A report on current global access to new childhood vaccines



VIEW-hub Report: Global Vaccine Introduction and Implementation

December 2016

Developed from data in VIEW-hub www.VIEW-hub.org Johns Hopkins Bloomberg School of Public Health International Vaccine Access Center (IVAC) Contact: Kirthini Muralidharan (kmurali2@jhu.edu)

New vaccine introduction updates (since September 2016) include:

- Mongolia introduced pneumococcal conjugate vaccine (PCV).
- Ireland and Sao Tome and Principe introduced rotavirus vaccine.



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Acknowledgement and Notes

Appendix

• The appendix includes a description of VIEW-hub, support and funding for VIEW-hub, and how to cite VIEW-hub as a source.

This report and the PowerPoint slides with the report graphics can be found at: <u>http://www.jhsph.edu/research/centers-and-insti-tutes/ivac/view-hub</u>. For all other VIEW-hub-related inquiries, please email Kirthini Muralidharan at kmurali2@jhu.edu.



VACCINE INTRODUCTION DASHBOARD

The following section provides contextual historic information about Hib vaccine, PCV, rotavirus vaccine, and IPV introduction in low-, middle-, and high-income countries, as well as Gavi-supported countries. It also provides a summary snapshot of the cumulative number of countries that have introduced each vaccine to date (globally and for Gavi countries only).

Year of First Vaccine Introduction

| Income Level | Hib Vaccine | PCV | Rotavirus Vaccine | IPV |
|----------------|--------------------|--------------------|--------------------|--------------------|
| High-Income | 1989 (Iceland) | 2000 (US) | 2006 (3 countries) | 1955 (2 countries) |
| Middle-Income | 1994 (2 countries) | 2008 (5 countries) | 2006 (5 countries) | 1959 (Hungary) |
| Low-Income | 1997 (Gambia) | 2009 (Rwanda) | 2012 (Rwanda) | 2014 (Nepal) |
| Gavi Supported | 2001 (2 countries) | 2009 (2 countries) | 2008 (Bolivia) | 2014 (Nepal) |

Total number of countries that have introduced each vaccine, by program type

| Vaccine | Global Introductions (194 Countries) | | | Total |
|-----------|---|---------------------------|-------------|-------|
| | Universal | Special Risk Populations* | Subnational | |
| Hib | 191 | 0 | 1 | 192 |
| PCV | 128 | 6 | 3 | 137 |
| Rotavirus | 80 | 0 | 7 | 87 |
| IPV* | 157 | 1 | 6 | 163 |

| Vaccine | Gavi Introductions (73 Countries) | | | Total |
|-----------|--------------------------------------|---------------------------|-------------|-------|
| | Universal | Special Risk Populations* | Subnational | |
| Hib | 73 | 0 | 0 | 73 |
| PCV | 54 | 0 | 1 | 55 |
| Rotavirus | 37 | 0 | 2 | 39 |
| IPV** | 44 | 0 | 4 | 48 |

*This program type targets special populations at high risk, and will be hereforth referred to as "risk programs". Note: The definition of high-risk populations may vary by country.

**IPV introduction defined as the inclusion of at least one dose of IPV into the child immunization schedule.



EXECUTIVE SUMMARY

The VIEW-hub Global Vaccine Introduction and Implementation report is an extension of the previous VIMS report, with enhanced content and figures generated by IVAC's newly launched VIEW-hub data visualization platform, now accessible at <u>www.VIEW-hub.org</u>. VIEW-hub is an interactive platform (supported by internal databases), developed and mainted by IVAC and supported by Gavi, The Vaccine Alliance and the Bill & Melinda Gates Foundation.

The VIEW-hub report displays data and figures on the introduction status of *Haemophilus influenzae* type b (Hib) vaccine, pneumococcal conjugate vaccine (PCV), rotavirus vaccine, and inactivated polio vaccine (IPV) both globally and in the 73 Gavi countries. The images and text below describe: the number of countries that have introduced each vaccine or plan to in the future, global and Gavi rates of vaccine coverage and access, projected introduction dates for Gavi countries, and historical trends in the rate of global vaccine introduction.

Since March 2016, new additions to the VIEW-hub report are information on countries' current product and dosing schedule for pneumococcal conjugate vaccine (PCV), rotavirus vaccine, and inactivated polio vaccine (IPV). Beginning in June 2016, besides the vaccine introduction dashboard section of the report, Hib updates will be limited to the global map of introductions and pie chart of introductions, given most countries (except 2) have already introduced the vaccine.

The report concludes with a more detailed description of VIEW-hub and its uses.



METHODS

This report has been prepared using data and maps generated in VIEW-hub, a data visualization tool developed and maintained by the International Vaccine Access Center at the Johns Hopkins Bloomberg School of Public Health for use by IVAC and its affiliated partners and projects. Information in VIEW-hub was gathered from internationally recognized sources, such as the World Health Organization (WHO), UNICEF, Gavi, vaccine manufacturers, ministries of health, and news media.

Current Introduction Statuses for Hib, Pneumococcal Conjugate, Rotavirus, and Inactivated Polio Vaccines

Data on historical years of vaccine introduction are gathered from the WHO. Information on current introduction status are gathered from a variety of sources, such as WHO, UNICEF, Gavi, vaccine manufacturers, ministries of health, and news media. Forecasted introduction dates are from WHO and Gavi's Strategic Demand Forecast v12. For more information on sources, see the full data dictionary within VIEW-hub (www.VIEW-hub.org) or email Kirthini Muralidharan at kmurali2@jhu.edu.

Coverage

The number of children vaccinated in each country, was calculated with the following formula: Surviving Infants with Access*Vaccine Coverage Rate. (See method for calculating number of surviving infants with access in the "Access" section below.) The following WHO/UNICEF estimates of national immunization coverage (WUENIC) were used for each vaccine: third dose of PCV, last dose of rotavirus vaccine, and first dose of IPV. For countries that have introduced a vaccine, but the coverage rate for that particular vaccine is not yet available, DTP3 coverage rates were used as a proxy to estimate level of coverage.

