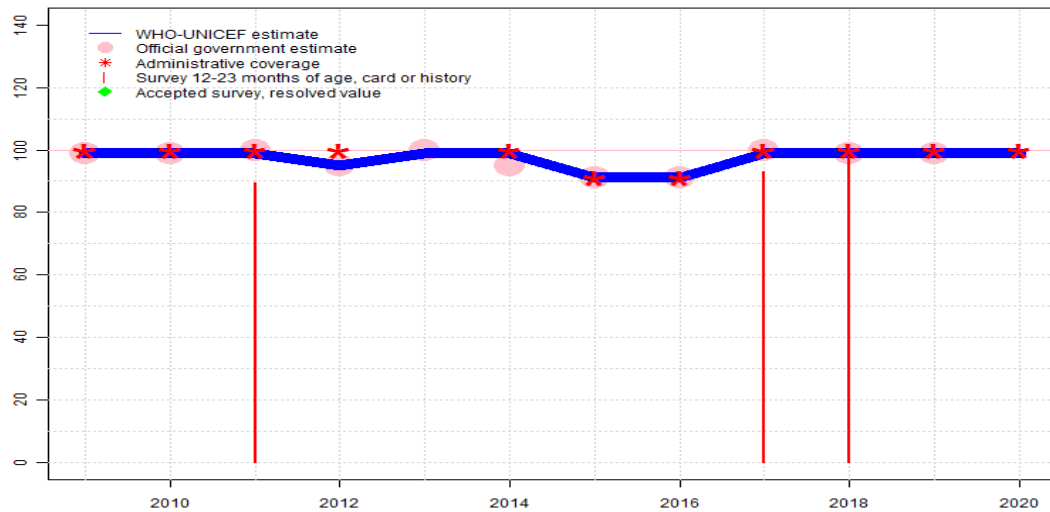
**PcV3:** percentage of surviving infants who received the 3rd dose of pneumococcal conjugate vaccine. In countries where the national schedule recommends two doses during infancy and a booster dose at 12 months or later based on the epidemiology of disease in the country, coverage estimates may reflect 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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# Tonga - BCG

TON - BCG



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	100	95	91	91	100	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●	●	●	●●	●	●	●
Official	99	99	100	95	100	95	91	91	100	99	99	NA
Administrative	100	100	100	100	NA	100	91	91	100	100	100	100
Survey	NA	NA	89.4	NA	NA	NA	NA	NA	93.1	98	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: 2020 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:

- 2020: Estimate based on reported administrative data. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Preliminary survey results suggest 98 percent coverage. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2014: Estimate based on reported administrative data. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. Estimate challenged by: D-
- 2013: Estimate based on coverage reported by national government. GoC=R+

# Tonga - BCG

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

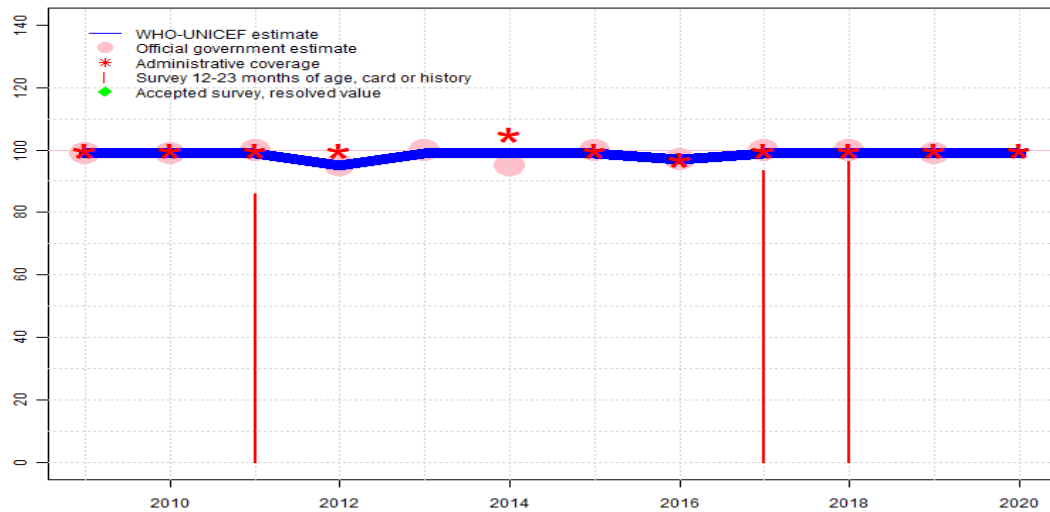
2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. GoC=R+ D+

2010: Estimate based on coverage reported by national government. GoC=R+ D+

2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - DTP1

TON - DTP1



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	99	99	99	97	99	99	99	99
Estimate GoC	••	••	••	••	••	•	••	•	••	••	•	••
Official	99	99	100	95	100	95	100	97	100	100	99	NA
Administrative	100	100	100	100	NA	105	100	97	100	100	100	100
Survey	NA	NA	86	NA	NA	NA	NA	NA	93.3	96.4	NA	NA

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- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2020 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:

- 2020: Estimate based on reported administrative data. Programme reports national-level vaccine stock-out of unspecified duration. GoC=R+ D+
- 2019: DTP1 coverage estimated based on DTP3 coverage of 100. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-R-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. GoC=R+ D+
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. GoC=R+ D+
- 2014: Estimate based on interpolation between data reported by national government. Reported data excluded because 105 percent greater than 100 percent. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. Estimate challenged by: D-

