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:

*Brown et al. 2013. An introduction to the grade of confidence used to characterize uncertainty around and processes.

OFFICIAL coverage: Estimated coverage reported by national authorities that reflects their Report on national immunization coverage. OFFICIAL coverage is 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:

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.

Malaria: percentage of surviving infants who received the 3rd dose of P. falciparum vaccine.
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.
HepB: percentage of births which received a dose of hepatitis B vaccine within 24 hours of delivery.
Hib: percentage of infants born to HepB virus-infected mothers only or where there is insufficient information to determine whether vaccination is within 24 hours of birth.
Pcv: percentage of surviving infants who received the 3rd dose of Hib vaccine containing vaccine.
Rota: 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.
Pneumococcal: percentage of surviving infants who received the 3rd dose of pneumococcal conjugate vaccine.
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.

Disclaimer: All reasonable precautions have been taken by the World Health Organization and United Nations Children’s Fund to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization or United Nations Children’s Fund be liable for damages arising from its use.
The WHO and UNICEF estimates of national immunization coverage (vaccine) 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: 2019 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.

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Description:

- 2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Programme reports a one month vaccine stock-out. GoC=R+ D+
- 2018: Estimate based on coverage reported by national government. Programme reports a four-month vaccine stock-out. 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. 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 interpolation between data reported by national government. Reported data excluded because 104 percent greater than 100 percent. Results from the 2013 Multiple Indicator Cluster Survey for the 2012 birth cohort suggest coverage of 96 percent. GoC=R+ D+
- 2011: Estimate based on coverage reported by national government. GoC=R+ D+
- 2010: Estimate based on interpolation between data reported by national government. Reported data excluded because 111 percent greater than 100 percent. GoC=R+ D+
- 2009: Estimate based on interpolation between data reported by national government. Reported data excluded because 101 percent greater than 100 percent. GoC=R+ D+
- 2008: Estimate based on interpolation between data reported by national government. Reported data excluded because 104 percent greater than 100 percent. GoC=R+ D+
The WHO and UNICEF estimates of national immunization coverage (vunic) 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: 2019 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:

2019: Estimate based on extrapolation from data reported by national government. Reported data excluded because 101 percent greater than 100 percent. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+

2018: Estimate based on extrapolation from data reported by national government. Reported data excluded because 102 percent greater than 100 percent. GoC=R+ D+

2017: Estimate based on extrapolation from data reported by national government. Reported data excluded because 103 percent greater than 100 percent. GoC=R+ D+

2016: Estimate based on extrapolation from data reported by national government. Reported data excluded because 102 percent greater than 100 percent. Programme reports a one-month vaccine stock-out in 2016. 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. Results from the 2013 Multiple Indicator Cluster Survey for the 2012 birth cohort suggest coverage of 92 percent. GoC=R+ D+

2011: Estimate based on interpolation between data reported by national government. Reported data excluded because 103 percent greater than 100 percent. GoC=R+ D+

2010: Estimate based on interpolation between data reported by national government. Reported data excluded because 108 percent greater than 100 percent. GoC=R+ D+

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

2008: Estimate based on coverage reported by national government. Denominator based on number of children receiving BCG. GoC=R+ D+
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: 2019 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.
The WHO and UNICEF estimates of national immunization coverage (wunie) 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: 2019 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:

2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Programme reports a four month vaccine stock-out. GoC=R+ D+

2018: Estimate based on coverage reported by national government. GoC=R+ D+

2017: Estimate based on coverage reported by national government. Country reports stock-out of five months. GoC=R+ D+

2016: Estimate based on coverage reported by national government. Programme reports a three-month vaccine stock-out OPV and IPV. 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. Results from the 2013 Multiple Indicator Cluster Survey for the 2012 birth cohort supports reported coverage levels. 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. GoC=R+ D+

2008: Estimate based on coverage reported by national government. Denominator based on number of children receiving BCG. GoC=R+ D+

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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.

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).

2019: Estimate is based on extrapolation from 2017. Reported data excluded because 101 percent greater than 100 percent. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Estimate challenged by: R-

2018: Estimate is based on extrapolation from 2017. Reported data excluded because 102 percent greater than 100 percent. Estimate challenged by: R-

2017: Coverage set at level of estimate for DTP1. Country is using hexavalent DTaP-Hib-HepB-IPV. Reported data excluded because 103 percent greater than 100 percent. Estimate challenged by: R-

2016: Coverage set at level of estimate for DTP1. Country is using hexavalent DTaP-Hib-HepB-IPV. Reported data excluded because 102 percent greater than 100 percent. Estimate challenged by: R-

2015: Estimate based on coverage reported by national government. GoC=R+ D+

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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: 2019 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.
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.

