PCV and rotavirus vaccine introduction options

Introducing PCV & Rotavirus Vaccine Workshop, N'Djamena, Chad

14 Sept 2023

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World Health Organization | IVB

PCV Policy recommendations 1/2

- Most recent **WHO Position Paper** on **PCV use in children**, February 2019
- **Recommended schedules:**
  - 3-dose schedule (either 2p+1 or 3p+0) for infants starting as early as 6 weeks of age with a minimum interval of 4 weeks between doses
  - For the 2p+1 schedule, the booster should be given between 9–18 months of age, and an interval of ≥8 weeks is recommended between primary doses
- **Catch up vaccination** in children aged **1-5 years**, at time of introduction of PCV, should be used to accelerate vaccine impact on disease
- Three prequalified PCV products: two 10-valent (PCV-10) and one 13-valent (PCV-13)

Immunization, Vaccines and Biologicals
https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/pneumonia

2019, 94, 85–104 No 8

World Health Organization
Organisation mondiale de la Santé

Weekly epidemiological record
Relevé épidémiologique hebdomadaire

22 FEBRUARY 2019, 94th YEAR / 22 FÉVRIER 2019, 94e ANNÉE
No 8, 2019, 94, 85–104
http://www.who.int/wer

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Pneumococcal conjugate vaccines in infants and children under 5 years of age: WHO position paper – February 2019

Vaccins antipneumococciques conjugués chez les nourrissons et les enfants de moins de 5 ans: note de synthèse de l'OMS – février 2019

Introduction

In accordance with guidance to Mer policy matters, W regularly updated vaccines and cor against diseases th public health imp concerned prima vaccines in la programmes. The background infor vaccines and con WHO position o worldwide.

The papers are experts and WHO the WHO Strateg Experts (SAGE) o www.who.int/imm Grading of Recom Development and method is used to available evidenc SAGE decision-ma in "evidence-to-re The processes fol tion of vaccine described at: http zation/position_p process.pdf. The intended for use n health officials an zation programme interest to interna vaccine advisory facturers, health ers, the scientific public.

World Health Organization

Considerations for Pneumococcal Conjugate Vaccine (PCV) Product Choice

Disclaimer: WHO does not endorse the use of specific branded products over others; this publication may not be used for any commercial or promotional purposes.

Background

This document summarizes current technical and programmatic information on WHO prequalified PCV products to facilitate informed country choices for PCV introduction or product switch for childhood immunization programmes. Three PCV products are prequalified by the World Health Organization (WHO) for use in infants and children. They include the 13-valent PCV manufactured by Pfizer (PCV-13, Prev(e)nar®), a 10-valent PCV manufactured by GlaxoSmithKline (PCV-10^{GSK}, Synflorix®), and a 10-valent PCV manufactured by Serum Institute of India (PCV-10^{SII}, PNEUMOSIL®). Manufacturers are expected to seek WHO prequalification for additional higher valent PCV products in the future. This summary of considerations may be updated in the future to address new products.

This document is based on published sources except for content related to the newest prequalified product, PNEUMOSIL®, where the manufacturer provided the unpublished Clinical Study Report confidentially. The document should not be viewed as formal WHO recommendations or guidelines.

WHO Position on Pneumococcal Vaccines in Infants and Children

The 2019 WHO position paper[1] presents the current policy recommendations for pneumococcal conjugate vaccines in infants and children. The document does not express preference among prequalified PCV products but does not reference PCV-10^{SII} or data specific to this product given that it was prequalified in December 2019 after the paper's publication. Despite the most recent product not being mentioned, the 2019 policy recommendations are considered applicable to PCV-10^{SII}. The position paper states:

- "Both PCV10 and PCV13 have substantial impacts against pneumonia, vaccine type (VT) invasive pneumococcal disease (IPD), and nasopharyngeal (NP) carriage" in a variety of settings".
- "The choice of product to be used in a country should be based on programmatic characteristics, vaccine supply, vaccine price, the local and regional prevalence of vaccine serotypes and antimicrobial resistance patterns".
- "PCV13 may have an additional benefit [over PCV-10^{GSK}] in settings where disease attributable to serotype (ST) 19A or ST 6C is significant".

[1] Pneumococcal conjugate vaccines in infants and children under 5 years of age: WHO position paper – February 2019. Weekly epidemiological record (Relevé épidémiologique hebdomadaire). 2019;94(8):85–104.

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Sept 2021, https://www.who.int/publications/i/item/considerations-for-pneumococcal-conjugate-vaccine-(pcv)-product-choice

PCV Policy recommendations 2/2

WHO considerations for vaccination in adults (2021)

- Bimodal distribution of pneumococcal disease (children under 5 and adults ≥50 yrs)
- **Prioritize introduction of PCV into national childhood immunization programmes and measures to sustain high coverage** over initiating a pneumococcal vaccination programme for older adults
- In countries with mature childhood PCV programmes, decisions on initiating an adult programme (using PPV23 or PCV13), should take into account:
  - Local disease burden
  - Cost-effectiveness
  - Population structure and demographics
  - Enhanced surveillance to monitor serotypes in older adults
  - Operational factors

Immunization, Vaccines and Biologicals (06 Dec 2021)

Considerations for pneumococcal vaccination in older adults

Background

In accordance with its mandate to provide guidance to Member States on health policy matters, WHO issues a series of regularly updated position papers on vaccines and combinations of vaccines against diseases that have an international public health impact. These communications are concerned primarily with the use of vaccines in large-scale immunization programmes. They summarize essential background information on diseases and vaccines and conclude with the current WHO position on the use of vaccines worldwide. This concept note, on pneumococcal vaccination in older adults, is a departure from a traditional position paper. This is because, while data were being collected for a position paper, it became evident that there was an inadequate evidence base, especially in low- and middle-income countries, specifically related to burden of disease and serotype distribution. This concept note, therefore, summarizes existing evidence, highlights the information gaps, and provides guidance based on the available evidence. Further advice will be provided once the data gaps have been filled.

This concept note is intended for use mainly by national public health officials and managers of immunization programmes. It may also be of interest to international funding agencies, vaccine advisory groups, vaccine manufacturers, the medical community, the scientific media, and the general public.

This concept note supersedes the 2008 position paper on the use of pneumococcal

Considérations relatives à la vaccination antipneumococcique chez les personnes âgées

Contexte

Conformément à son mandat, qui prévoit qu'elle conseille les États Membres en matière de politique sanitaire, l'OMS publie une série de notes de synthèse régulièrement mises à jour sur les vaccins et les associations vaccinales contre les maladies ayant une incidence sur la santé publique internationale. Ces documents, qui portent principalement sur l'utilisation des vaccins dans les programmes de vaccination à grande échelle, résument les informations essentielles sur les maladies et les vaccins correspondants et présentent en conclusion la position actuelle de l'OMS concernant l'utilisation de ces vaccins à l'échelle mondiale. La présente note conceptuelle, qui traite de la vaccination antipneumococcique des personnes âgées, diffère d'une note de synthèse traditionnelle. En effet, tandis que des données étaient recueillies en vue de l'élaboration d'une note de synthèse, il est apparu clairement que les connaissances actuelles sur la charge de morbidité et la distribution des sérotypes demeurent insuffisantes, en particulier dans les pays à revenu faible ou intermédiaire. Cette note conceptuelle vise donc à présenter un résumé des données actuelles, à mettre en lumière les lacunes existantes en matière d'information et à formuler des orientations sur la base des éléments d'information disponibles. Des conseils supplémentaires seront fournis une fois que les données manquantes auront été recueillies.

Cette note conceptuelle s'adresse avant tout aux responsables nationaux de la santé publique et aux administrateurs des programmes de vaccination, mais elle peut également présenter un intérêt pour les organismes internationaux de financement, les groupes consultatifs sur la vaccination, les fabricants de vaccins, le corps médical, les médias scientifiques et le grand public.