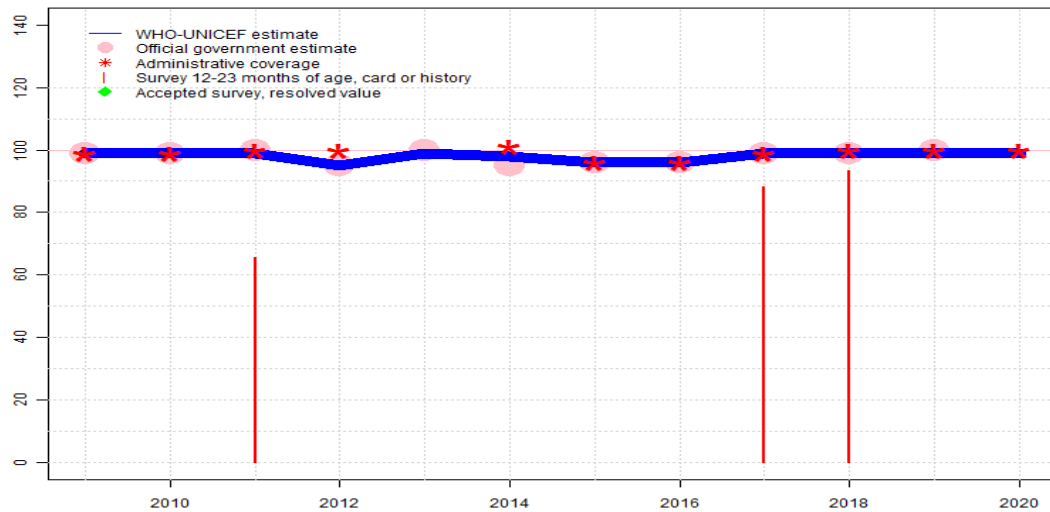
# Tonga - DTP1

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- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - DTP3

TON - DTP3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	99	98	96	96	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●●	●●	●	●●	●	●	●
Official	99	99	100	95	100	95	96	96	99	99	100	NA
Administrative	99	99	100	100	NA	101	96	96	99	100	100	100
Survey	NA	NA	65.7	NA	NA	NA	NA	NA	88.1	93.5	NA	NA

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- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2020 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:

- 2020: Estimate based on reported administrative data. Programme reports national-level vaccine stock-out of unspecified duration. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 94 percent modified for recall bias to 96 percent based on 1st dose card or history coverage of 96 percent, 1st dose card only coverage of 94 percent and 3rd dose card only coverage of 93 percent. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Preliminary survey results suggest 93 percent coverage. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 88 percent modified for recall bias to 91 percent based on 1st dose card or history coverage of 93 percent, 1st dose card only coverage of 89 percent and 3rd dose card only coverage of 87 percent. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. GoC=R+

# Tonga - DTP3

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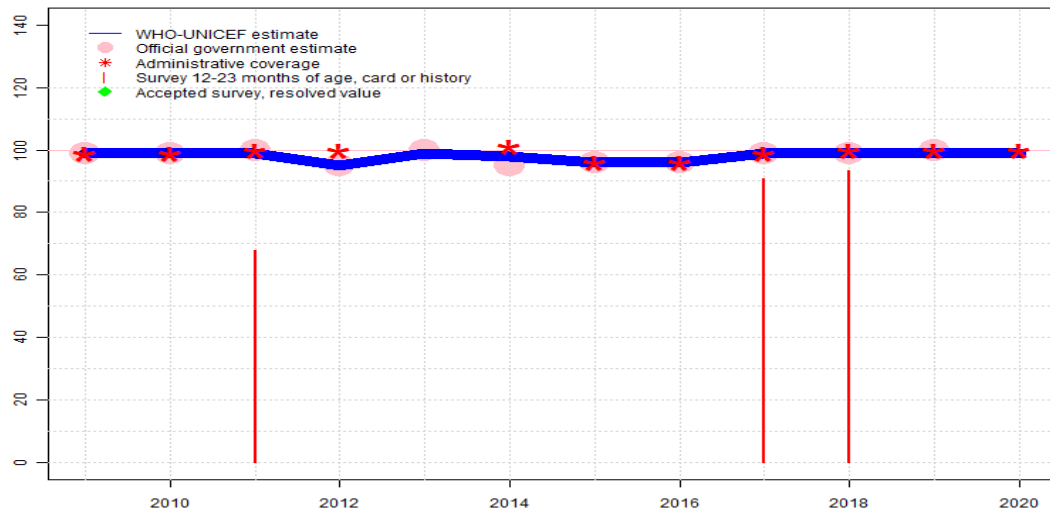
D+

- 2014: Estimate based on interpolation between data reported by national government. Reported data excluded because 101 percent greater than 100 percent. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. Kingdom of Tonga Demographic and Health Survey 2012 card or history results of 66 percent modified for recall bias to 83 percent based on 1st dose card or history coverage of 86 percent, 1st dose card only coverage of 48 percent and 3rd dose card only coverage of 47 percent. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+



# Tonga - Pol3

TON - Pol3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	100	98	96	96	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●●	●●	●	●●	●	●	●
Official	99	99	100	95	100	95	96	96	99	99	100	NA
Administrative	99	99	100	100	NA	101	96	96	99	100	100	100
Survey	NA	NA	67.8	NA	NA	NA	NA	NA	90.9	93.5	NA	NA

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- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2020 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.

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## Description:

- 2020: Estimate based on reported administrative data. Programme reports national-level vaccine stock-out of unspecified duration. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 94 percent modified for recall bias to 96 percent based on 1st dose card or history coverage of 98 percent, 1st dose card only coverage of 95 percent and 3rd dose card only coverage of 93 percent. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 91 percent modified for recall bias to 93 percent based on 1st dose card or history coverage of 93 percent, 1st dose card only coverage of 89 percent and 3rd dose card only coverage of 88 percent. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. GoC=R+ D+