Access

• The variable "surviving infants with access" refers to the number of children in each country who are intended to be vaccinated according to the country's vaccine policy. It is therefore a combination of the number of surviving infants in the country and the type of vaccine program (i.e., recommended for use universally in all infants, among special populations at high risk of disease only, or only in subnational areas). If the country has introduced universally, the number of surviving infants with access is equal to the total number of surviving infants in the country. Given the difficulty in estimating the number of surviving infants targeted by countries vaccinating only special risk populations (as the definition for special populations at high risk vary by country), the number of infants with access in these countries is assumed to be the country's total number of surviving infants (although we acknowledge this is an overestimate and a limitation in the analysis). For countries currently with subnational vaccine programs, the number of surviving infants with access is equal to the total number of surviving infants in the country multiplied by the fraction of the total population that are living in the subnational areas that have introduced. For countries that have not yet introduced a vaccine, the number of surviving infants with access is set at zero.

Vaccine Introduction by Income Level

• Countries were classified using 2016 World Bank income classifications (2015 GNI data). Year of introduction or forecasted introduction was determined through WHO reports, news media, and Gavi's Strategic Demand Forecast v12.

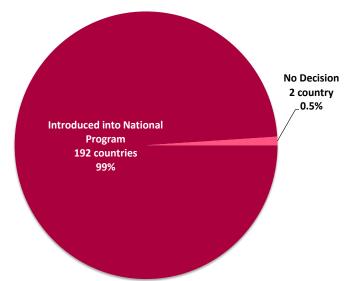
Projected introduction dates for Gavi countries are taken from the most recently available Gavi Strategic Demand Forecast and WHO sources. For non-Gavi countries, WHO and a variety of other sources are used. Information on a particular country's Gavi application status or projected introduction date may be sensitive and should not be used for public circulation without prior consent from VIEW-hub personnel.

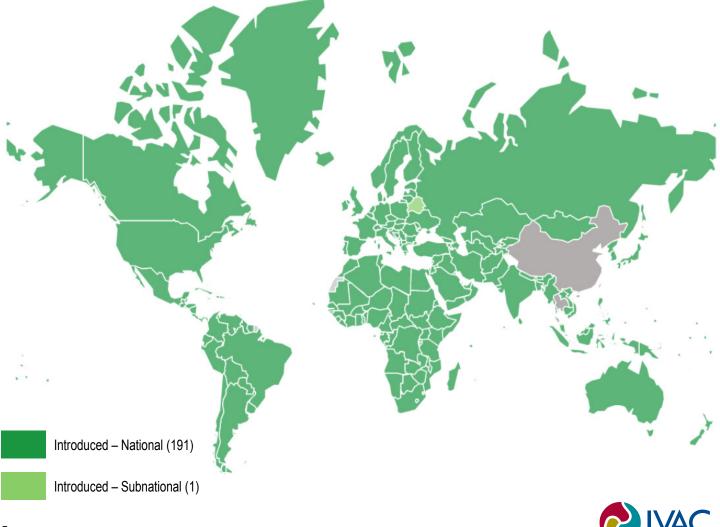


Global Hib Vaccine Introduction Status

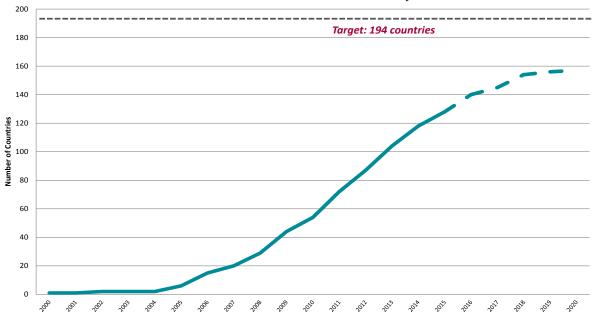
As of December 2016, 192 countries have introduced a Hib-containing vaccine into their National Immunization Program, one of which (Belarus) introduced subnationally. Two countries (Thailand and China) have yet to make a decision regarding introduction.

A map of countries that have introduced Hib vaccine is below.



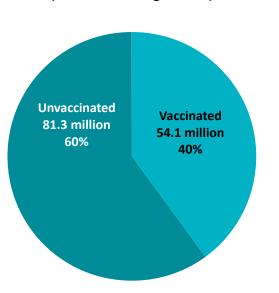


Global PCV Introduction by Year



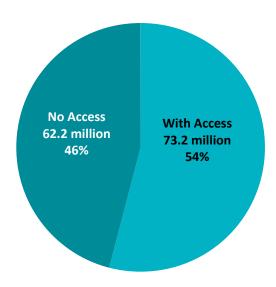
An estimated 60% of the world's infants (81.3 million) are not receiving PCV, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine (n=55), or they are not being reached by the routine immunization services in their country.

An estimated 46% of the world's infants (62.2 million) live in countries or subnational regions within countries that have not yet introduced PCV into their National Immunization Program (n=55).



PCV Coverage (Global Surviving Infants)

PCV Access (Global Surviving Infants)



PCV coverage is calculated as the number of surviving infants globally covered by PCV3 in countries or subnational regions within countries that have introduced PCV. In the absence of PCV3 coverage data for 2015, DTP3 coverage was used as a proxy to estimate PCV coverage.

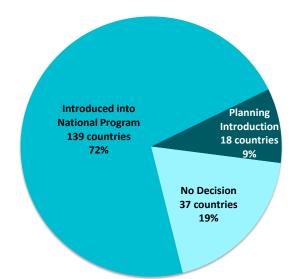
PCV access is calculated as the number of surviving infants globally that live in countries or subnational regions within countries that have introduced PCV.