La présente note conceptuelle annule et remplace les informations relatives à l'utilisation des

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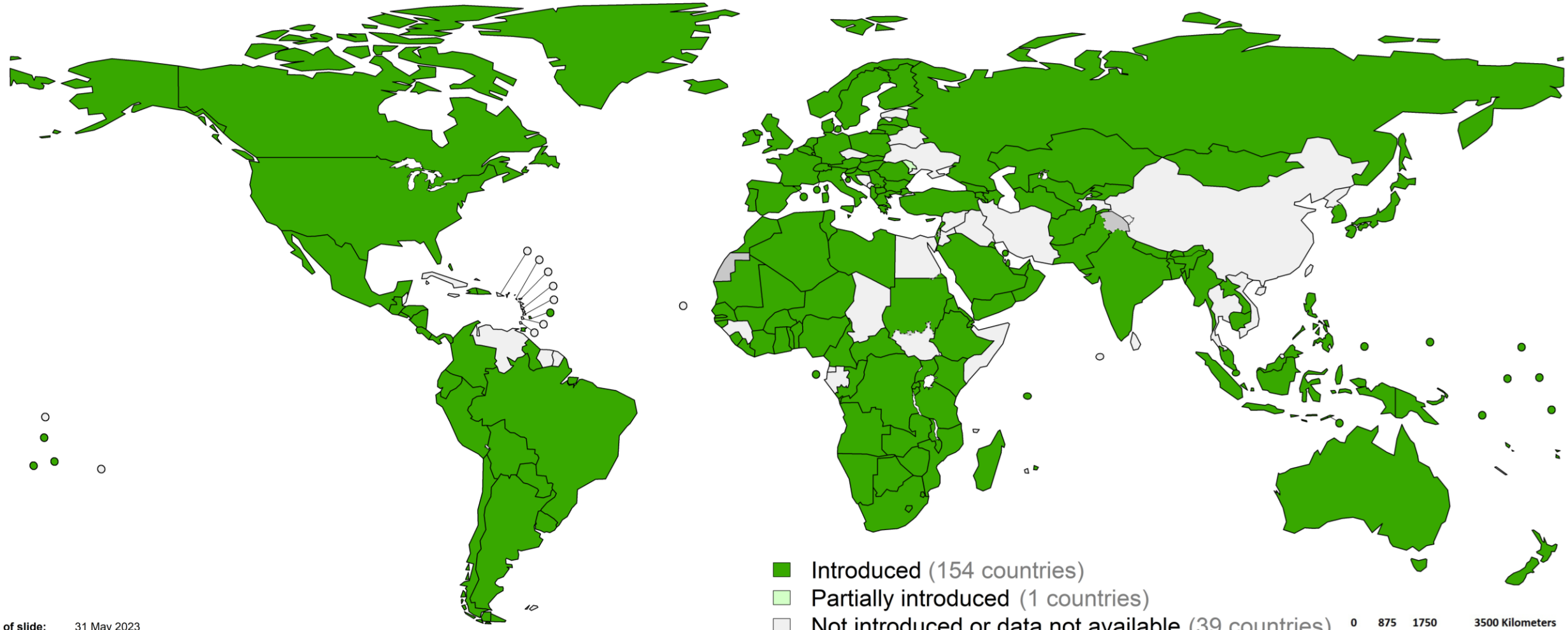
June 2021, https://www.who.int/publications/i/item/WER9623-217-228

Global PCV introduction status to the national immunization programme



Date of slide: 31 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: IVB database as at 31 May 2023. International Vaccine Access Center (IVAC), Johns Hopkins Bloomberg School of Public Health. VIEW-hub. www.view-hub.org. Accessed: 4/6/2023.

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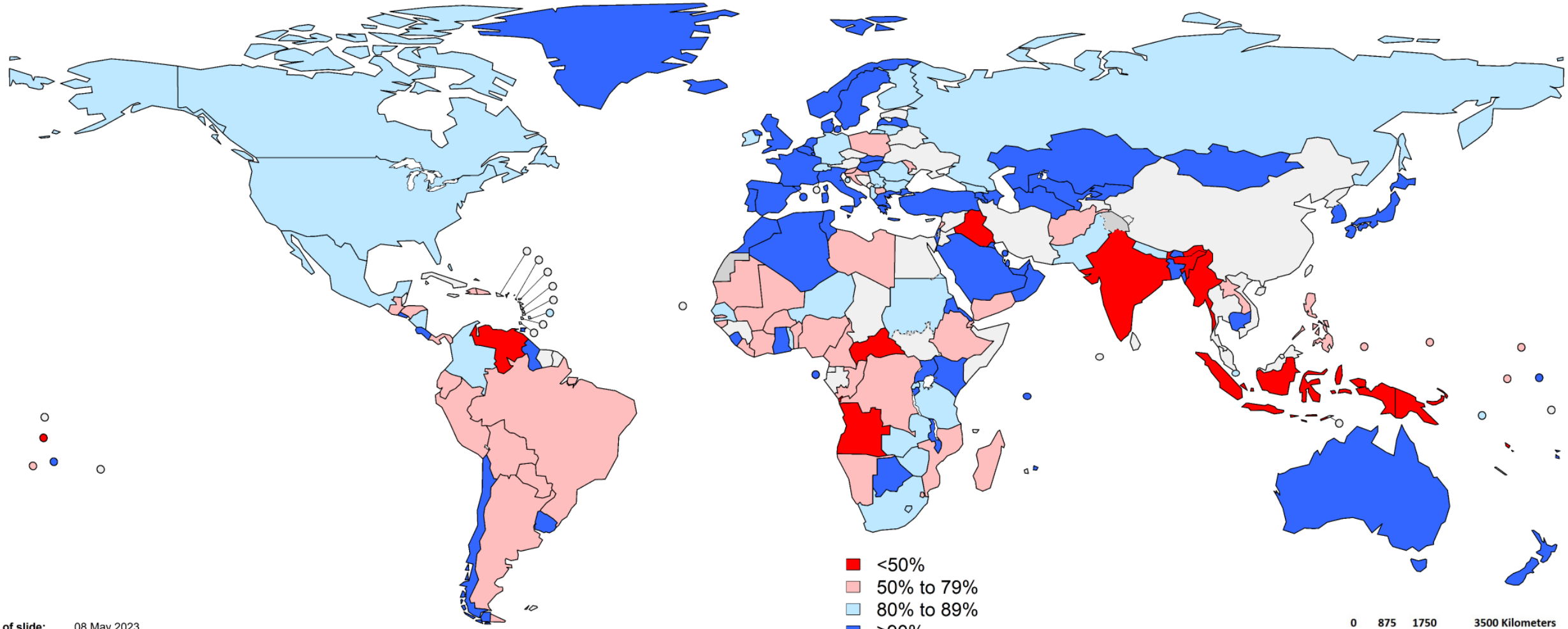
World Health Organization

Coverage estimates, pneumococcal conjugate vaccine 3rd dose , 2021



Date of slide: 08 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: WHO/UNICEF estimates 2021 revision, July 2022
194 WHO Member states.

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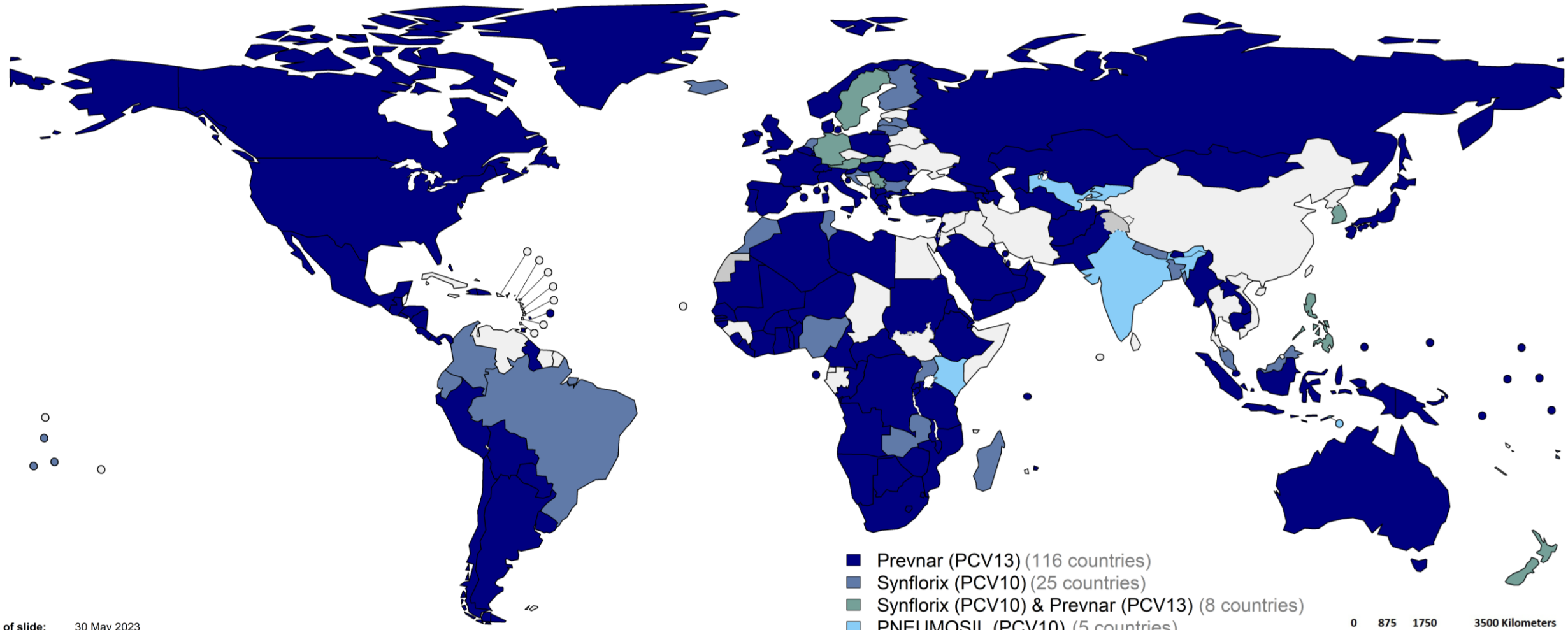
World Health Organization

Global PCV introduction status and product use



Date of slide: 30 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: IVB database as at 30 May 2023. International Vaccine Access Center (IVAC), Johns Hopkins Bloomberg School of Public Health. VIEW-hub. www.view-hub.org. Accessed: 4/6/2023.