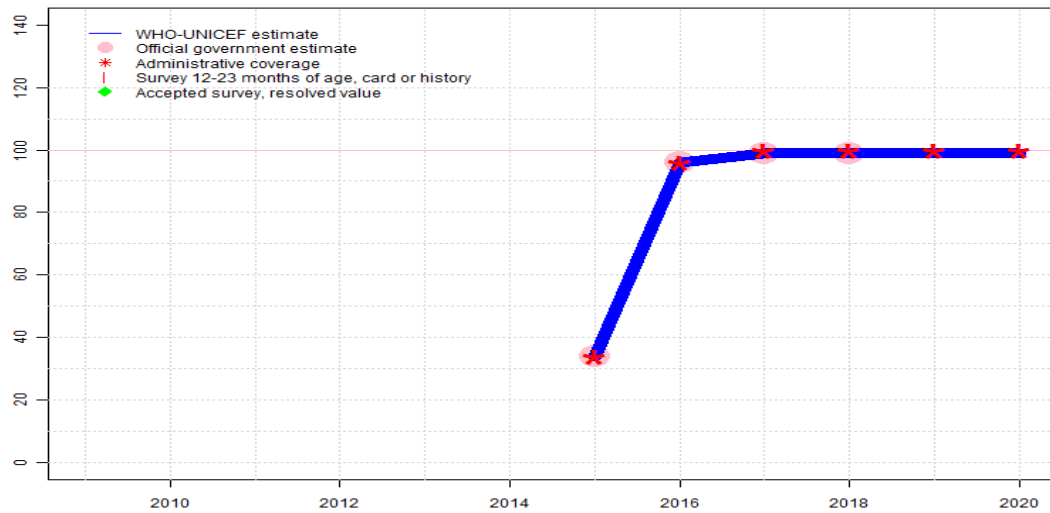
# Tonga - Pol3

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- 2014: Estimate based on interpolation between data reported by national government. Reported data excluded because 101 percent greater than 100 percent. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. Kingdom of Tonga Demographic and Health Survey 2012 card or history results of 68 percent modified for recall bias to 85 percent based on 1st dose card or history coverage of 88 percent, 1st dose card only coverage of 48 percent and 3rd dose card only coverage of 47 percent. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - IPV1

TON - IPV1



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	NA	NA	NA	NA	NA	NA	34	96	99	99	99	99
Estimate GoC	NA	NA	NA	NA	NA	NA	•	•	••	•	•	•
Official	NA	NA	NA	NA	NA	NA	34	96	99	99	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	34	96	100	100	100	100
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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- Estimate is supported by reported data [R+], coverage recalculated with an independent denominator from the World Population Prospects: 2020 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.
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- There are no directly supporting data; or data from at least one source; [R-], [D-], [S-]; challenge the estimate.

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## Description:

Estimates for a dose of inactivated polio vaccine (IPV) begin in 2015 following the Global Polio Eradication Initiative's Polio Eradication and Endgame Strategic Plan: 2013-2018 which recommended at least one full dose or two fractional doses of IPV into routine immunization schedules as a strategy to mitigate the potential consequences should any re-emergence of type 2 poliovirus occur following the planned withdrawal of Sabin type 2 strains from oral polio vaccine (OPV).

2020: Estimate based on reported administrative estimate. Programme reports national-level vaccine stock-out of unspecified duration. Estimate challenged by: D-

2019: Estimate based on reported administrative estimate. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-

2018: Estimate based on coverage reported by national government. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Estimate challenged by: D-

2017: Estimate based on coverage reported by national government. GoC=R+ D+

2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-

2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Inactivated polio vaccine introduced in December 2015. Programme reports 100 percent coverage in three percent of the national target population. Estimate is based on coverage achieved in the

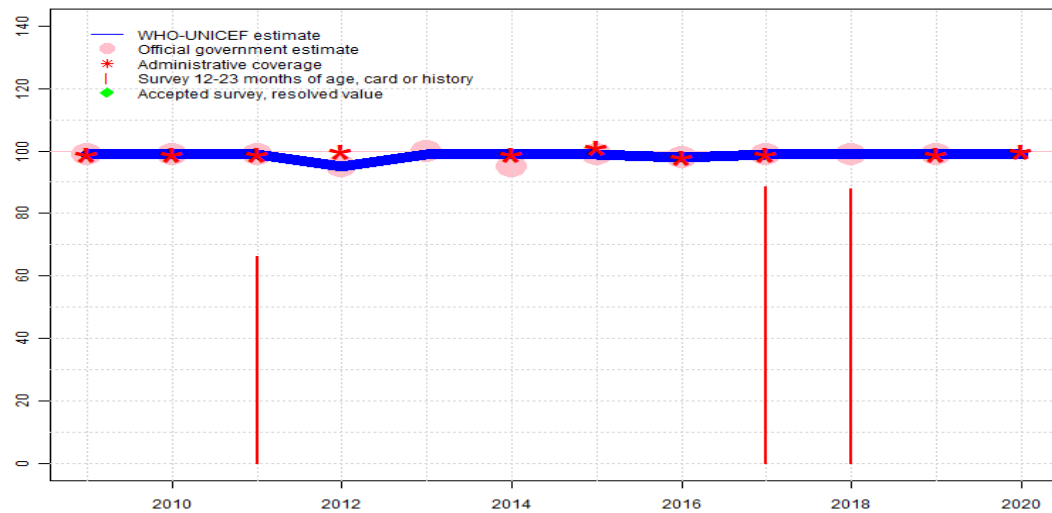
# Tonga - IPV1

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total annual national population. Estimate challenged by: D-

# Tonga - MCV1

TON - MCV1



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	99	99	99	98	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●●	●	●	●●	●●	●	●
Official	99	99	99	95	100	95	99	98	99	99	99	NA
Administrative	99	99	99	100	NA	99	101	98	99	NA	99	100
Survey	NA	NA	66.2	NA	NA	NA	NA	NA	88.6	88	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: 2020 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:

- 2020: Estimate based on reported administrative data. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. GoC=R+
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2014: Estimate based on reported administrative data. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate for MCV1 is likely underestimated slightly because the survey results reflect coverage for children aged 12-23 m at the time of survey while measles vaccine is recommended at 12 m. Reported adjustment to administrative data are unexplained. GoC=R+ D+