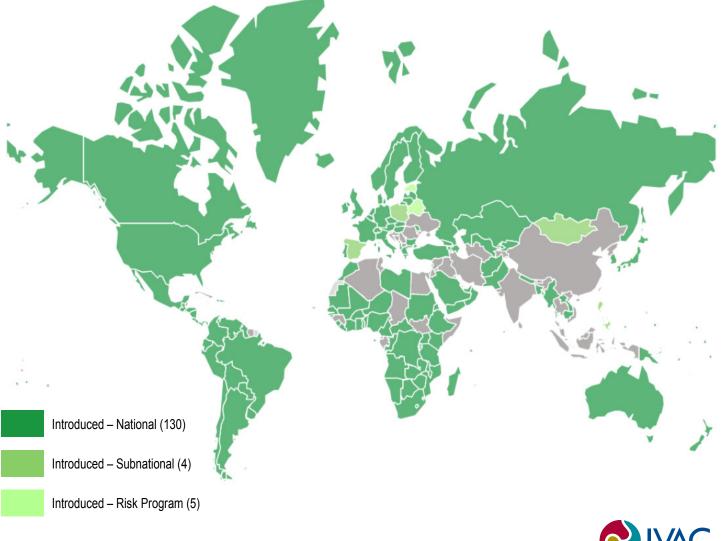


Global PCV Introduction Status

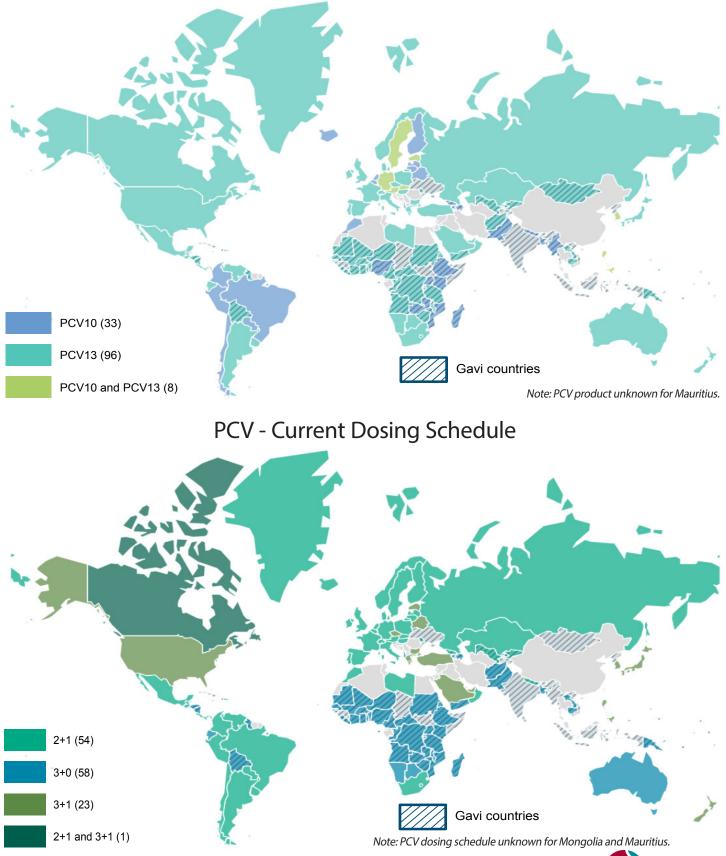
As of December 2016, 139 countries have introduced PCV into their National Immunization Program, including 130 universal, 4 subnational, and 5 risk programs. Eighteen countries have announced plans to introduce PCV into their NIP. Thirtyseven countries have yet to make a decision regarding introduction.

A map of countries that have introduced PCV is below.



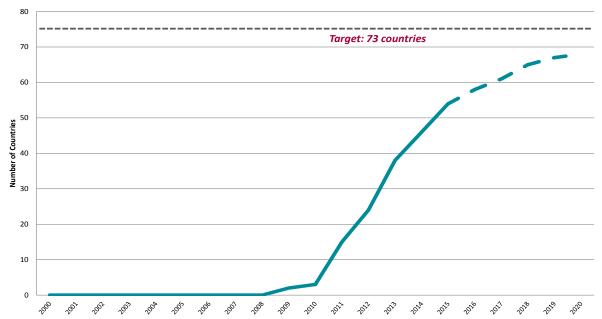


PCV - Current Product



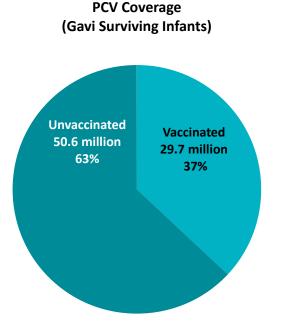


Gavi PCV Introduction by Year

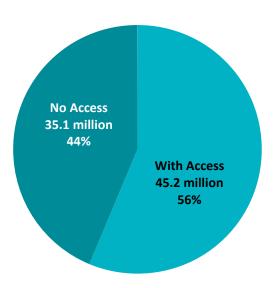


An estimated 63% of infants in Gavi countries (50.6 million) are not receiving PCV, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine (n=16), or they are not being reached by the routine immunization services in their country.

An estimated 44% of infants in Gavi countries (35.1 million) live in countries or subnational regions within Gavi countries that have not yet introduced PCV into their National Immunization Program (n=16).



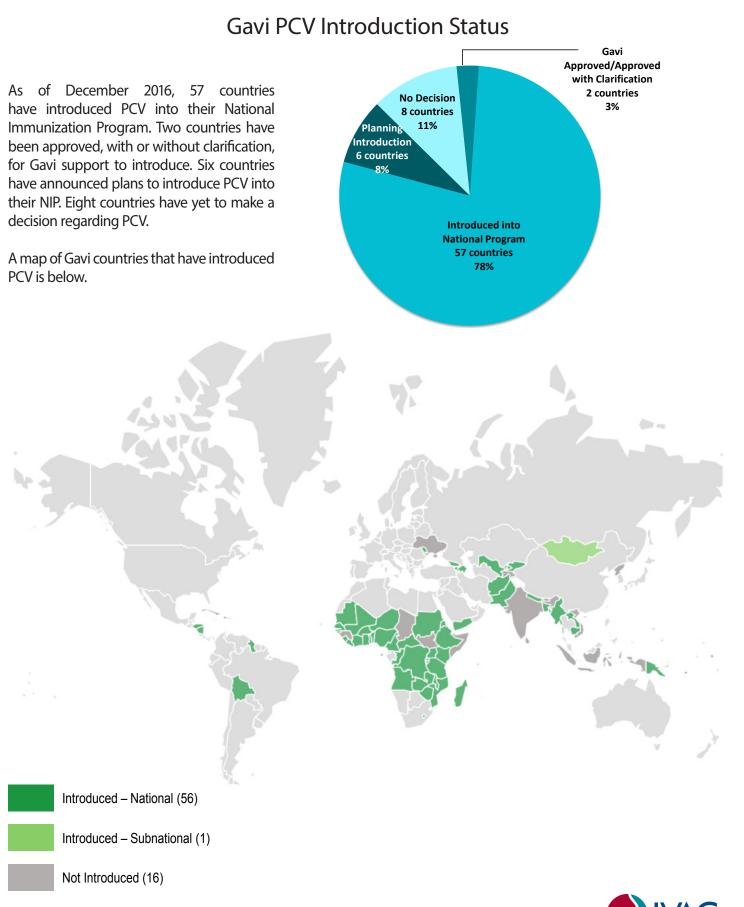
PCV Access (Gavi Surviving Infants)