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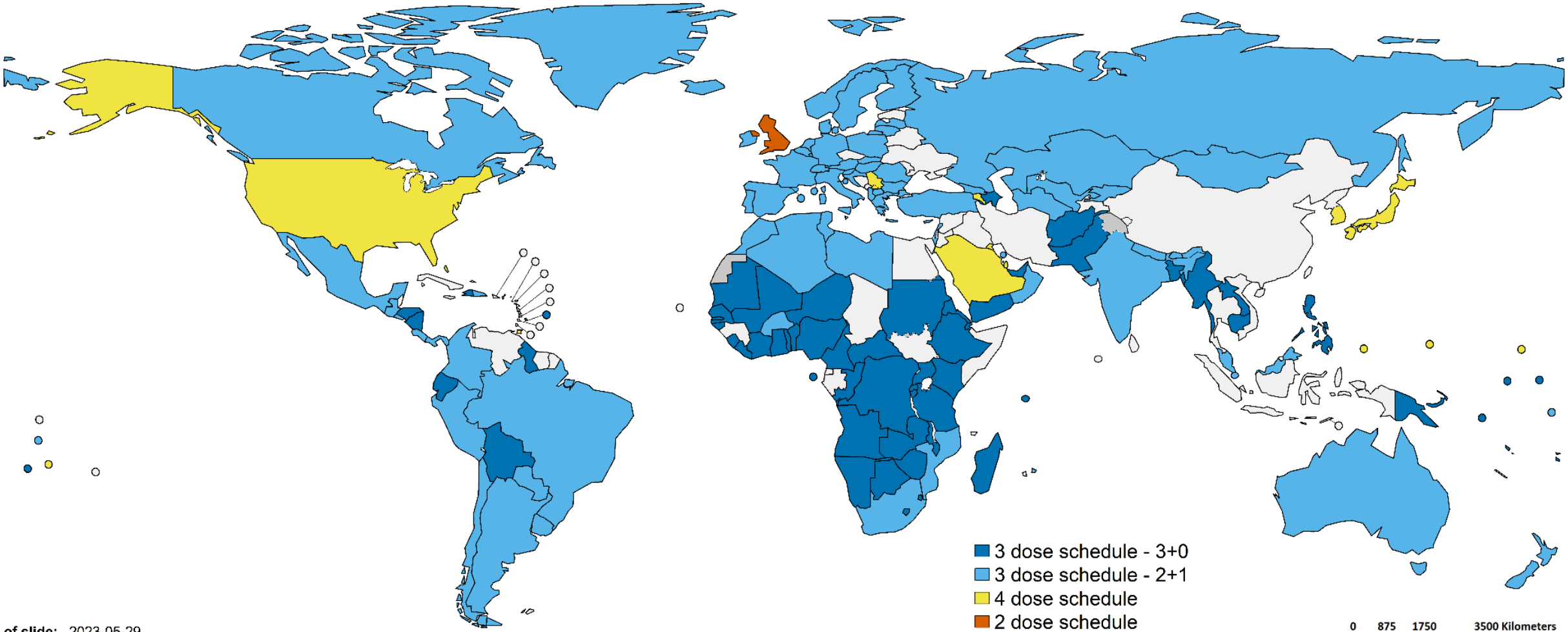
World Health Organization

Global PCV dosing schedules in use



Date of slide: 2023-05-29
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Notes: 3+0 - A 3 dose PCV schedule including a 3 dose primary series with all doses given before 9 months of age
2+1 - A 3 dose PCV schedule including a 2 dose primary series with a booster dose between 9 and 18 months of age

Disclaimer:
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area nor of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

World Health Organization

PCV introduction decision-making considerations

Six key aspects of the immunization programme should be assessed to weigh the potential benefits and trade-offs of each introduction or switch option

Efficacy, effectiveness, safety

- Disease burden and local/regional epidemiology (incl. serotype prevalence & AMR patterns)
- Clinical trial data
- Real-world effectiveness/impact
- Country-specific data
- Risk of administration errors

Ease of use

- Doses per schedule
- Doses per vial
- Route of administration
- Volume to administer
- Time required to prepare the dose
- Similarity to vaccine in use (for switches)

Expected coverage

- Doses per schedule
- Impact on HW hesitancy to open a vial (missed opportunities)

Cold chain, transport, storage

- Cold chain capacity needs (including auxiliary equipment)
- Sensitivities to heat and freeze damage
- Type of cold chain needed
- Freeze-thaw flexibility

Financial sustainability

- Wastage-adjusted cost to fully immunize a child
- Price per dose
- Wastage rates (doses/vial, sessions sizes, discard period)
- Future price outlook

Supply availability and security

- Current availability and predictability of future availability
- Made locally
- Size of supplier's capacity
- Lead time for supplier to manufacture

Adapted from: WHO's Principles and considerations for adding a vaccine to a national immunization programme (2014)

Key questions for PCV introduction or switch decision-making

Considerations for NITAG/ICC recommendation:

1. Which vaccine product and presentation to use?
2. Which PCV routine schedule to use (3+0 or 2+1)?
3. Will a PCV catch-up campaign be done at the time of launch (if yes: when)?
4. Are there opportunities for integration with other antigens, both for a catch-up campaign and for introduction in routine immunization?
   - *In routine, whether to launch PCV in routine together with vaccination against rotavirus (dose schedule identical in most cases, high potential for impact)*
   - *If introducing PCV and rotavirus vaccine together, which rotavirus vaccine presentations are preferred*

WHO prequalified PCV products*:

Serotypes included and possible cross-protection

Product	Carrier protein(s)	Conjugation method & preservative	Pneumococcal serotypes													
			1	3	4	5	6A	6B	6C	7F	9V	14	18C	19A	19F	23F
PCV13 Prevenar 13®, Pfizer	CRM197	Conjugation: Reductive amination Preservative: 1-dose vial: none 4-dose vial: 2-phenoxyethanol														
PCV10 PNEUMOSIL® Serum Institute of India	CRM197	Conjugation: CDAP* Preservative: 1-dose vial: none 5-dose vial: thimerosal														
PCV10 Synflorix®, GSK	Protein D (PD), tetanus toxoid (TT), diphtheria toxoid (DT)	Conjugation: CDAP* Preservative: 1-dose vial: none 2-dose vial: none 4-dose vial: 2-phenoxyethanol														

* CDAP: 1-cyano-4-dimethylaminopyridinium tetrafluoroborate

- Serotype included in vaccine
- Serotype not included in vaccine
- Serotype not included in vaccine but some evidence of cross-protection
- Serotype 3 included in vaccine but no conclusive evidence for cross-protection

*WHO does not approve or endorse the use of specific branded products over others; this publication may not be used for any commercial or promotional purposes.

WHO. (2021). Considerations for Pneumococcal Conjugate Vaccine (PCV) Product Choice. https://apps.who.int/iris/handle/10665/344915

PCV immunogenicity, efficacy, effectiveness

2019 WHO position paper

"PCV10 and PCV13 have comparable immunogenicity and impact on IPD, pneumonia and NP carriage due to shared vaccine serotypes. While differences were found in their immunogenicity and impact on the 3 serotypes included in PCV13 and not PCV10 and on serotype 6C, there is currently insufficient evidence that the 2 vaccines differ in their impact on overall pneumococcal disease burden."