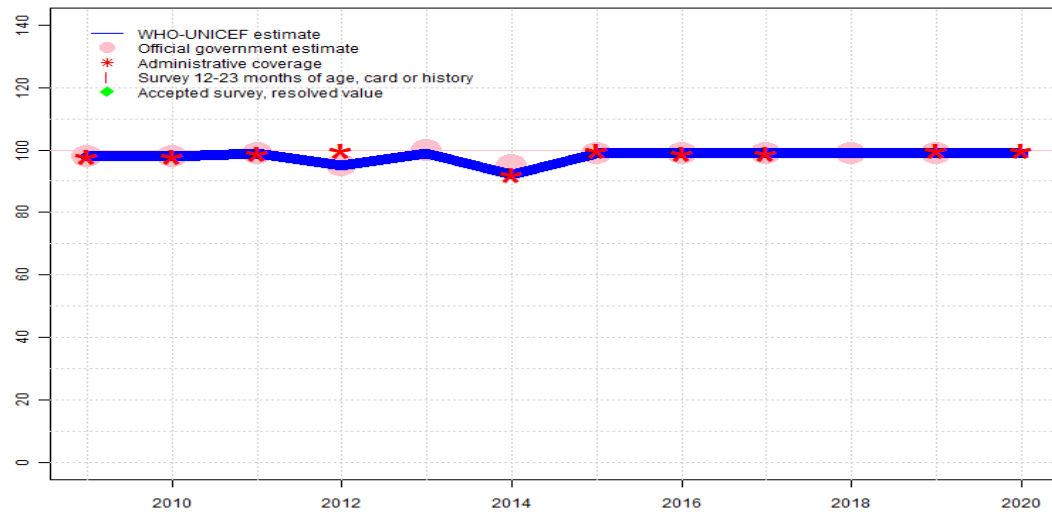
# Tonga - MCV1

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- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results for MCV1 are ignored given that MCV1 is recommended at 12 months according to data reported in the national immunization schedule. The survey results are from children aged 12-23 months at the time of the survey and therefore may underestimate coverage. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - MCV2

TON - MCV2



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	98	98	99	95	99	92	99	99	99	99	99	99
Estimate GoC	•	•	••	••	••	••	•	•	••	••	••	•
Official	98	98	99	95	100	95	99	99	99	99	99	NA
Administrative	98	98	99	100	NA	92	100	99	99	NA	100	100
Survey	NA	NA	NA	NA	NA	NA	NA	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: 2020 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.

- 2020: Estimate based on reported administrative estimate. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. GoC=R+ D+
- 2018: Estimate based on coverage reported by national government. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. GoC=R+
- 2017: Estimate based on coverage reported by national government. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2014: Estimate based on reported administrative estimate. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+

# Tonga - MCV2

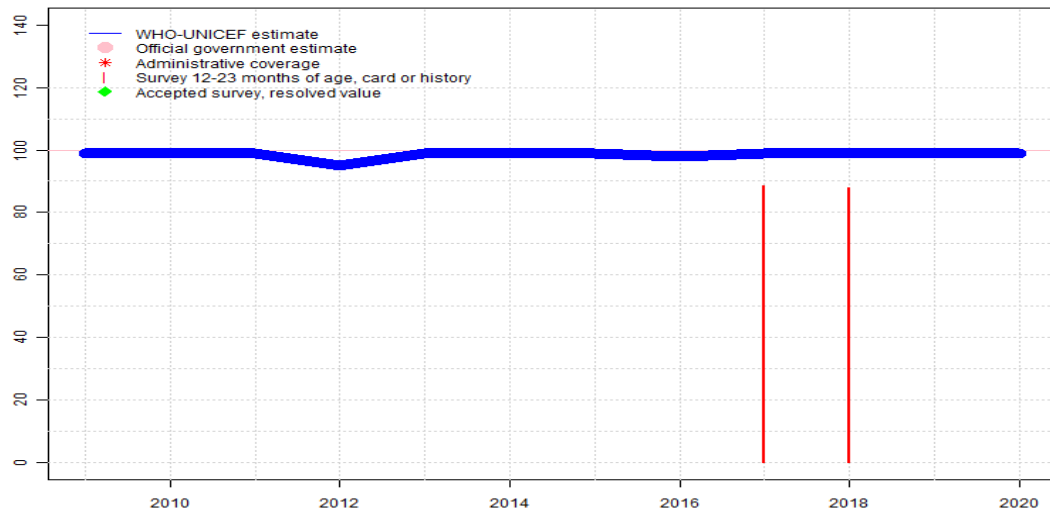
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2012: Estimate based on coverage reported by national government. GoC=R+ D+  
2011: Estimate based on coverage reported by national government. GoC=R+ D+  
2010: Estimate based on coverage reported by national government. Estimate challenged by: D-  
2009: Estimate based on coverage reported by national government. Estimate challenged by: D-



# Tonga - RCV1

TON - RCV1



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	99	99	99	98	99	99	99	99
Estimate GoC	••	••	••	••	••	••	•	•	••	••	•	•
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Survey	NA	NA	NA	NA	NA	NA	NA	NA	88.6	88	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: 2020 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:

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.

2020: Estimate based on estimated MCV1. Estimate challenged by: D-

2019: Estimate based on estimated MCV1. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-

2018: Estimate based on estimated MCV1. Survey results ignored. Sample size 235 less than 300. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. GoC=R+

2017: Estimate based on estimated MCV1. Survey results ignored. Sample size 284 less than 300. GoC=R+ D+

2016: Estimate based on estimated MCV1. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-

2015: Estimate based on estimated MCV1. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-

2014: Estimate based on estimated MCV1. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative

# Tonga - RCV1

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data are unexplained. GoC=R+ D+

2013: Estimate based on estimated MCV1. GoC=R+

2012: Estimate based on estimated MCV1. GoC=R+ D+

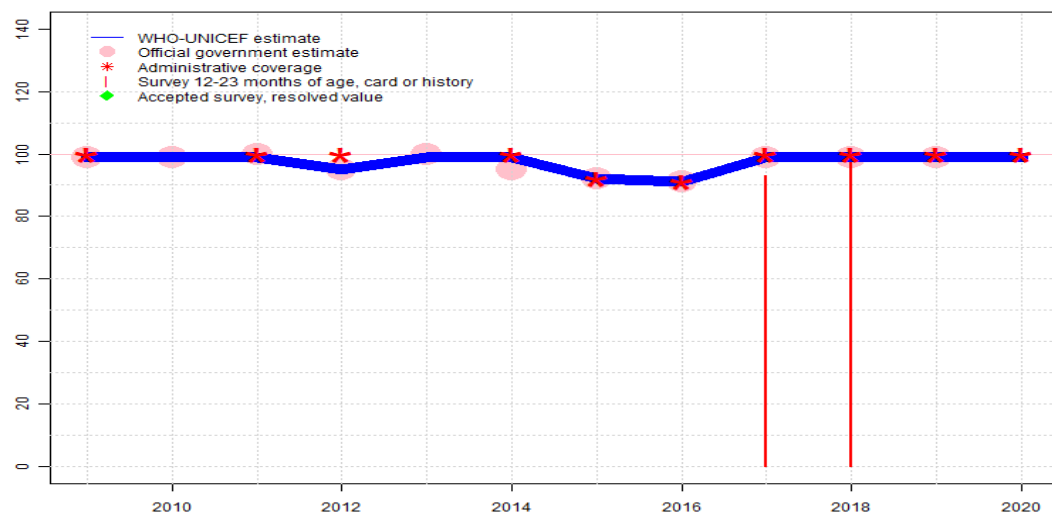
2011: Estimate based on estimated MCV1. GoC=R+ D+