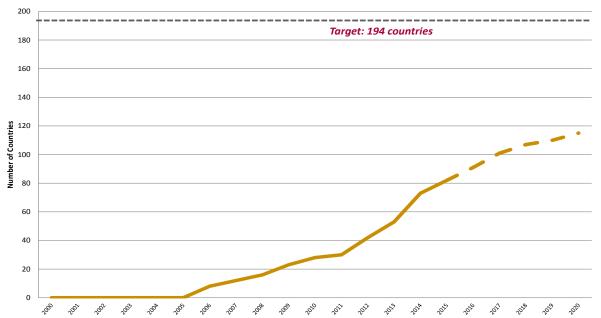
PCV coverage is calculated as the number of surviving infants covered by PCV3 in Gavi countries or subnational regions within Gavi countries that have introduced PCV. In the absence of PCV3 coverage data for 2015, DTP3 coverage was used as a proxy to estimate PCV coverage.

PCV access is calculated as the number of surviving infants that live in Gavi countries or subnational regions within Gavi countries that have introduced PCV.





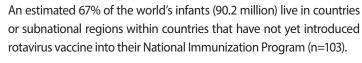


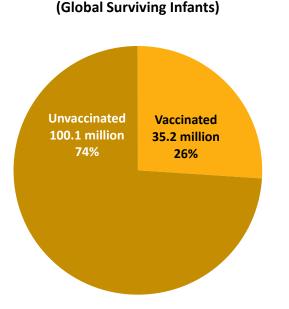


Global Rotavirus Vaccine Introduction by Year

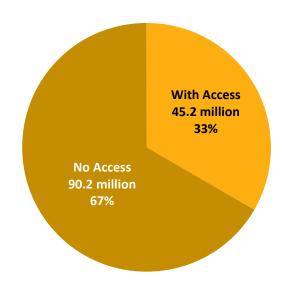
An estimated 74% of the world's infants (100.1 million) are not receiving rotavirus vaccine, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine (n=103), or they are not being reached by the routine immunization services in their country.

Rotavirus Vaccine Coverage





Rotavirus Vaccine Access (Global Surviving Infants)



Rotavirus vaccine coverage is calculated as the number of surviving infants covered by the last dose of rotavirus vaccine in countries or subnational regions within countries that have introduced rotavirus vaccine. In the absence of rotavirus vaccine coverage data for 2015, DTP3 coverage was used as a proxy to estimate rotavirus vaccine coverage.

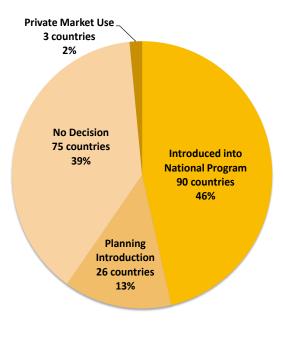
Rotavirus vaccine access is calculated as the number of surviving infants globally that live in countries or subnational regions within countries that have introduced rotavirus vaccine.

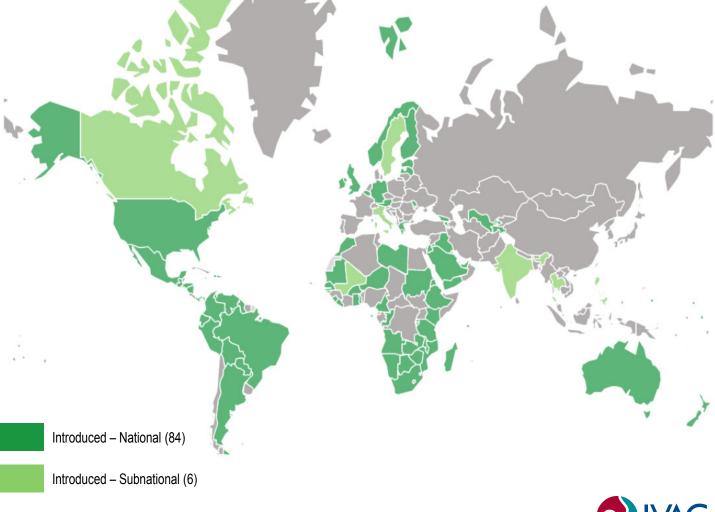


Global Rotavirus Vaccine Introduction Status

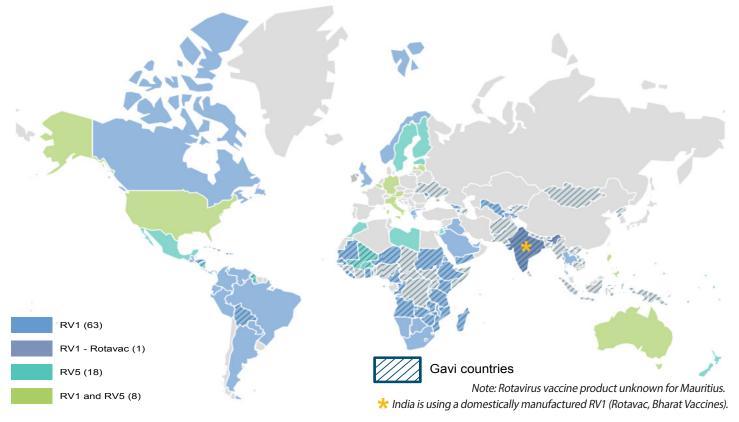
As of December 2016, 80 countries have introduced rotavirus vaccine into their National Immunization Program; six of these countries have introduced subnationally. Twenty-six countries have announced plans to introduce rotavirus vaccine into their NIP. Three countries are known to have coverage through the private market. Seventy-five countries have yet to make a decision regarding introduction.