There is at present insufficient evidence of a difference in the net impact of the 2 products on overall disease burden. PCV13 may have an additional benefit in settings where disease attributable to serotype 19A or serotype 6C is significant. ***The choice of product to be used in a country should be based on programmatic characteristics, vaccine supply, vaccine price, the local and regional prevalence of vaccine serotypes and antimicrobial resistance pattern****."*

- All three PCV products show **high levels of immunogenicity and are recommended** based on WHO prequalification
- Efficacy and effectiveness data are not available for PCV10^{SII}
- **Serotype-specific coverage differences**
  - There is **cross-protection** for some serotypes, making PCV10^{SII} expected protection similar to PCV13
  - **Serotype 19A** is only present in PCV13 and PCV10^{SII}
  - The three PCV products are considered **interchangeable**

PCV safety and co-administration

- The safety profiles of both **PCV-10^{GSK} and PCV-13** have been reviewed as part of the WHO prequalification process and by the Global Advisory Committee on Vaccine Safety (GACVS). Both products have extensive post-marketing data and have **excellent safety profiles**
- Clinical trial data for **PCV-10^{SII}** were reviewed during the WHO prequalification process; the product was well tolerated and has a **comparable safety profile** to the other prequalified PCVs[2]
- Despite lack of comprehensive data on the immunogenicity, effectiveness and safety of all possible combinations of PCV and other routine vaccines, **co-administration for programmatic reasons is acceptable**

Public Assessment Summary Report. Pneumococcal Conjugate Vaccine, (adsorbed, 10-valent), Serum Institute of India Pvt. Ltd. 17 December 2019. https://extranet.who.int/pqweb/content/pneumosil®-0

Role of catch-up campaigns

- **Timing**: just before introducing PCV into routine programme (new introductions)
- **Value**: accelerate direct & indirect protection and hasten impact of PCV
- **Target**: children from 12-59 months
- **Doses**: one single dose or 2 PCV doses separated with at least 8 weeks
- **Considerations**:
  - ✓ Implementation synergies and budget efficiencies if timed right
  - ✓ Use operational support for long-term strengthening of routine programme
  - — Resources used for catch-up diverted away from routine immunization or delay PCV introduction
  - — Only moderate vaccine serotype carriage/disease in catch-up age cohort

https://cdn.who.int/media/docs/default-source/immunization/training/vaccine-specific/pneumo/pcv_catch-up_faq_final.pdf

PCV catch-up vaccination FAQ

Pneumococcal conjugate vaccine (PCV) catch-up vaccination at the time of PCV introduction in children aged 1 to 5 years of age has been recommended by WHO as reflected in the 2019 WHO position paper.

What is the value of PCV catch-up vaccinations?

Modeling studies* suggest that PCV immunisation for children outside the birth cohort at the time of national introduction **accelerates both direct and indirect protection and thereby hastens the impact of PCV**.

If logistically feasible, catch-up campaigns at PCV introduction can enhance the benefit per dose of the PCV program in settings with high vaccine-type carriage and disease beyond infancy.

*Studies in Kenya and Viet Nam

Who is the target population?

Children from 12-59 months of age

How many doses are administered as part of a catch-up campaign?

Often a single dose only is administered to children on a one-off basis.

Evidence remains limited on whether a single dose is sufficient or whether 2 doses are required for catch-up vaccination after infancy. For children aged 12–23 months of age, some programmes have used 2 PCV doses separated by at least 8 weeks, while others have used a single dose.

Gavi *Gavi only covers a single dose for catch-up at this time*

What should be prioritized if resources are limited?

If there is limited availability or capacity for catch-up immunisation, **the youngest children (e.g. <2 year of age) should be prioritized** to receive catch-up doses of PCV because of the higher pneumococcal disease risk.

What are key decision-making considerations for catch-up vaccination?

How can **implementation synergies and budget efficiencies can be leveraged** to launch the catch-up at the time of introduction or where campaigns for other antigens are planned within the same year?

How will the operational support for the catch-up implementation be used for **long-term strengthening of vaccine delivery** through the routine immunisation programme?

Situations where a country might choose **not** to implement a catch-up campaign:

- if the resources needed for the campaign divert resources and negatively impact PCV coverage in the routine birth cohort,
- if the resources for the campaign result in delayed introduction of PCV in the routine birth cohort, or
- if the epidemiologic setting is one where there is only moderate vaccine serotype carriage and disease in those in the catch-up age cohort.

How should catch-up campaigns be timed?

Ideally, catch-up vaccination campaigns **should take place just prior to the start of routine immunisation** with a defined target age cohort for the campaign that aims to target the largest number of children possible (i.e. children older than eligible for routine introduction and up to 5 years of age).

Gavi *For Gavi countries to receive catch-up support, countries must run catch-up vaccination within 12 months of routine launch. At the latest possible, doing a catch-up campaign 11 months after routine launch would adjust for the year of routine vaccination that has passed, resulting in a catch-up age cohort reduced to those 2-5 years.*

Additional resources

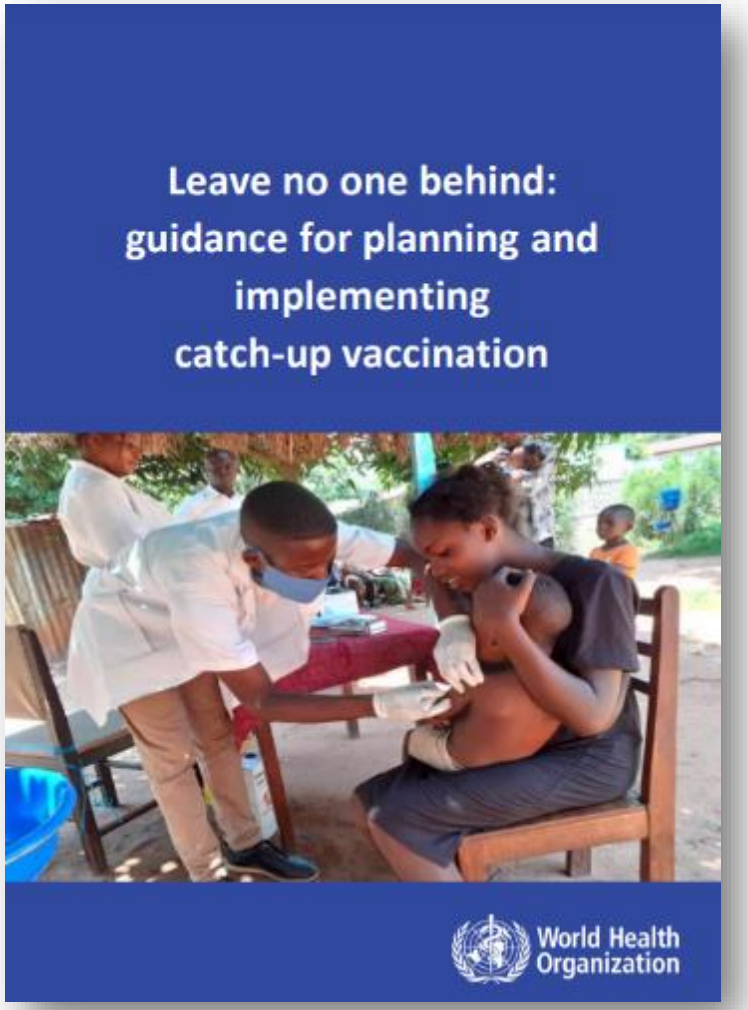
WHO Leave no one behind: guidance for planning and implementing catch-up vaccination
WHO SIA Planning and Implementation Guide - for guidance on preparatory and implementation activities
Gavi Vaccine Funding Guidelines- for Gavi submission requirements
Pneumococcal Conjugate Vaccine: WHO Position Paper (2019)
WHO Principles and considerations for adding a vaccine to a national immunization programme

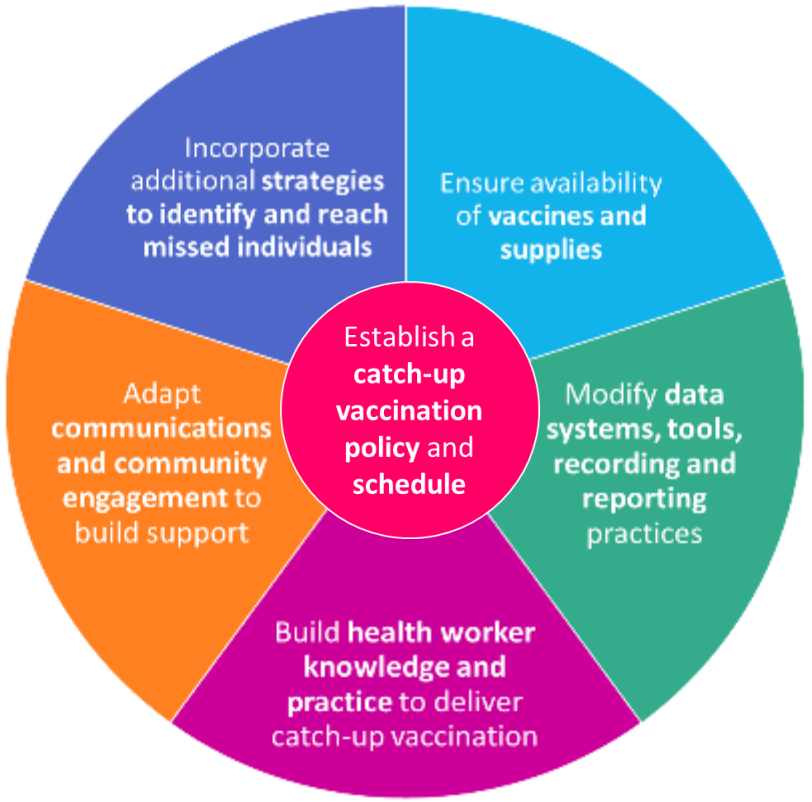
CHOICES

Catch-up vaccination (after introduction)

