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

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

MCV1: percentage of surviving infants who received the 1st dose of measles containing vaccine.
In countries where the national schedule recommends the 1st dose of MCV at 12 months or later
based on the epidemiology of disease in the country, coverage estimates reflect the percentage of
children who received the 1st dose of MCV as recommended.

MCV2: percentage of children who received the 2nd dose of measles containing vaccine according to
the nationally recommended schedule.

RCV1: percentage of surviving infants who received the 1st dose of rubella containing vaccine. Co
verage estimates are based on WHO and UNICEF estimates of coverage for the dose of measles
containing vaccine that corresponds to the first measles-rubella combination vaccine. Nationally
reported coverage of RCV is not taken into consideration nor are the data represented in the
accompanying graph and data table.

HepBB: percentage of births which received a dose of hepatitis B vaccine within 24 hours of delivery.

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.

SCHEDULE 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 survivors 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

OFFICIAL coverage: Estimated coverage reported by national authorities that reflects their
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.

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.

July 8, 2021; page 2  WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2022  data received as of July 6, 2021

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
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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 (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 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. Estimate challenged by: D-
- **2019**: Estimate based on coverage reported by national government. 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. Estimate challenged by: D-
- **2013**: Estimate based on coverage reported by national government. Estimate challenged by: D-
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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+ D+
- **2009**: Estimate based on coverage reported by national government. GoC=R+ D+
Estonia - DTP1

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.

Estimation criteria:

- **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 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+

2019: Estimate based on coverage reported by national government. GoC=R+ D+

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

2017: Estimate based on coverage reported by national government. Programme reports one month vaccine stock-out. GoC=R+ D+

2016: Estimate based on coverage reported by national government. GoC=R+ D+

2015: Estimate based on coverage reported by national government. Programme reports three month national level stock-out. 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. GoC=R+ D+

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

### Table: Estonia - DTP1

```
+-----------+----+----+----+----+----+----+----+----+----+----+----+----+
| Year      | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|-----------+----+----+----+----+----+----+----+----+----+----+----+----|
| Estimate  | 97 | 96 | 96 | 96 | 96 | 95 | 94 | 94 | 94 | 94 | 93 | 92 | 92 |
| Estimate GoC | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| Official  | 97 | 96 | 96 | 96 | 96 | 95 | 94 | 94 | 94 | 94 | 93 | 92 | 92 |
| Administrative | 97 | 96 | 96 | 96 | 96 | 95 | 94 | 94 | 94 | 94 | 93 | 92 | 92 |
| Survey    | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
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The WHO and UNICEF estimates of national immunization coverage (wunivc) 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 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+

#### 2019: Estimate based on coverage reported by national government. GoC=R+ D+

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

#### 2017: Estimate based on coverage reported by national government. Programme reports one month vaccine stock-out. GoC=R+ D+

#### 2016: Estimate based on coverage reported by national government. GoC=R+ D+

#### 2015: Estimate based on coverage reported by national government. Programme reports three month national level stock-out. 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. GoC=R+ D+

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

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Estonia - Pol3

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 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+
2019: Estimate based on coverage reported by national government. GoC=R+ D+
2018: Estimate based on coverage reported by national government. GoC=R+ D+
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2016: Estimate based on coverage reported by national government. GoC=R+ D+
2015: Estimate based on coverage reported by national government. Programme reports three month national level stock-out. 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+
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2009: Estimate based on coverage reported by national government. GoC=R+ D+

July 8, 2021; page 6  WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2022  data received as of July 6, 2021
### 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 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+
- **2019:** Estimate based on coverage reported by national government. 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+

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.
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: 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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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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July 8, 2021; page 8

WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2022

Data received as of July 6, 2021
Estonia - MCV2

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.

### Description:

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

- **2020**: 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+
- **2019**: Estimate based on coverage reported by national government. GoC=R+ D+
- **2018**: Estimate based on coverage reported by national government. GoC=R+ D+
- **2017**: Estimate based on coverage reported by national government. Estimate challenged by: D-
- **2016**: Estimate based on coverage reported by national government. Estimate challenged by: D-
- **2015**: Estimate based on coverage reported by national government. Estimate challenged by: D-
- **2014**: Estimate based on coverage reported by national government. Estimate challenged by: D-
- **2013**: Estimate based on coverage reported by national government. Estimate challenged by: D-
- **2012**: Estimate based on coverage reported by national government. Estimate challenged by: 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. Estimate challenged by: D-

The estimated rates of coverage are based on WHO and United Nations Children’s Fund estimates as of July 8, 2021; page 9 WHO and UNICEF estimates of national immunization coverage - next revision available July 15, 2022. Data received as of July 6, 2021.
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.

### 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.

2020: 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+

2019: Estimate based on estimated MCV1. 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. GoC=R+ D+

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

2009: Estimate based on estimated MCV1. 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.

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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.
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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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Estonia - HepB3

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### Description:

#### 2020:
- Reported data calibrated to 2014 levels. 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-

#### 2019:
- Reported data calibrated to 2014 levels. Estimate challenged by: R-

#### 2018:
- Reported data calibrated to 2014 levels. Estimate challenged by: R-

#### 2017:
- Reported data calibrated to 2014 levels. Programme reports use of two- and three-dose schedule rotavirus vaccine. Estimate challenged by: R-

#### 2016:
- Reported data calibrated to 2014 levels. Estimate challenged by: R-

#### 2015:
- Reported data calibrated to 2014 levels. Estimate challenged by: R-

#### 2014:
- Estimate of 32 percent assigned by working group. Rotavirus vaccine introduced during 2014. Programme achieved 34 percent coverage in 93 percent of the national target population. Estimate is based on total national target population. Estimate challenged by: R-

### Table:

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Further information and estimates for previous years are available at:
http://www.data.unicef.org/child-health/immunization