A map of countries that have introduced rotavirus vaccine is below.

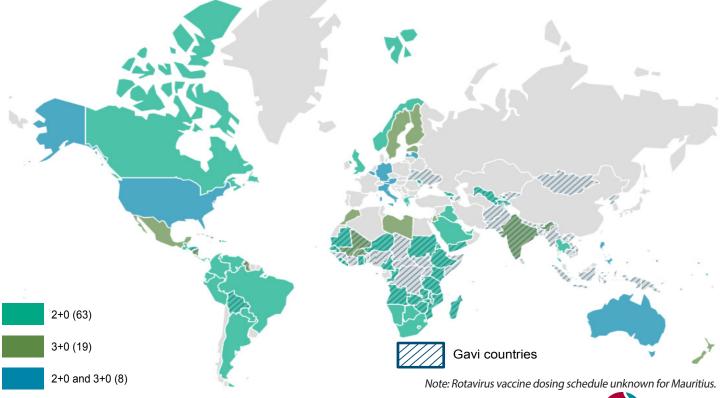




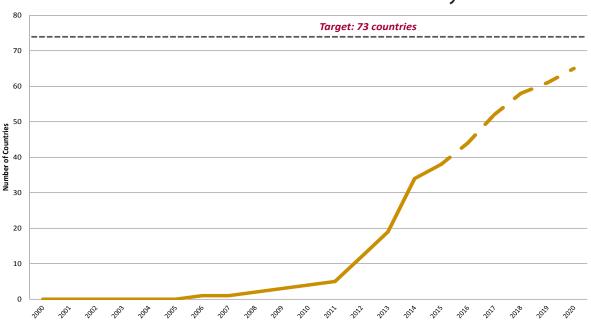
Rotavirus Vaccine - Current Product



Rotavirus Vaccine - Current Dosing Schedule





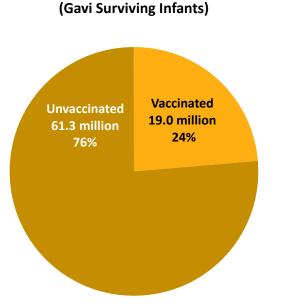


Gavi Rotavirus Vaccine Introduction by Year

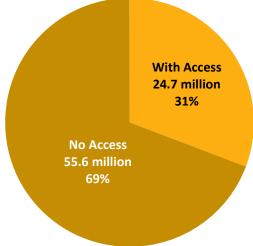
An estimated 76% of infants in Gavi countries (61.3 million) are not receiving rotavirus vaccine, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine (n=32), or they are not being reached by the routine immunization services in their country.

Rotavirus Vaccine Coverage

An estimated 69% of infants in Gavi countries (55.6 million) live in countries or regions that have not yet introduced rotavirus vaccine into their National Immunization Program (n=32).



Rotavirus vaccine coverage is calculated as the number of surviving infants covered by the last dose of rotavirus vaccine in Gavi countries or subnational regions within Gavi countries that have introduced rotavirus vaccine. In the absence of rotavirus vaccine coverage data for 2015, DTP3 coverage was used as a proxy to estimate rotavirus vaccine coverage. Rotavirus Vaccine Access (Gavi Surviving Infants)



Rotavirus vaccine access is calculated as the number of surviving infants that live in Gavi countries or subnational regions within Gavi countries that have introduced rotavirus vaccine.

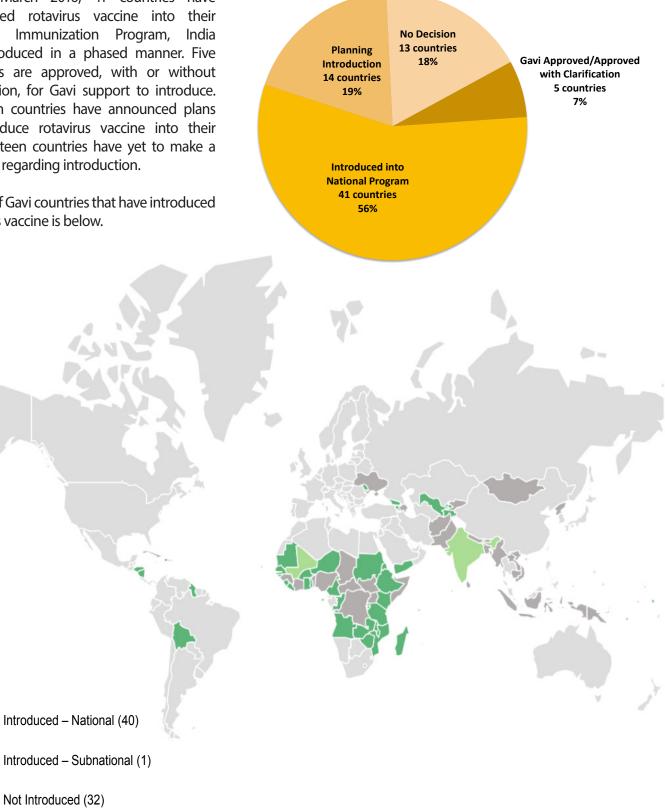


Rotavirus

Gavi Rotavirus Vaccine Introduction Status

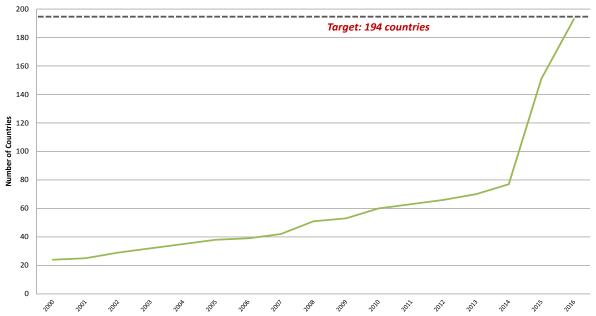
As of March 2016, 41 countries have introduced rotavirus vaccine into their National Immunization Program, India has introduced in a phased manner. Five countries are approved, with or without clarification, for Gavi support to introduce. Fourteen countries have announced plans to introduce rotavirus vaccine into their NIP. Thirteen countries have yet to make a decision regarding introduction.