2010: Estimate based on estimated MCV1. GoC=R+ D+

2009: Estimate based on estimated MCV1. GoC=R+ D+

# Tonga - HepBB

TON - HepBB



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	99	99	92	91	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●	●	●	●●	●	●	●
Official	99	99	100	95	100	95	92	91	99	99	99	NA
Administrative	100	NA	100	100	NA	100	92	91	100	100	100	100
Survey	NA	NA	NA	NA	NA	NA	NA	NA	93	97.2	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: 2020 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:

- 2020: Estimate based on reported administrative estimate. Estimate challenged by: D-
- 2019: Estimate based on coverage reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. Estimate challenged by: D-
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2014: Estimate based on reported administrative estimate. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. Estimate challenged by: D-
- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - HepBB

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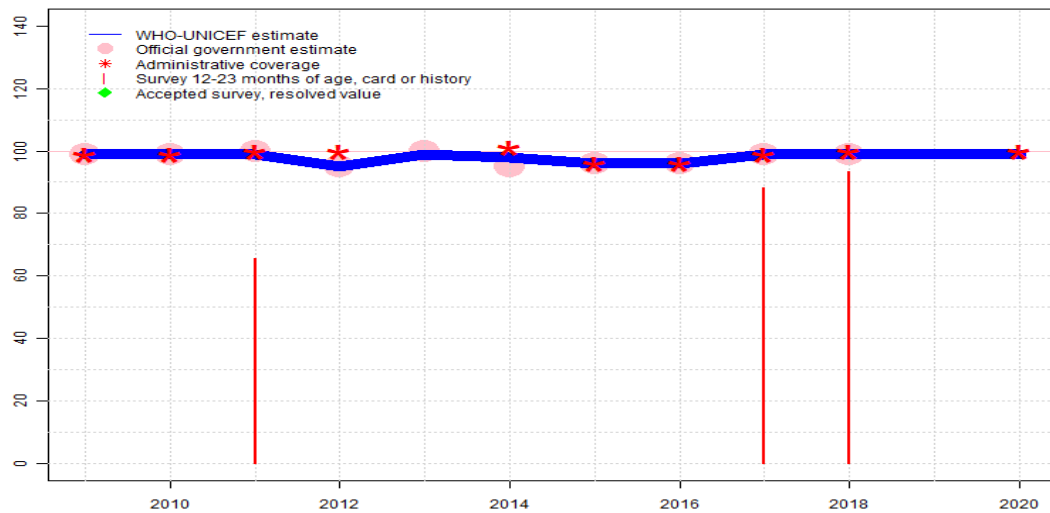
2011: Estimate based on coverage reported by national government. GoC=R+ D+

2010: Estimate based on coverage reported by national government. GoC=R+

2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - HepB3

TON - HepB3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	100	98	96	96	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●●	●●	●	●●	●	●	●
Official	99	99	100	95	100	95	96	96	99	99	NA	NA
Administrative	99	99	100	100	NA	101	96	96	99	100	NA	100
Survey	NA	NA	65.7	NA	NA	NA	NA	NA	88.1	93.5	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: 2020 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:

- 2020: Estimate based on reported administrative data. Programme reports national-level vaccine stock-out of unspecified duration. Estimate challenged by: D-
- 2019: Estimate based on interpolation between data reported by national government. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. GoC=No accepted empirical data
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 94 percent modified for recall bias to 96 percent based on 1st dose card or history coverage of 96 percent, 1st dose card only coverage of 94 percent and 3rd dose card only coverage of 93 percent. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 88 percent modified for recall bias to 91 percent based on 1st dose card or history coverage of 93 percent, 1st dose card only coverage of 89 percent and 3rd dose card only coverage of 87 percent. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. GoC=R+ D+

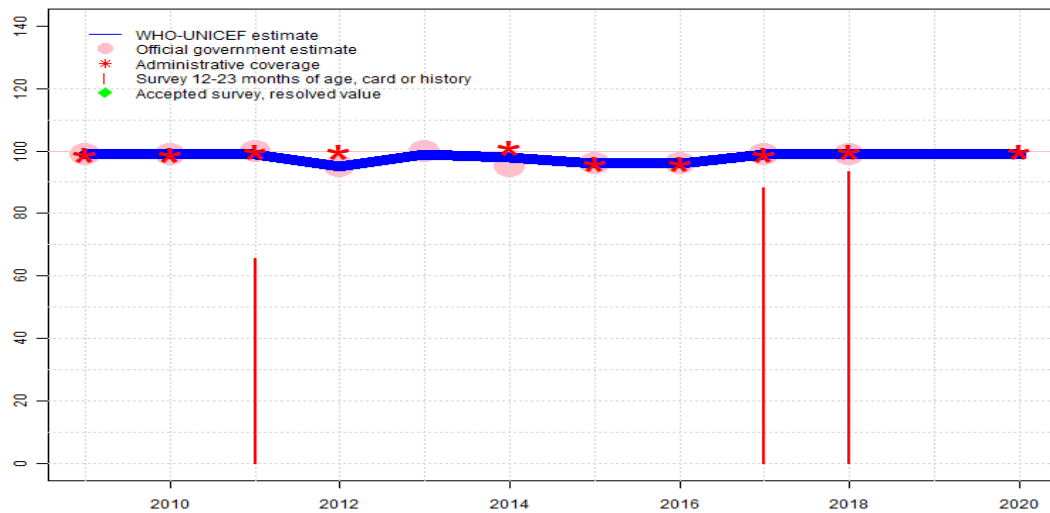
# Tonga - HepB3

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- 2014: Estimate based on interpolation between data reported by national government. Reported data excluded because 101 percent greater than 100 percent. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. Kingdom of Tonga Demographic and Health Survey 2012 card or history results of 66 percent modified for recall bias to 83 percent based on 1st dose card or history coverage of 86 percent, 1st dose card only coverage of 48 percent and 3rd dose card only coverage of 47 percent. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+