- WHO recommends a catch-up schedule for delayed or interrupted vaccination (for all antigens in the schedule)
- Interrupted schedules should be resumed without repeating the previous dose.
- Catch-up vaccination can be done with a single dose of PCV for children ≥24 months
- Unvaccinated children aged 1–5 years who are at high risk for pneumococcal infection because of underlying medical conditions, such as HIV infection or sickle-cell disease, should receive at least 2 doses separated by at least 8 weeks.
- WHO does not currently have recommendations on the use of PCV in individuals over 5 years of age

WHO has published recommendations and operational guidance for catch-up vaccination





WHO Recommendations for Interrupted or Delayed Routine Immunization

Available in EN, FR, PT

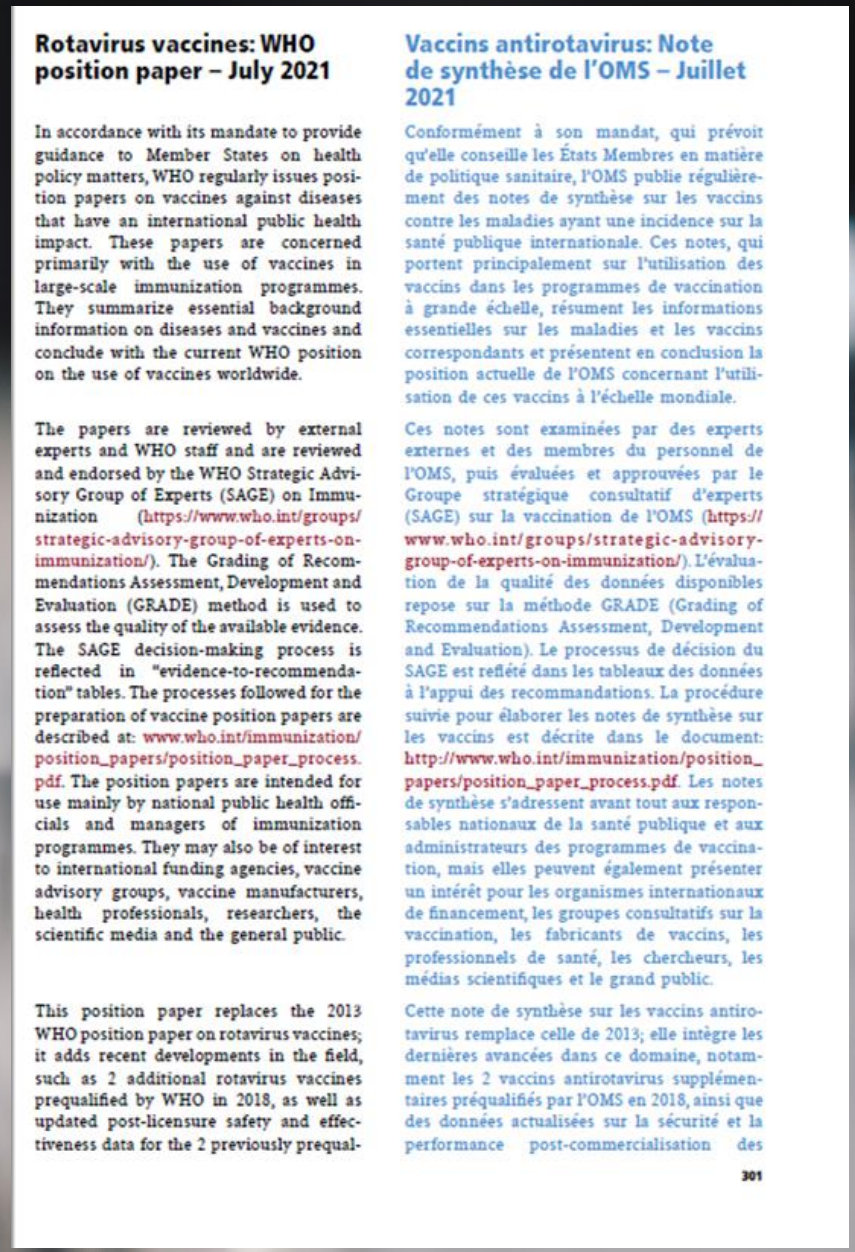
www.who.int/teams/immunization-vaccines-and-biologicals/essential-programme-on-immunization/implementation/catch-up-vaccination

Future updates to PCV recommendations

- The SAGE pneumococcal vaccines working group will be convened in 2023-24 to review evidence in the following areas:
  - **Schedule optimization in childhood** (2+1 versus 3+0, 1+1, 0+1)
  - **Multi-age cohort PCV campaigns** in response to outbreaks, in humanitarian settings or in areas where uptake is very low
  - Review of available data and timelines to licensure/prequalification for **newer PCV products (including higher valent)** with pediatric indication
- Recommendations expected late 2024 or 2025

Rotavirus Policy recommendations (2021)

- WHO recommends rotavirus vaccines be **included in all national immunization programmes**
- All prequalified products are **oral rotavirus vaccines**
- **RotaTeq, Rotavac and ROTASIL** should be administered in a **3-dose schedule**, while a **2-dose** schedule should be used for **Rotarix**
- 1st dose: Administered as soon as possible after 6 weeks of age with a minimum of 4 weeks between doses
- Rotavirus vaccinations may be administered simultaneously with other vaccines of the childhood immunization programme



Rotavirus vaccines: WHO position paper – July 2021

In accordance with its mandate to provide guidance to Member States on health policy matters, WHO regularly issues position papers on vaccines against diseases that have an international public health impact. These papers are concerned primarily with the use of vaccines in large-scale immunization programmes. They summarize essential background information on diseases and vaccines and conclude with the current WHO position on the use of vaccines worldwide.

The papers are reviewed by external experts and WHO staff and are reviewed and endorsed by the WHO Strategic Advisory Group of Experts (SAGE) on Immunization (https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/). The Grading of Recommendations Assessment, Development and Evaluation (GRADE) method is used to assess the quality of the available evidence. The SAGE decision-making process is reflected in "evidence-to-recommendation" tables. The processes followed for the preparation of vaccine position papers are described at: www.who.int/immunization/position_papers/position_paper_process.pdf. The position papers are intended for use mainly by national public health officials and managers of immunization programmes. They may also be of interest to international funding agencies, vaccine advisory groups, vaccine manufacturers, health professionals, researchers, the scientific media and the general public.

This position paper replaces the 2013 WHO position paper on rotavirus vaccines; it adds recent developments in the field, such as 2 additional rotavirus vaccines prequalified by WHO in 2018, as well as updated post-licensure safety and effectiveness data for the 2 previously prequal-

Vaccins antirotavirus: Note de synthèse de l'OMS – Juillet 2021

Conformément à son mandat, qui prévoit qu'elle conseille les États Membres en matière de politique sanitaire, l'OMS publie régulièrement des notes de synthèse sur les vaccins contre les maladies ayant une incidence sur la santé publique internationale. Ces notes, qui portent principalement sur l'utilisation des vaccins dans les programmes de vaccination à grande échelle, résument les informations essentielles sur les maladies et les vaccins correspondants et présentent en conclusion la position actuelle de l'OMS concernant l'utilisation de ces vaccins à l'échelle mondiale.

Ces notes sont examinées par des experts externes et des membres du personnel de l'OMS, puis évaluées et approuvées par le Groupe stratégique consultatif d'experts (SAGE) sur la vaccination de l'OMS (https://www.who.int/groups/strategic-advisory-group-of-experts-on-immunization/). L'évaluation de la qualité des données disponibles repose sur la méthode GRADE (Grading of Recommendations Assessment, Development and Evaluation). Le processus de décision du SAGE est reflété dans les tableaux des données à l'appui des recommandations. La procédure suivie pour élaborer les notes de synthèse sur les vaccins est décrite dans le document: http://www.who.int/immunization/position_papers/position_paper_process.pdf. Les notes de synthèse s'adressent avant tout aux responsables nationaux de la santé publique et aux administrateurs des programmes de vaccination, mais elles peuvent également présenter un intérêt pour les organismes internationaux de financement, les groupes consultatifs sur la vaccination, les fabricants de vaccins, les professionnels de santé, les chercheurs, les médias scientifiques et le grand public.