A map of Gavi countries that have introduced rotavirus vaccine is below.





Global IPV Introduction by Year



An estimated 56% of the world's infants (76.1 million) are not receiving IPV, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine (n=21), largely because of supply constraints (since all countries have made the decision to introduce), or they are not being reached by the routine immunization services in their country.

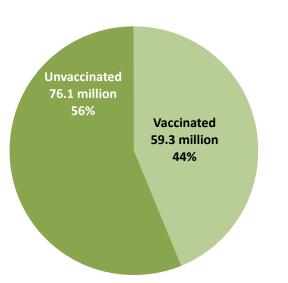
IPV Coverage

(Global Surviving Infants)

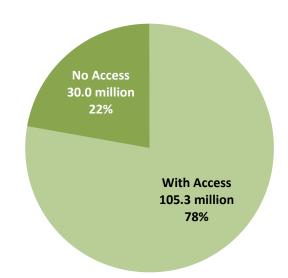
An estimated 22% of the world's infants (30.0 million) live in countries or regions that have not yet introduced IPV into their National Immunization Program (n=21).

IPV Access

(Global Surviving Infants)



IPV coverage is calculated as the number of surviving infants covered by IPV in countries or subnational regions within countries that have introduced IPV. In the absence of IPV coverage data fro 2015, DTP3 rates were used as a proxy to estimate IPV coverage.



IPV access is calculated as the number of surviving infants globally that live in countries or subnational regions within countries that have introduced IPV.

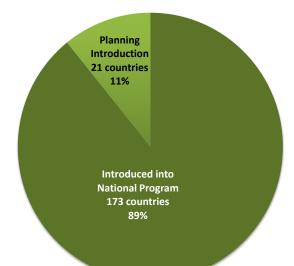


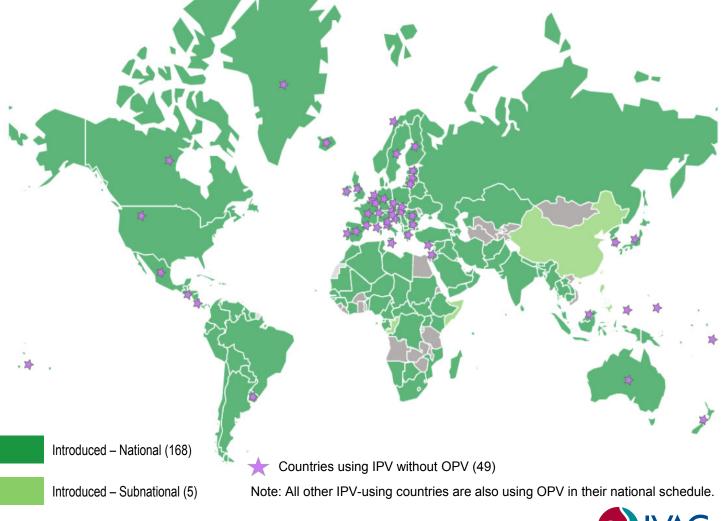
Global IPV Introduction Status

As of December 2016, 173 countries have introduced IPV into their National Immunization Program; among these, five countries have introduced subnationally. Twenty-one countries have announced plans to introduce IPV into their NIP.

Currently, 49 countries are using IPV exclusively and 124 countries are using both IPV and OPV in their national immunization schedule.

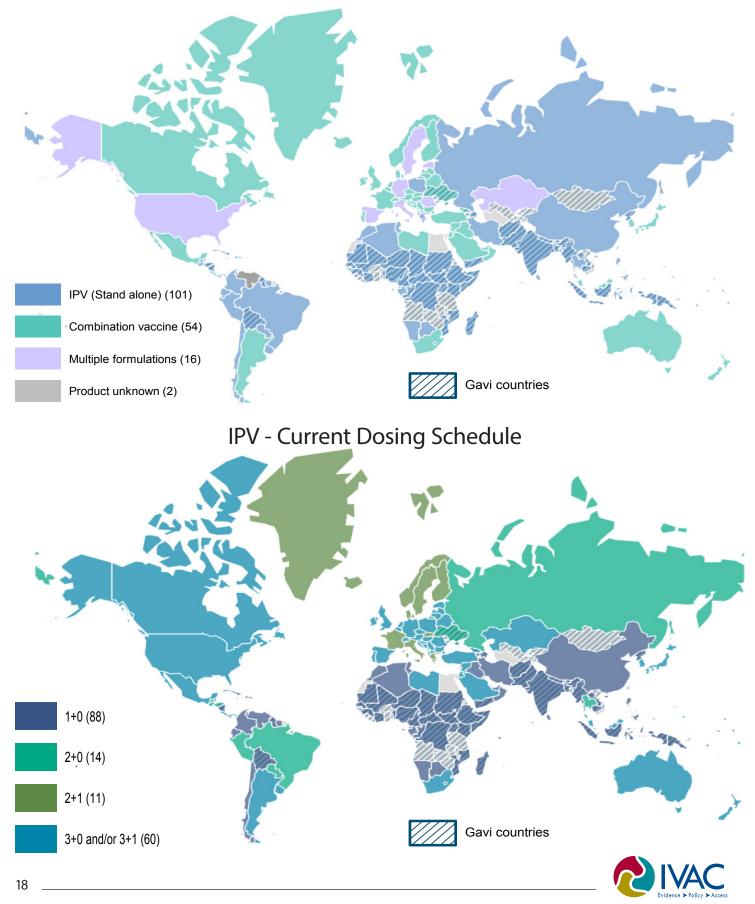
A map of countries that have introduced IPV is below.