# Tonga - Hib3

TON - Hib3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	99	99	99	95	100	98	96	96	99	99	99	99
Estimate GoC	●●	●●	●●	●●	●●	●●	●●	●	●●	●	●	●
Official	99	99	100	95	100	95	96	96	99	99	NA	NA
Administrative	99	99	100	100	NA	101	96	96	99	100	NA	100
Survey	NA	NA	65.7	NA	NA	NA	NA	NA	88.1	93.5	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: 2020 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:

- 2020: Estimate based on reported administrative estimate. Programme reports national-level vaccine stock-out of unspecified duration. Estimate challenged by: D-
- 2019: Estimate based on interpolation between reported values. A report of supplementary immunization activity during the measles outbreak in Tonga notes that most measles cases during the outbreak were among children aged 10 to 24 years and among children aged less than 9 months (who are not age eligible for measles vaccine). This observation would suggest coverage levels that are higher than an independent vaccination coverage survey for the 2011 birth cohort. Reviews of the routine immunization system as part of the outbreak investigation also suggest the immunization delivery system is robust overall in spite of the outbreak. GoC=No accepted empirical data
- 2018: Estimate based on coverage reported by national government. Survey results ignored. Sample size 235 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 94 percent modified for recall bias to 96 percent based on 1st dose card or history coverage of 96 percent, 1st dose card only coverage of 94 percent and 3rd dose card only coverage of 93 percent. Programme has expressed disagreement with the results of the 2012 Demographic and Health Survey providing evidence of the vaccination experience for the 2011 birth cohort. In a 2015 health sector review report, the Government notes that the home-based records seen during the survey may not have been up-to-date and their concern that caregiver recall of vaccination history is inaccurate. Results from the 2012 Demographic and Health Survey suggest coverage among children with documented evidence in home-based records are consistent with reported high vaccination coverage levels by the government. The survey suggests that 48 percent of children currently maintained a home-based record at the time of the survey. There is recognition that there may have been problems with caregiver recall of vaccination history in the survey. It is relevant to note, however, that the survey did identify children with no evidence of vaccination. Estimate challenged by: D-
- 2017: Estimate based on coverage reported by national government. Survey results ignored. Sample size 284 less than 300. Tonga Multiple Indicator Cluster Survey 2019 card or history results of 88 percent modified for recall bias to 91 percent based on 1st dose card or history coverage of 93 percent, 1st dose card only coverage of 89 percent and 3rd dose card only coverage of 87 percent. GoC=R+ D+
- 2016: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Estimate challenged by: D-
- 2015: Estimate based on coverage reported by national government. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. GoC=R+ D+

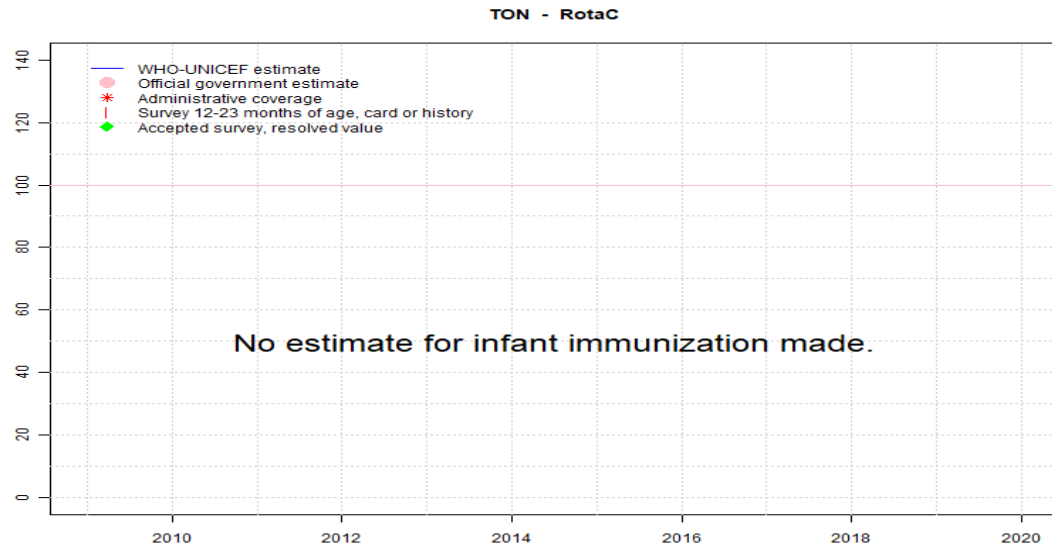
# Tonga - Hib3

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- 2014: Estimate based on interpolation between reported values. Reported data excluded because 101 percent greater than 100 percent. Reported target population data for 2014 through 2016 suggest an implied infant mortality rate of 60 deaths per 1000 live-births which is inconsistent with other published data suggesting infant mortality rates that are much lower, around 11 deaths per 1000 live-births. Reported adjustment to administrative data are unexplained. GoC=R+ D+
- 2013: Estimate based on coverage reported by national government. GoC=R+
- 2012: Estimate based on coverage reported by national government. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. Kingdom of Tonga Demographic and Health Survey 2012 results ignored by working group. Survey results ignored following consultation with regional technical staff highlighting possible implementation issues with the survey. Kingdom of Tonga Demographic and Health Survey 2012 card or history results of 66 percent modified for recall bias to 83 percent based on 1st dose card or history coverage of 86 percent, 1st dose card only coverage of 48 percent and 3rd dose card only coverage of 47 percent. GoC=R+ D+
- 2010: Estimate based on coverage reported by national government. GoC=R+ D+
- 2009: Estimate based on coverage reported by national government. GoC=R+ D+