Cette note de synthèse sur les vaccins antirotavirus remplace celle de 2013; elle intègre les dernières avancées dans ce domaine, notamment les 2 vaccins antirotavirus supplémentaires préqualifiés par l'OMS en 2018, ainsi que des données actualisées sur la sécurité et la performance post-commercialisation des

301

July 2021 https://www.who.int/publications/i/item/WHO-WER9628

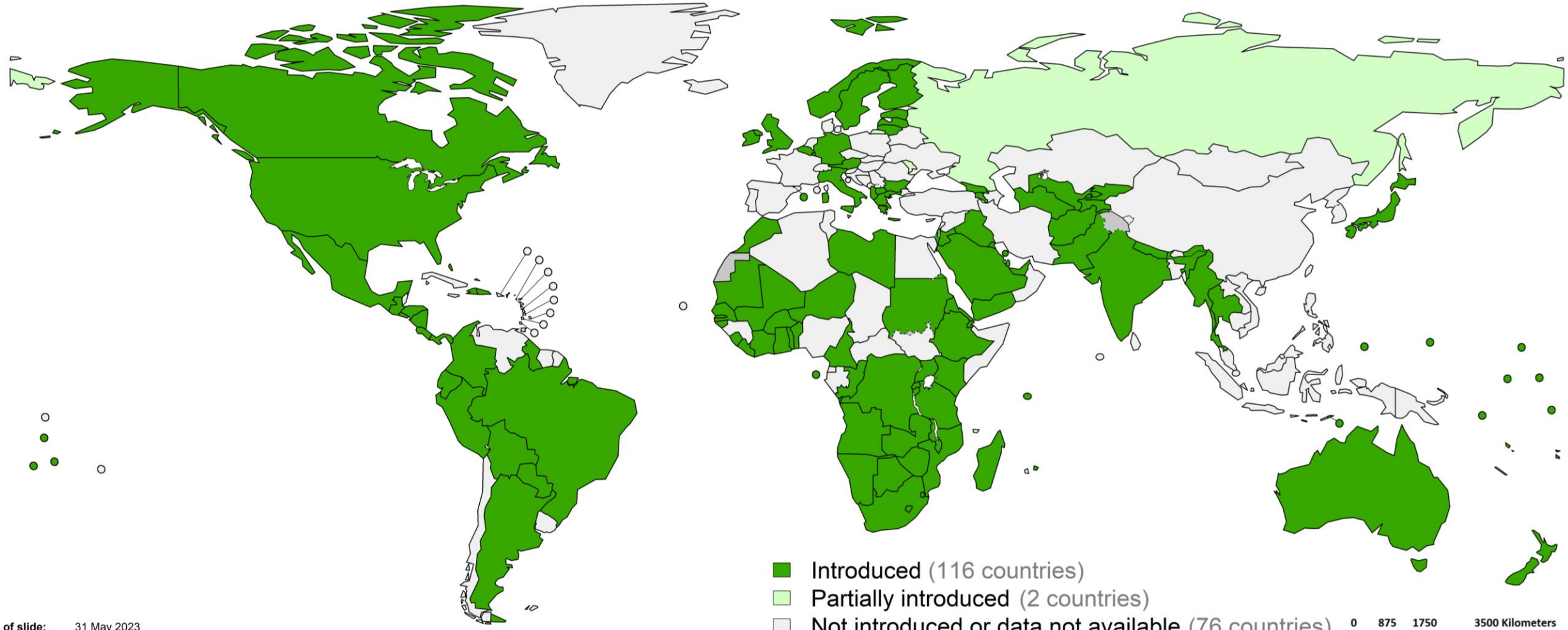
Immunization, Vaccines and Biologicals (06 Dec 2021)

WHO position – catch-up vaccination

- If a child **<24 months of age** misses a rotavirus dose or series for any reason, **WHO recommends rotavirus vaccination for that child**
- Interrupted schedules should be resumed without repeating the previous dose. Because of the typical age distribution of RVGE, **rotavirus vaccination of children >24 months of age is not recommended**
- This WHO-recommended upper age limit for rotavirus vaccination is higher than the age restrictions indicated by manufacturers and thus constitutes an **off-label recommendation** for these products
- The need for rotavirus vaccination for children with missed, delayed or interrupted routine immunization is particularly important after significant disruptions to immunization programmes and in high-mortality or crisis contexts

www.who.int/teams/immunization-vaccines-and-biologicals/essential-programme-on-immunization/implementation/catch-up-vaccination

Global rotavirus vaccine introduction status to the national immunization programme



Date of slide: 31 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: IVB database as at 31 May 2023. International Vaccine Access Center (IVAC), Johns Hopkins Bloomberg School of Public Health. VIEW-hub. www.view-hub.org. Accessed: 4/6/2023.

Disclaimer:

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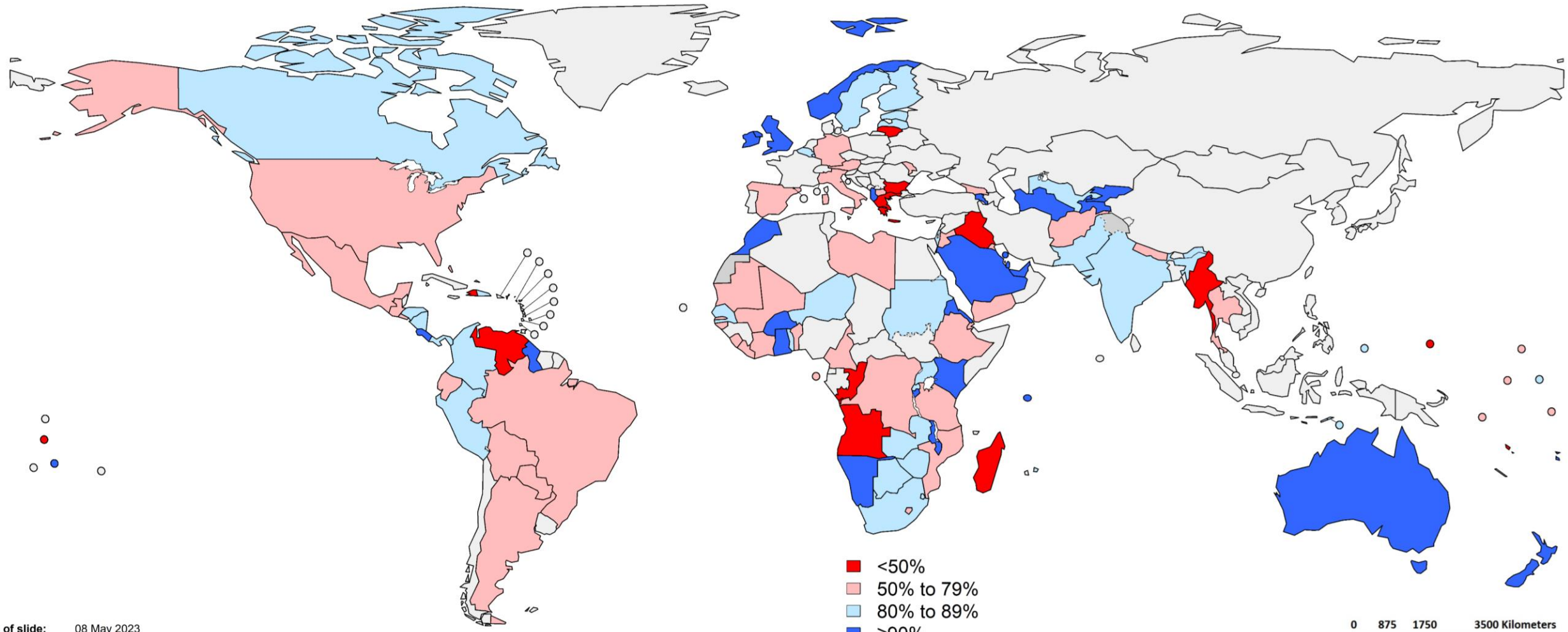
World Health Organization

Coverage estimates, rotavirus vaccine last dose , 2021



Date of slide: 08 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: WHO/UNICEF estimates 2021 revision, July 2022
194 WHO Member states.