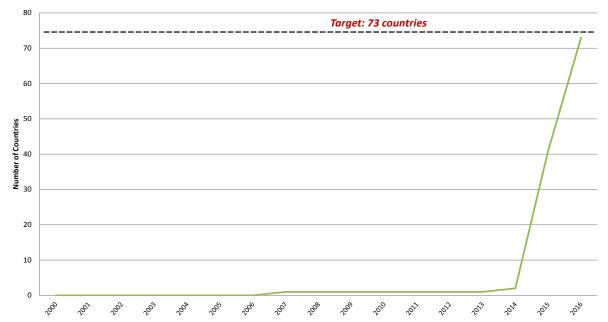




IPV - Current Product



Gavi IPV Introduction by Year

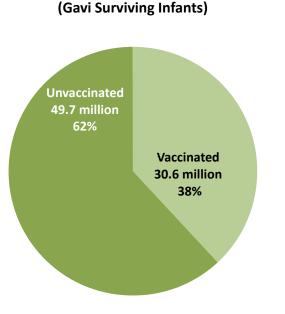


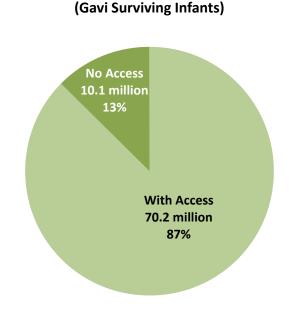
An estimated 62% percent of infants in Gavi countries (49.7 million) are not receiving IPV, according to 2015 WHO/UNICEF estimates of national immunization coverage. These children are unvaccinated because either their country has not yet introduced the vaccine, or they are not being reached by the routine immunization services in their country.

IPV Coverage

An estimated 13% of infants in Gavi countries (10.1 million) live in countries or subnational regions within Gavi countries that have not yet introduced IPV into their National Immunization Program.

IPV Access





IPV coverage is calculated as the number of surviving infants covered by IPV in Gavi countries or subnational regions within Gavi countries that have introduced IPV. In the absence of IPV coverage data for 2015, DTP3 rates were used as a proxy to estimate IPV coverage.

IPV access is calculated as the number of surviving infants that live in Gavi countries or subnational regions within Gavi countries that have introduced IPV.

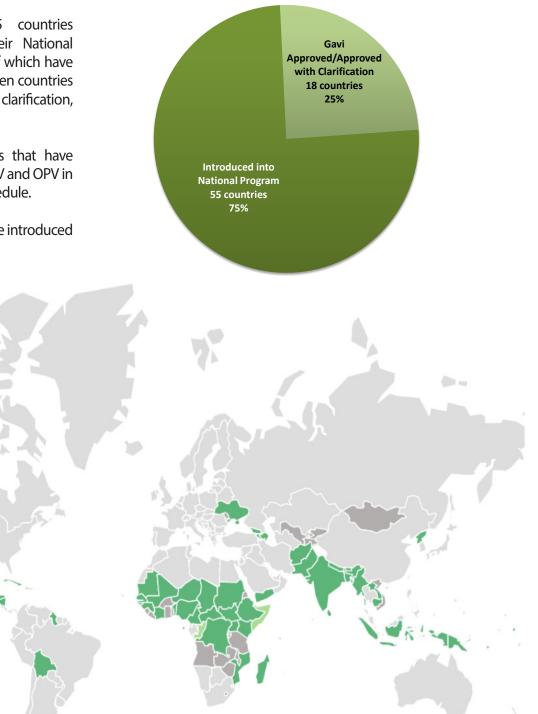


Gavi IPV Introduction Status

As of December 2016, 55 countries have introduced IPV into their National Immunization Program, three of which have introduced subnationally. Eighteen countries are approved, with or without clarification, for Gavi support to introduce.

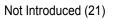
Currently, all 55 Gavi countries that have introduced IPV are using both IPV and OPV in their national immunization schedule.

A map of Gavi countries that have introduced IPV is below.



Introduced – National (52)

Introduced – Subnational (3)





ACKNOWLEDGEMENTS AND NOTES

This report and VIEW-hub are supported by Gavi, The Vaccine Alliance and the Bill & Melinda Gates Foundation. This report has been generated using data and maps from VIEW-hub, developed and maintained by the International Vaccine Access Center (IVAC) at the Johns Hopkins Bloomberg School of Public Health for use by IVAC and its affiliated projects and partners. VIEW-hub is a new publicly-accessible interactive platform that allows real-time visualization of data on vaccine introduction, use, and impact. Information was gathered from internationally-recognized sources, such as WHO, Gavi, UNICEF, vaccine manufacturers, ministries of health, and news media.

Please note that all forecasted dates in this report rest on assumptions and actual dates may vary. Vaccine introduction dates do not imply an obligation by Gavi to support coverage.

<u>Disclaimer:</u> The presentation of VIEW-hub maps in this report is not by any means an expression of IVAC's opinion regarding the legal status of countries/territories, their governing authorities, or their official boundaries. On VIEW-hub's website, country borders which are not in full agreeement are displayed with dotted lines, which may be difficult to visualize at the global view presented in this report.

Definitions and sources are available within VIEW-hub at www.VIEW-hub.org.

This report and the PowerPoint slides with the report graphics can be found at: <u>http://www.jhsph.edu/research/centers-and-institutes/ivac/view-hub/</u>. All maps shown in this report were generated on <u>VIEW-hub</u> and can be replicated/ updated on the site.