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- **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.

### Coverage estimates for the second dose of measles containing vaccine:

**2019:** Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+

**2018:** Estimate based on coverage reported by national government. GoC=R+ D+

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

**2016:** Estimate based on interpolation between reported values. Reported data excluded because 102 percent greater than 100 percent. GoC=R+ D+

**2015:** Estimate based on coverage reported by national government. GoC=R+ D+

**2014:** Estimate based on coverage reported by national government. Recommended age for the second dose of measles containing vaccine changed from 4 years of age to 18 months during 2014. Estimate challenged by: 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 coverage reported by national government. GoC=R+ D+

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

**2009:** Estimate based on interpolation between reported values. Reported data excluded due to an increase from 60 percent to 98 percent with decrease 73 percent. Estimate challenged by: D-

**2008:** Estimate based on interpolation between reported values. Reported data excluded due to decline in reported coverage from 80 percent to 60 percent with increase to 98 percent. Estimate challenged by: D-

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**Description:**

Coverage estimates for the second dose of measles containing vaccine are for children by the nationally recommended age.
The WHO and UNICEF estimates of national immunization coverage (vaccine) 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: 2019 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.

Panama - RCV1

**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 accompanying graph and data table.

- **2019:** Estimate based on estimated MCV1. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+
- **2018:** Estimate based on estimated MCV1. GoC=R+ D+
- **2017:** Estimate based on estimated MCV1. GoC=R+ D+
- **2016:** Estimate based on estimated MCV1. GoC=R+ D+
- **2015:** Estimate based on estimated MCV1. GoC=R+ D+
- **2014:** Estimate based on estimated MCV1. GoC=R+ D+
- **2013:** Estimate based on estimated MCV1. GoC=R+ D+
- **2012:** Estimate based on estimated MCV1. GoC=R+ D+
- **2011:** Estimate based on estimated MCV1. Estimate challenged by: D-
- **2010:** Estimate based on estimated MCV1. GoC=R+ D+
- **2009:** Estimate based on estimated MCV1. Estimate challenged by: D-
- **2008:** Estimate based on estimated MCV1. Estimate challenged by: D-

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The WHO and UNICEF estimates of national immunization coverage (vaccine) 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: 2019 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.
Panama - HepBB

Description:

2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Programme reports eight months vaccine stock-out. GoC=R+ D+

2018: Estimate based on coverage reported by national government. GoC=R+ D+

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

2016: Estimate based on coverage reported by national government. 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 coverage reported by national government. Estimate challenged by: D-

2010: Estimate based on coverage reported by national government. Estimate challenged by: D-

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

2008: Estimate based on coverage reported by national government. GoC=R+ D+

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: 2019 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.
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: 2019 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:**

2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+

2018: Estimate based on coverage reported by national government. GoC=R+ D+

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

2016: Estimate based on coverage reported by national government. Programme reports a one-month vaccine stock-out. 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 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. GoC=R+ D+

2008: Estimate based on coverage reported by national government. Denominator based on number of children receiving BCG. GoC=R+ D+

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.

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- •• 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.

July 6, 2020; page 12
WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2021 data received as of June 29, 2020
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: 2019 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.

|------|----------|------|------|------|------|------|------|------|------|------|------|------|------|      |
|      | Official | 86   | 85   | 94   | 87   | 86   | 80   | 80   | 73   | 86   | 81   | 88   |       |
|      | Estimate | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   |       |
|      | Administrative | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   |       |
|      | Survey   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   | NA   |       |

2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+

2018: Estimate based on coverage reported by national government. GoC=R+ D+

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

2016: Estimate based on coverage reported by national government. Programme reports a one-month vaccine stock-out. 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 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. GoC=R+ D+

2008: Estimate based on coverage reported by national government. Denominator based on number of children receiving BCG. GoC=R+ D+

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: 2019 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.
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: 2019 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:

2019: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. GoC=R+ D+

2018: Estimate based on coverage reported by national government. GoC=R+ D+

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

2016: Estimate based on coverage reported by national government. 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. Results from the 2013 Multiple Indicator Cluster Survey for the 2012 birth cohort suggest coverage of 78 percent. GoC=R+ D+

2011: Estimate based on coverage reported by national government. Estimate challenged by: D-

2010: Estimate based on coverage reported by national government. Estimate challenged by: D-

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

2008: Estimate based on coverage reported by national government. Rotavirus vaccine introduced in 2006. GoC=R+ D+

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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: 2019 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:

- **2019**: Estimate based on coverage reported by national government. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Programme reports a two month vaccine stock-out. GoC=R+ D+
- **2018**: Estimate based on coverage reported by national government. Estimate of 97 percent changed from previous revision value of 92 percent. GoC=R+ D+
- **2017**: Estimate based on coverage reported by national government. Estimate of 97 percent changed from previous revision value of 90 percent. GoC=R+ D+
- **2016**: Estimate based on coverage reported by national government. Programme reports a three-month vaccine stock-out in 2016. Estimate of 94 percent changed from previous revision value of 83 percent. GoC=R+ D+
- **2015**: Estimate based on coverage reported by national government. Estimate of 92 percent changed from previous revision value of 82 percent. GoC=R+ D+
- **2014**: Estimate based on coverage reported by national government. Changes in PcV schedule affected data reporting and coverage calculation. The recommended age is 2, 4 and 12 months. Coverage for the second dose of PcV is 91 percent. Data are not reported for the third dose. Estimate of 91 percent changed from previous revision value of 75 percent. GoC=R+ D+
- **2013**: Estimate based on coverage reported by national government. Changes in PcV schedule affected data reporting and coverage calculation. Estimate of 88 percent changed from previous revision value of 68 percent. GoC=R+ D+
- **2012**: Estimate based on interpolation between reported values. Reported data excluded. Changes in PcV schedule affected data reporting and coverage calculation. Reported data excluded because 119 percent greater than 100 percent. Reported data excluded due to an increase from 63 percent to 119 percent with decrease 88 percent. Results from the 2013 Multiple Indicator Cluster Survey for the 2012 birth cohort suggest coverage of 78 percent. Estimate of 76 percent changed from previous revision value of 62 percent. Estimate challenged by: D-
- **2011**: Estimate based on coverage reported by national government. Estimate of 63 percent changed from previous revision value of 55 percent. Estimate challenged by: D-
- **2010**: Estimate based on coverage reported by national government. Pneumococcal conjugate vaccine introduced in 2010. GoC=R+ D+
Panama - YFV

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.

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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.

### 2019: Programme reports 107 percent coverage reached in seven percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Reported data excluded because 107 percent greater than 100 percent. Reported data excluded due to sudden change in coverage from 85 level to 107 percent. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Estimate challenged by: R-

### 2018: Eighty-five percent coverage reached in seven percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

### 2017: Ninety-two percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

### 2016: Eighty-one percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

### 2015: Sixty percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

### 2014: Sixty-nine percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. GoC=Assigned by working group. 

### 2013: Fifty two percent coverage reached in seven percent of the national birth cohort. Reported data excluded because of sudden change in coverage from 98 percent to 52 percent with increase to 69 percent. GoC=Assigned by working group. 

### 2012: Ninety eight percent coverage achieved in five percent of the total population. GoC=Assigned by working group. 

### 2011: YFV introduced in 1974 for areas at risk. Data available are not sufficient to produce an estimate. Results from the 2013 Multiple Indicator Cluster Survey for the 2011 birth cohort suggest coverage of 80 percent. GoC=Assigned by working group. 

### 2010: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

### 2009: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

### 2008: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

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**Description:**

2019: Programme reports 107 percent coverage reached in seven percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Reported data excluded because 107 percent greater than 100 percent. Reported data excluded due to sudden change in coverage from 85 level to 107 percent. No nationally representative household survey within the last 5 years. WHO and UNICEF recommend a high-quality survey to confirm reported levels of coverage. Estimate challenged by: R-

2018: Eighty-five percent coverage reached in seven percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

2017: Ninety-two percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

2016: Eighty-one percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. Estimate challenged by: R-

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2014: Sixty-nine percent coverage reached in eight percent of the national birth cohort. Estimate is based on annualized coverage among the total national birth cohort. GoC=Assigned by working group. 

2013: Fifty two percent coverage reached in seven percent of the national birth cohort. Reported data excluded due to decline in reported coverage from 98 percent to 52 percent with increase to 69 percent. GoC=Assigned by working group. 

2012: Ninety eight percent coverage achieved in five percent of the total population. GoC=Assigned by working group. 

2011: YFV introduced in 1974 for areas at risk. Data available are not sufficient to produce an estimate. Results from the 2013 Multiple Indicator Cluster Survey for the 2011 birth cohort suggest coverage of 80 percent. GoC=Assigned by working group. 

2010: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

2009: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

2008: YFV introduced in 1974 for areas at risk. Data are not available to produce an estimate. GoC=Assigned by working group. 

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July 6, 2020; page 16

WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2021

data received as of June 29, 2020
Further information and estimates for previous years are available at:
http://www.data.unicef.org/child-health/immunization