Vaccine Schedules

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Outline

- What vaccines do we include.
- When do we vaccinate.
- Focus on EPI schedules.
- Timeliness of vaccination.
- Vaccination of pregnant women.
- Information on private schedules.

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Immunization, Vaccines and Biologicals

- Immunization, Vaccines and Biologicals
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- Global Vaccine Action Plan
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  - Policy and strategies
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  - Linking with other interventions
  - Vaccine procurement
  - Financing and planning
  - Supply chain
- Monitoring and surveillance
- Quality, safety and standards
- Research and development

Principles and considerations for adding a vaccine to a national immunization programme

From decision to implementation and monitoring

Authors:
World Health Organization

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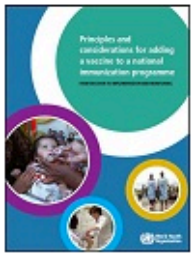

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This essential resource document reviews the principles and issues to be considered when making decisions about, planning, and implementing the introduction of a vaccine into a national immunization programme. Importantly, the document highlights ways to use the opportunity provided by the vaccine introduction to strengthen immunization and health systems. The comprehensive guidance also describes the latest references and tools related to vaccine decision-making, economic ar control and health promotion, vaccine safety, co provides key URL links to many of these resourc

http://www.who.int/immunization/programmes_systems/policies_strategies/vaccine_intro_resources/nvi_guidelines/

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National programmes and systems
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Vaccine Position Papers

BCG

- Position paper (January 2004) Original English and French versions
  pdf, 468kb
- References
  pdf, 83kb
- Revised BCG vaccination guidelines for infants at risk for HIV infection (May 2007) Original English and French version
  pdf, 167kb

Cholera

- Position paper (March 2010) Original English and French versions
  pdf, 283kb
- Grading of scientific evidence (safety)
  pdf, 117kb
- Grading of scientific evidence (efficacy/effectiveness)
  pdf, 115kb
- Grading of scientific evidence (duration)
  pdf, 106kb
- Summary of WHO position paper on cholera
  pdf, 70kb
- Key references to the cholera position paper
  pdf, 229kb
- Presentation: Summary of key points - WHO position paper on cholera
  pdf, 2.24Mb

This version updates and replaces the previous position paper pub
2001.

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WHO recommendations for routine immunization
- Summary tables

The Immunological Basis for immunization
- Link to series

http://www.who.int/immunization/documents/positionpapers/en/

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Package Inserts

Vaccine index

View all
Anthrax
Chickenpox (varicella)
DTaP
Hib
Hepatitis A
Hepatitis B
HPV
Influenza
Japanese encephalitis
Measles
Meningococcal
Mumps
Pneumococcal - PCV
Pneumococcal - PPSV
Polio - IPV
Rabies
Rotavirus
Rubella
Shingles (zoster)
Smallpox
Td
Tdap
Typhoid
Yellow fever

Package Inserts - Anthrax

BioThrax Package Insert
Emergent BioSolutions

Package Inserts - Chickenpox (varicella)

ProQuad Package Insert
Combination vaccine: Varicella+MMR
Merck & Co., Inc.

Varivax Package Insert
Merck & Co., Inc.

Package Inserts - DTaP

DAPTACEL Package Insert
sanofi pasteur

Tripedia Package Insert [product discontinued]
sanofi pasteur

Infanrix Package Insert
GlaxoSmithKline

Pentacel Package Insert

http://www.immunize.org/packageinserts/

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WHO recommendations for routine immunization - summary tables

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In order to assist programme managers develop optimal immunization schedules WHO has compiled key information on its current routine immunization recommendations into three summary tables.

Table 1 summarizes recommended routine immunizations for all age groups - children, adolescents, and adults. As such, it provides an overview of vaccine recommendations across the lifespan, including both primary series and booster doses.

Table 2 provides detailed information for routine immunizations for children, including age at first dose and intervals. It reiterates recommendations on the primary series and booster doses.

In Table 3, WHO has consolidated its recommendations for interrupted and delayed vaccination. These irregular situations can be challenging to health workers who may not know what to do.