For any VIEW-hub-related inquiries, please email Kirthini Muralidharan at kmurali2@jhu.edu.



| Gavi Eligibility Status | Gavi, The Vaccine Alliance. Gavi Eligible Countries. 2016. Last accessed Jan 2016 at http://www.gavialliance.org/support/apply/countries-eligible-for-support/ |
|--|---|
| DTP3 Coverage Rate | WHO/UNICEF Estimates of National Immunization Coverage. 2014 data as of 10 Jul 2015, update of 11 Aug 2015. Retrieved from: http://www.who.int/immunization/monitoring_surveillance/data/en/ |
| Surviving Infants | United Nations Population Division. World Population Prospects (WPP): 2015 Revision. Retrieved from: http://esa.un.org/unpd/wpp/ |
| Projected Introduction Dates | This information comes from a variety of sources, primarily the most recent Gavi Strategic Demand Forecast and WHO regional projections. For more information, please contact Linh Nguyen at linh.nguyen@jhu.edu. |
| Dates of Introduction | This information comes from a variety of sources, such as Gavi, WHO, UNICEF, ministries of health, the news media, and IVAC partners/contacts. For more information, please contact Linh Nguyen at linh.nguyen@jhu.edu. It is cross-referenced with WHO information (below). World Health Organization. Immunization Repository. Includes data on introductions through the end of Mar 2016, as of Apr 2016. |
| Current Vaccine Use Status and Program Type | This information comes from a variety of sources, such as Gavi, WHO, UNICEF, ministries of health, news media, and IVAC partners/contacts. For more information, please contact Linh Nguyen at linh.nguyen@jhu.edu |



SELECTED KEY TERMS

For any definitions not provided below, please refer to the data dictionary in VIEW-hub.

Approved: the application meets all the criteria and is approved for Gavi support.

Approved with clarification: the application lacks specific pieces of data, which must be provided generally within a month. Data must be received before the application is considered officially approved for Gavi support.

Children with access: the number of children (based on surviving infants 2015) who live in a country that has introduced the vaccine into the national immunization program. This does not include countries with widespread market use or high-risk programs. For regional introductions, those regions that have introduced may be included and the regions which have not introduced excluded.

Children vaccinated: the number of surviving infants who received the vaccination based on the 2014 coverage rates of countries who have introduced. The WHO/UNICEF estimates of national immunization coverage (WUENIC) coverage rates are used for this figure.

Introduced into national immunization program: the vaccine has been incorporated into the national government's immunization program, either for all children or for special populations at high-risk of disease, and it may include programs that are being phased in over time. This status can apply to any country, regardless of Gavi eligibility. For IPV, this status covers all countries that have introduced at least one dose of IPV into its child national immunization schedule.

Subnational introductions: the vaccine has been introduced into the vaccination schedule for a geographic subset of the country. This status can apply to any country, regardless of Gavi eligibility. Subnational introductions in this report refers to countries with phased national rollouts as well as countries that have introduced only on a subnational level (with no known plans of national scale up).

Gavi application submitted under review: the country has submitted a New and Underused Vaccines Support (NVS) application for this vaccine and is awaiting Gavi evaluation.

Gavi approved/approved with clarification: the country's application to Gavi for New and Underused Vaccines Support (NVS) financing for this vaccine has been approved or approved with clarifications.

Gavi conditional approval to introduce: the application to Gavi for New and Underused Vaccines Support (NVS) for this vaccine does not fulfill specific or significant application requirements. Missing requirements must be provided in a subsequent round to complement the original application. If the conditions are not met within the given timeframe after the first submission, re-submission of a new application is required.

Gavi resubmission: the New and Underused Vaccines Support (NVS) application for this vaccine is incomplete and a full application should be submitted in a future round.

Gavi plan to apply: country has made a public statement (through government or other recommending body on vaccines) that they plan to introduce the vaccine and apply for Gavi New and Underused Vaccines Support (NVS), but has not yet submitted an application.

No decision: the country has not indicated a firm decision to introduce the vaccine into its national immunization program or to apply for Gavi New and Underused Vaccines Support (NVS) for the vaccine.



Non-Gavi planning introduction: a country that is not eligible for Gavi support has plans to introduce the vaccine into its national immunization program and has taken steps to initiate its program, such as contacting the vaccine manufacturer. OR: A country that is eligible for Gavi support and plans to introduce without it.

Planning introduction: is the combination of countries that have announced plans to apply for Gavi support, Gavi countries that have announced plans to introduce the vaccine without Gavi support, or non-Gavi countries that have announced a plan to introduce.

Risk: program for this vaccine only covers children in special populations at high-risk for disease; this may include children with health conditions, those of vulnerable socioeconomic statuses or ethnic groups, or those living in regions of high risk.

Widespread coverage through private market: most (over half) of the target population is receiving the vaccine through private market use.



APPENDIX

VIEW-hub is a new, interactive data visualization tool, which has replaced IVAC's previous Vaccine Information Management System (VIMS) - developed in 2008. VIMS was a web-based database with key information related to the vaccine introduction, which provided data for the quarterly VIMS Global Vaccine Introduction reports. VIEW-hub has retained important data elements (such as vaccine introduction information) previously found in VIMS, but has expanded both in scope and functionality to better meet the evolving needs of global vaccine stakeholders and decision makers.

Since the launch of VIEW-hub in 2016, the VIMS Global Vaccine Introduction reports developed by IVAC each quarter will now be known as the VIEW-hub reports. The data are continuously updated as information is received, so as to permit real-time reporting.

VIEW-hub was made possible with support from Gavi, The Vaccine Alliance and the Bill & Melinda Gates Foundation.

Use of VIEW-hub:

Through VIEW-hub, users can instantly visualize data on vaccine introductions, product usage, dosing schedules, access, coverage, and more for a number of vaccines. Custom queries and maps, exportable data and graphics, and a map gallery are just some of the interactive features users can access. VIEW-hub extends the functionality and content of the former VIMS, allowing users to track progress and strategize ways to accelerate and optimize vaccine implementation.

Any data on projected introduction dates should not be reproduced or disseminated without prior consent from VIEWhub personnel.

If data are used in a presentation, please cite VIEW-hub accordingly:

Source: International Vaccine Access Center (IVAC), Johns Hopkins Bloomberg School of Public Health. VIEW-hub Global Vaccine Introduction Report, March 2016. www.jhsph.edu/ivac/view-hub. Accessed: [Day Month Year].

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