# Tonga - RotaC



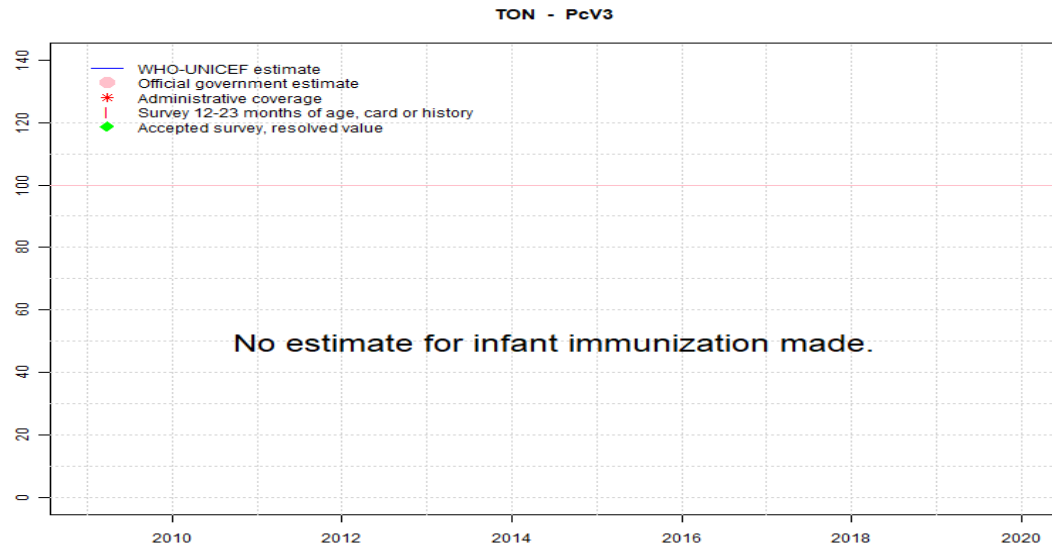
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Estimate GoC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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: 2020 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.

# Tonga - PcV3



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Estimate	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Estimate GoC	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Official	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Administrative	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Survey	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

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: 2020 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.

# Tonga - survey details

## 2018 Tonga Multiple Indicator Cluster Survey 2019

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	97	12-23 m	235	96
BCG	Card	95.2	12-23 m	235	96
BCG	Card or History	98	12-23 m	235	96
BCG	History	2.8	12-23 m	235	96
DTP1	C or H <12 months	95	12-23 m	235	96
DTP1	Card	94.1	12-23 m	235	96
DTP1	Card or History	96.4	12-23 m	235	96
DTP1	History	2.3	12-23 m	235	96
DTP3	C or H <12 months	90.7	12-23 m	235	96
DTP3	Card	93.4	12-23 m	235	96
DTP3	Card or History	93.5	12-23 m	235	96
DTP3	History	0.2	12-23 m	235	96
HepB1	C or H <12 months	95	12-23 m	235	96
HepB1	Card	94.1	12-23 m	235	96
HepB1	Card or History	96.4	12-23 m	235	96
HepB1	History	2.3	12-23 m	235	96
HepB3	C or H <12 months	90.7	12-23 m	235	96
HepB3	Card	93.4	12-23 m	235	96
HepB3	Card or History	93.5	12-23 m	235	96
HepB3	History	0.2	12-23 m	235	96
HepBB	C or H <12 months	96.2	12-23 m	235	96
HepBB	Card	95.4	12-23 m	235	96
HepBB	Card or History	97.2	12-23 m	235	96
HepBB	History	1.8	12-23 m	235	96
Hib1	C or H <12 months	95	12-23 m	235	96
Hib1	Card	94.1	12-23 m	235	96
Hib1	Card or History	96.4	12-23 m	235	96
Hib1	History	2.3	12-23 m	235	96
Hib3	C or H <12 months	90.7	12-23 m	235	96
Hib3	Card	93.4	12-23 m	235	96
Hib3	Card or History	93.5	12-23 m	235	96
Hib3	History	0.2	12-23 m	235	96
MCV1	Card	81.1	12-23 m	235	96
MCV1	Card or History	88	12-23 m	235	96
MCV1	History	6.8	12-23 m	235	96
MCV2	C or H <12 months	80.5	24-35 m	284	96
Pol1	C or H <12 months	97	12-23 m	235	96

Pol1	Card	95.4	12-23 m	235	96
Pol1	Card or History	98.4	12-23 m	235	96
Pol1	History	3.1	12-23 m	235	96
Pol3	C or H <12 months	92.1	12-23 m	235	96
Pol3	Card	93.4	12-23 m	235	96
Pol3	Card or History	93.5	12-23 m	235	96
Pol3	History	0.2	12-23 m	235	96

## 2017 Tonga Multiple Indicator Cluster Survey 2019

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	93.1	24-35 m	284	96
BCG	Card	89	24-35 m	284	96
BCG	Card or History	93.1	24-35 m	284	96
BCG	History	4.2	24-35 m	284	96
DTP1	C or H <12 months	92.6	24-35 m	284	96
DTP1	Card	88.5	24-35 m	284	96
DTP1	Card or History	93.3	24-35 m	284	96
DTP1	History	4.8	24-35 m	284	96
DTP3	C or H <12 months	87.4	24-35 m	284	96
DTP3	Card	86.7	24-35 m	284	96
DTP3	Card or History	88.1	24-35 m	284	96
DTP3	History	1.4	24-35 m	284	96
HepB1	C or H <12 months	92.6	24-35 m	284	96
HepB1	Card	88.5	24-35 m	284	96
HepB1	Card or History	93.3	24-35 m	284	96
HepB1	History	4.8	24-35 m	284	96
HepB3	C or H <12 months	87.4	24-35 m	284	96
HepB3	Card	86.7	24-35 m	284	96
HepB3	Card or History	88.1	24-35 m	284	96
HepB3	History	1.4	24-35 m	284	96
HepBB	C or H <12 months	92.8	24-35 m	284	96
HepBB	Card	88.1	24-35 m	284	96
HepBB	Card or History	93	24-35 m	284	96
HepBB	History	4.8	24-35 m	284	96
Hib1	C or H <12 months	92.6	24-35 m	284	96
Hib1	Card	88.5	24-35 m	284	96
Hib1	Card or History	93.3	24-35 m	284	96
Hib1	History	4.8	24-35 m	284	96