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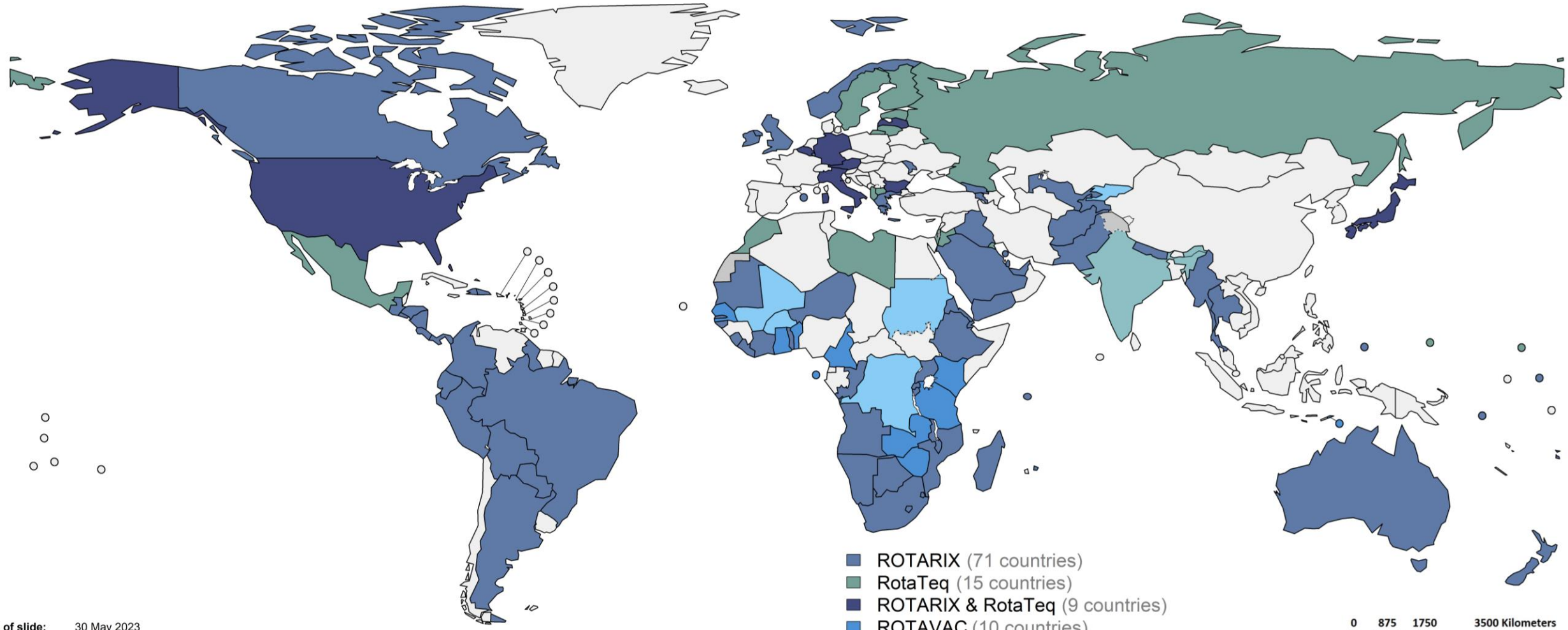
Global rotavirus vaccine introduction status & product choice



Date of slide: 30 May 2023
Map production: Immunization, Vaccines and Biologicals (IVB), World Health Organization (WHO)
Data source: IVB database as at 30 May 2023. International Vaccine Access Center (IVAC), Johns Hopkins Bloomberg School of Public Health. VIEW-hub. www.view-hub.org. Accessed: 4/6/2023.

Disclaimer:

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Rotavirus vaccine introduction/switch decision-making

Six key aspects of the immunization programme should be assessed to weigh the potential benefits and trade-offs of each introduction or switch option

Efficacy, effectiveness, safety

- Disease burden and epidemiology
- Clinical trial data
- Real-world effectiveness/impact
- Country-specific evidence (where available)
- Risk of administration errors

Ease of use

- Doses per schedule
- Doses per vial
- Route of administration
- Volume to administer
- Time required to prepare the dose
- Similarity to vaccine in use (for switches)

Expected coverage

- Doses per schedule
- Impact on HCW hesitancy to open a vial (missed opportunities)

Cold chain, transport, storage

- Cold chain capacity needs (including auxiliary equipment)
- Sensitivities to heat and freeze damage
- Type of cold chain needed
- Freeze-thaw flexibility

Financial sustainability

- Wastage-adjusted cost to fully immunize a child
- Price per dose
- Wastage rates (doses/vial, sessions sizes, discard period)
- Future price outlook

Supply availability and security

- Current availability and predictability of future availability
- Made locally
- Size of supplier's capacity
- Lead time for supplier to manufacture

Adapted from: WHO's Principles and considerations for adding a vaccine to a national immunization programme (2014)

Key questions for rotavirus introduction or switch decision-making

Considerations for NITAG/ICC recommendation:

1. Which vaccine presentation to use (many options available)?
2. Are there opportunities for integration with other antigens for introduction in routine immunization, as well as with other health programmes (child health, WASH)?
   - *In routine, whether to launch rotavirus vaccine in routine together with vaccination against PCV (dose schedule identical in most cases, high potential for impact)*
   - *If introducing PCV and rotavirus vaccine together, which rotavirus vaccine presentations are preferred*

WHO prequalified oral rotavirus vaccine products*

Characteristics		Rotarix™ (GlaxoSmithKline)	Rotateq™ (Merck)	Rotavac™ (Bharat Biotech International)	Rotasiil™ (Serum Institute of India Pvt Ltd)
Efficacy for severe rotavirus gastroenteritis by child mortality rate stratum of country of study site (at 2 years follow-up**)[1]	Low Mortality	90% (95% CI, 86-93%)	94% (95% CI, 61-99%)	No data available	No data available
	Medium Mortality	78% (95% CI, 70-83%)	81% (95% CI, 66-89%)	No data available	No data available
	High Mortality	54% (95% CI, 9-77%)	44% (95% CI, 23-59%)	54% (95% CI, 40-65%)	44% (95% CI, 26-58%)
	Study sites	Multiple countries at different income and mortality levels.		3 sites in India	6 sites in India; 1 center, multiple sites in Niger
Date of WHO prequalification		March 2009	October 2008	January 2018	September 2018
Recommended number of doses		*2 doses*	*3 doses*	*3 doses*	*3 doses*
Composition		*G1P[8] attenuated human strain*	*G1, G2, G3, G4, P[8] human proteins in bovine backbone*	*G9, P[11] attenuated human strain*	*G1-4, G9 human proteins with bovine P[5] in bovine backbone*

Current evidence indicates local data on **circulating rotavirus strains** should **NOT** drive product choice as all WHO prequalified rotavirus vaccines provide protection against heterologous strains

* WHO does not approve or endorse the use of specific branded products over others; this document may not be used for any commercial or promotional purposes.
** One year follow-up efficacy estimates for severe rotavirus gastroenteritis diarrhoea were reported in the 2020 Cochrane review and are similar to those for 2 year follow-up.
1. Systematic review and meta-analysis of the safety, effectiveness and efficacy of childhood schedules using Rotavirus Vaccines – Cochrane Response. October 2020 SAGE Meeting, Rotavirus Vaccines – Session 6. Background documents. https://www.who.int/publications/m/item/review-meta-analysis-rotavirus-vaccines

Safety considerations

- All WHO prequalified rotavirus vaccines are **safe** and **effective**
- In the past, the first rotavirus vaccine (Rotashield™) caused intussusception (IS), a serious but very rare bowel obstruction
- With the new rotavirus vaccines, there seems to be a very small increased risk of IS in infants following rotavirus vaccination, mainly in the first 1- 7 days following the first dose of rotavirus vaccine
- The risk of IS after rotavirus vaccination is much lower than the risk of severe rotavirus disease in unvaccinated children
- Data continue to be monitored globally. **Lack of IS surveillance in a country should not be an impediment to rotavirus vaccine introduction.**

Report of the WHO Global Advisory Committee on Vaccine Safety, 6-7 December 2017
http://apps.who.int/iris/bitstream/handle/10665/259874/WER9303.pdf?sequence=1
Report of the WHO Global Advisory Committee on Vaccine Safety, 4–5 December 2019. https://apps.who.int/iris/bitstream/handle/10665/330607/WER9504-eng-fre.pdf?ua=1

Comprehensive package of interventions for preventing and treating pneumonia and diarrhoea

World Health Organization

Source: End preventable deaths: Global Action Plan for Prevention and Control of Pneumonia and Diarrhoea
https://www.who.int/publications/i/item/the-integrated-global-action-plan-for-prevention-and-control-of-pneumonia-and-diarrhoea-(gappd)

Consider simultaneous introductions

Countries are encouraged to assess opportunities that may leverage implementation synergies and budget efficiencies (see examples)

Sufficient time is required to analyse the different introduction/switch implications, including:

- NITAG recommendation
- Financial analysis
- Cold-chain analysis
- Programmatic analysis
- Time, capacity and resources to combine training of health workers

Two different vaccine introductions in parallel or simultaneously	Two different vaccine switches in parallel or simultaneously	Switching a vaccine at the same time as a new vaccine introduction
Ex. introducing both PCV and rotavirus vaccines at the same time	Ex. switching both PCV and rotavirus vaccines at the same time	Ex. switching PCV product and introducing rotavirus vaccines at the same time
		

Cost considerations for new vaccine introductions

Incremental costs:

Used for fiscal impact analysis and for cost effectiveness analysis to compare different vaccines

INCREMENTAL COST OF ADDING THE NEW VACCINE

Immunization programme-specific costs:

- New vaccine and AD syringes
- Expansion of cold chain
- Social mobilization and training for new vaccine
- Revision of EPI forms, vaccination cards & other forms

Shared costs:

- Added time spent by multi-purpose health personnel
- Additional vehicles, transport costs

EXISTING IMMUNIZATION PROGRAMME COSTS

Immunization programme-specific costs:

- Vaccines and injection supplies
- Time spent by immunization-only personnel
- Cold chain equipment
- Vehicles used 100% for immunization
- Social mobilization and training
- Surveillance for vaccine-preventable diseases

Shared costs:

- Health facilities (buildings, utilities)
- Equipment
- Vehicles
- Transportation costs
- Time of multi-purpose health personnel spent on immunization

Full (total) cost of programme with new vaccine:

Used for cost-effectiveness analyses to compare with full costs of another (non-vaccine) intervention

Source: Principles and considerations for adding a vaccine to a national immunization program: from decision to implementation and monitoring https://apps.who.int/iris/bitstream/handle/10665/111548/9789241506892_eng.pdf

Thank you!

For additional PCV and rotavirus vaccine questions, please contact:

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Jenny Walldorf, walldorfj@who.int

Alejandro Ramirez Gonzalez, ramirezgonzaleza@who.int

PCV resources

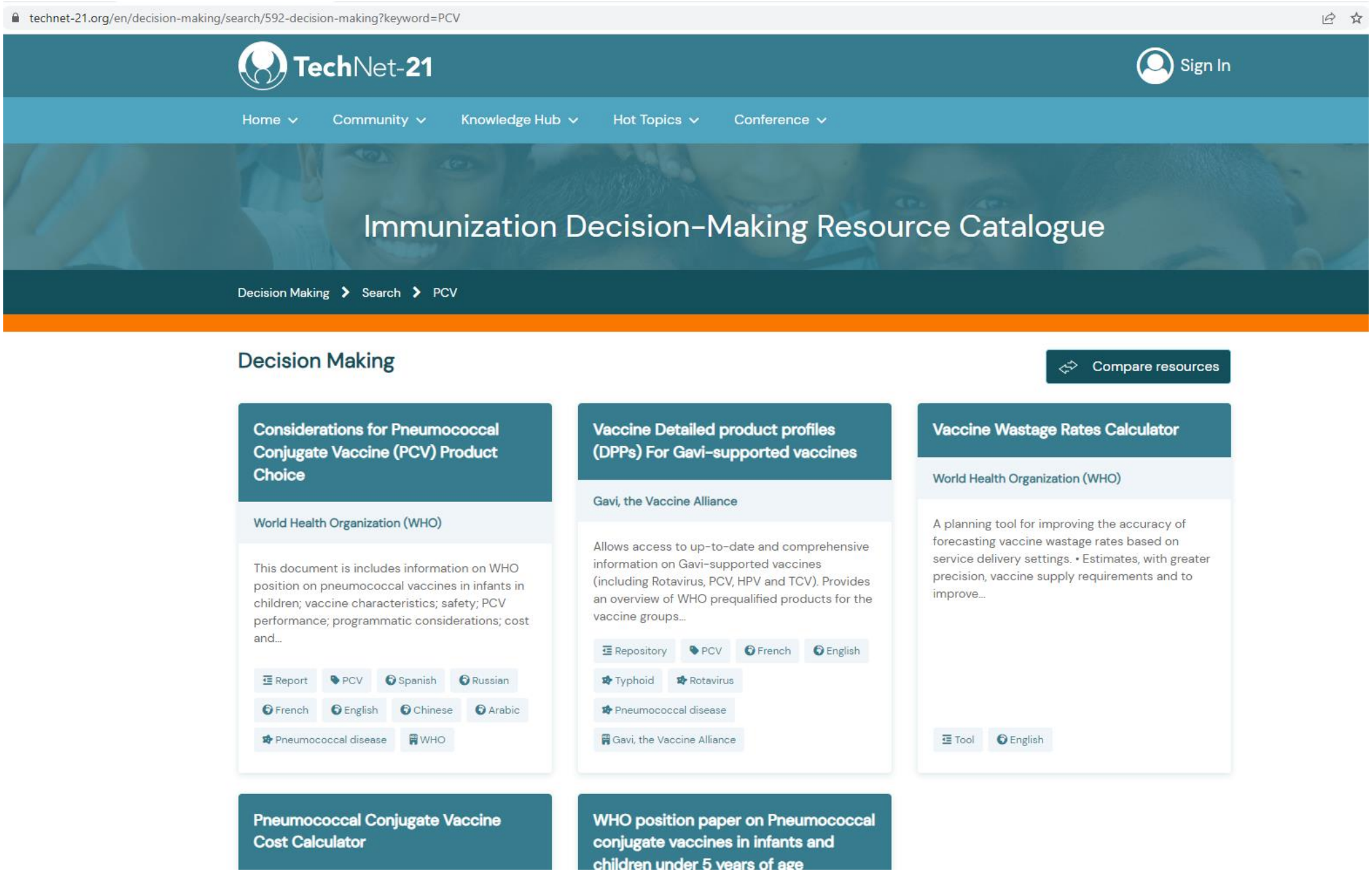
- Pneumococcal conjugate vaccines in infants and children under 5 years of age: WHO position paper – February 2019. https://apps.who.int/iris/bitstream/handle/10665/310968/WER9408.pdf?ua=1
- WHO Considerations for pneumococcal conjugate vaccine (PCV) product choice: https://apps.who.int/iris/handle/10665/344915
- Gavi PCV detailed product profile https://www.gavi.org/news/document-library/detailed-product-profiles
- Global Market Study: Pneumococcal Conjugate (PCV) And Polysaccharide (PPV) Vaccines. https://www.who.int/immunization/programmes_systems/procurement/mi4a/platform/module2/Pneumococcal_Vaccine_Market_Study-June2020.pdf?ua=1
- Pneumococcal Conjugate Vaccine (PCV) Interchangeability: Evidence Dossier. 2019. https://www.jhsph.edu/ivac/wp-content/uploads/2020/03/Evidence-dossier-PCV-Interchangeability_Global_Dec-2019.pdf\

Rotavirus vaccine resources

- Rotavirus vaccines : WHO position paper – July 2021 https://www.who.int/publications/i/item/WHO-WER9628
- Summary of key characteristics of WHO prequalified rotavirus vaccines (under revision): https://apps.who.int/iris/rest/bitstreams/1366824/retrieve
- WHO rotavirus training materials: https://www.who.int/teams/immunization-vaccines-and-biologicals/diseases/rotavirus
- PATH rotavirus vaccine cost calculator: https://www.path.org/resources/rotavirus-vaccine-cost-calculator/
- Gavi detailed product profiles: https://www.gavi.org/our-alliance/market-shaping/product-information-vaccines-cold-chain-equipment
- Gavi-supported rotavirus vaccines profiles slide kit https://www.gavi.org/news/document-library/rotavirus-vaccine-profiles

General vaccine decision-making resources

- WHO Principles and considerations for adding a vaccine to a national immunization programme: https://www.who.int/iris/bitstream/10665/111548/1/9789241506892_eng.pdf?ua=1
- WHO prequalified vaccines list: https://extranet.who.int/pqweb/vaccines/list-prequalified-vaccines?nav=2&AspxAutoDetectCookieSupport=1
- Table 3: WHO recommendations for routine immunization https://www.who.int/publications/m/item/table-3-who-recommendations-for-routine-immunization
- WHO: Leave no one behind: guidance for planning and implementing catch-up vaccination https://www.who.int/publications/i/item/9789240016514
- Immunization Decision-Making Resource Catalogue: https://www.technet-21.org/en/decision-making
- WHO immunization training materials: https://www.who.int/teams/immunization-vaccines-and-biologicals/essential-programme-on-immunization/training/general
- Gavi Vaccine Funding Guidelines – for Gavi submission requirements https://www.gavi.org/sites/default/files/document/2022/Vaccine_FundingGuidelines.pdf



https://www.technet-21.org/en/decision-making