# Tonga - survey details

Hib3	C or H <12 months	87.4	24-35 m	284	96
Hib3	Card	86.7	24-35 m	284	96
Hib3	Card or History	88.1	24-35 m	284	96
Hib3	History	1.4	24-35 m	284	96
MCV1	C or H <12 months	88.1	24-35 m	284	96
MCV1	Card	83.7	24-35 m	284	96
MCV1	Card or History	88.6	24-35 m	284	96
MCV1	History	4.8	24-35 m	284	96
Pol1	C or H <12 months	93.2	24-35 m	284	96
Pol1	Card	88.5	24-35 m	284	96
Pol1	Card or History	93.4	24-35 m	284	96
Pol1	History	4.9	24-35 m	284	96
Pol3	C or H <12 months	90.5	24-35 m	284	96
Pol3	Card	88	24-35 m	284	96
Pol3	Card or History	90.9	24-35 m	284	96
Pol3	History	2.9	24-35 m	284	96

## 2011 Kingdom of Tonga Demographic and Health Survey 2012

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	89.4	12-23 m	307	48
BCG	Card	48.2	12-23 m	148	48
BCG	Card or History	89.4	12-23 m	307	48
BCG	History	41.2	12-23 m	159	48
DTP1	C or H <12 months	86	12-23 m	307	48
DTP1	Card	48	12-23 m	148	48
DTP1	Card or History	86	12-23 m	307	48
DTP1	History	38.1	12-23 m	159	48
DTP3	C or H <12 months	65.1	12-23 m	307	48
DTP3	Card	46.5	12-23 m	148	48
DTP3	Card or History	65.7	12-23 m	307	48
DTP3	History	19.2	12-23 m	159	48
HepB1	C or H <12 months	86	12-23 m	307	48
HepB1	Card	48	12-23 m	148	48
HepB1	Card or History	86	12-23 m	307	48
HepB1	History	38.1	12-23 m	159	48
HepB3	C or H <12 months	65.1	12-23 m	307	48
HepB3	Card	46.5	12-23 m	148	48
HepB3	Card or History	65.7	12-23 m	307	48

HepB3	History	19.2	12-23 m	159	48
Hib1	C or H <12 months	86	12-23 m	307	48
Hib1	Card	48	12-23 m	148	48
Hib1	Card or History	86	12-23 m	307	48
Hib1	History	38.1	12-23 m	159	48
Hib3	C or H <12 months	65.1	12-23 m	307	48
Hib3	Card	46.5	12-23 m	148	48
Hib3	Card or History	65.7	12-23 m	307	48
Hib3	History	19.2	12-23 m	159	48
MCV1	C or H <12 months	3.5	12-23 m	307	48
MCV1	Card	30	12-23 m	148	48
MCV1	Card or History	66.2	12-23 m	307	48
MCV1	History	36.2	12-23 m	159	48
Pol1	C or H <12 months	87.9	12-23 m	307	48
Pol1	Card	48	12-23 m	148	48
Pol1	Card or History	87.9	12-23 m	307	48
Pol1	History	39.9	12-23 m	159	48
Pol3	C or H <12 months	67.1	12-23 m	307	48
Pol3	Card	46.5	12-23 m	148	48
Pol3	Card or History	67.8	12-23 m	307	48
Pol3	History	21.3	12-23 m	159	48

## 2010 Kingdom of Tonga Demographic and Health Survey 2012

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	86.8	24-35 m	383	48
DTP1	C or H <12 months	83.4	24-35 m	383	48
DTP3	C or H <12 months	59.9	24-35 m	383	48
HepB1	C or H <12 months	83.4	24-35 m	383	48
HepB3	C or H <12 months	59.9	24-35 m	383	48
Hib1	C or H <12 months	83.4	24-35 m	383	48
Hib3	C or H <12 months	59.9	24-35 m	383	48
MCV1	C or H <12 months	2.1	24-35 m	383	48
Pol1	C or H <12 months	84.9	24-35 m	383	48
Pol3	C or H <12 months	61.2	24-35 m	383	48

## 2009 Kingdom of Tonga Demographic and Health Survey 2012

# Tonga - survey details

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	85.4	36-47 m	334	48
DTP1	C or H <12 months	83.6	36-47 m	334	48
DTP3	C or H <12 months	59.4	36-47 m	334	48
HepB1	C or H <12 months	83.6	36-47 m	334	48
HepB3	C or H <12 months	59.4	36-47 m	334	48
Hib1	C or H <12 months	83.6	36-47 m	334	48
Hib3	C or H <12 months	59.4	36-47 m	334	48
MCV1	C or H <12 months	2.3	36-47 m	334	48
Pol1	C or H <12 months	84.2	36-47 m	334	48
Pol3	C or H <12 months	60.2	36-47 m	334	48

## 2008 Kingdom of Tonga Demographic and Health Survey 2012

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	C or H <12 months	84.6	48-59 m	302	48
DTP1	C or H <12 months	80.6	48-59 m	302	48

DTP3	C or H <12 months	61.3	48-59 m	302	48
HepB1	C or H <12 months	80.6	48-59 m	302	48
HepB3	C or H <12 months	61.3	48-59 m	302	48
Hib1	C or H <12 months	80.6	48-59 m	302	48
Hib3	C or H <12 months	61.3	48-59 m	302	48
MCV1	C or H <12 months	6.3	48-59 m	302	48
Pol1	C or H <12 months	83.1	48-59 m	302	48
Pol3	C or H <12 months	61.1	48-59 m	302	48

## 2002 Evaluation of Immunization Program of the Kingdom of Tonga, 2003

Vaccine	Confirmation method	Coverage	Age cohort	Sample	Cards seen
BCG	Card or History	87	12-23 m	114	-
DTP3	Card or History	96	12-23 m	114	-
HepB3	Card or History	94	12-23 m	114	-
MCV1	Card or History	84	12-23 m	114	-
Pol3	Card or History	96	12-23 m	114	-

Further information and estimates for previous years are available at:

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

<https://www.who.int/teams/immunization-vaccines-and-biologicals/immunization-analysis-and-insights/global-monitoring/data-statistics-and-graphics>