Table 4 summarizes WHO's recommendations for the vaccination of health care workers.

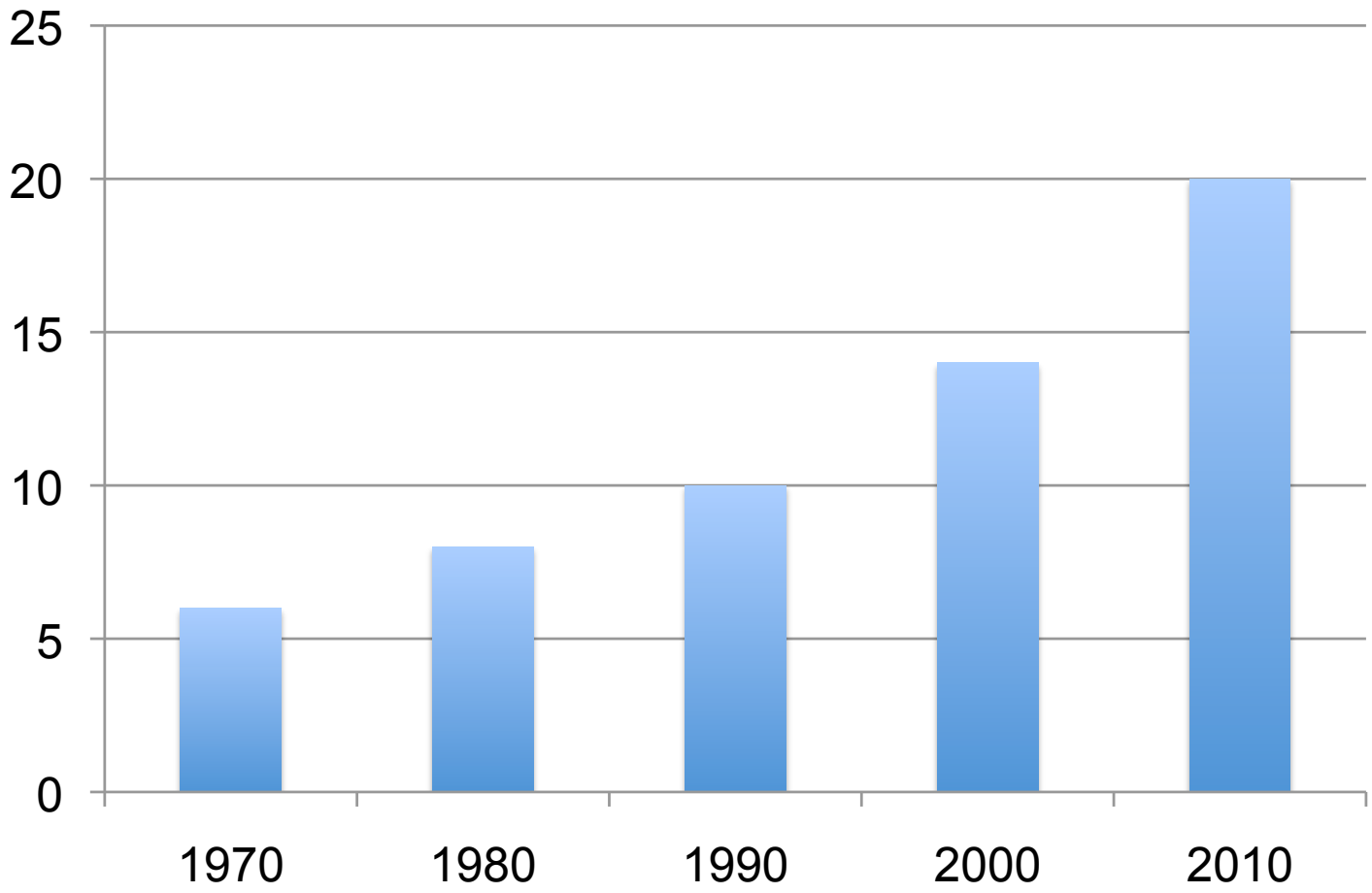
Links to tables

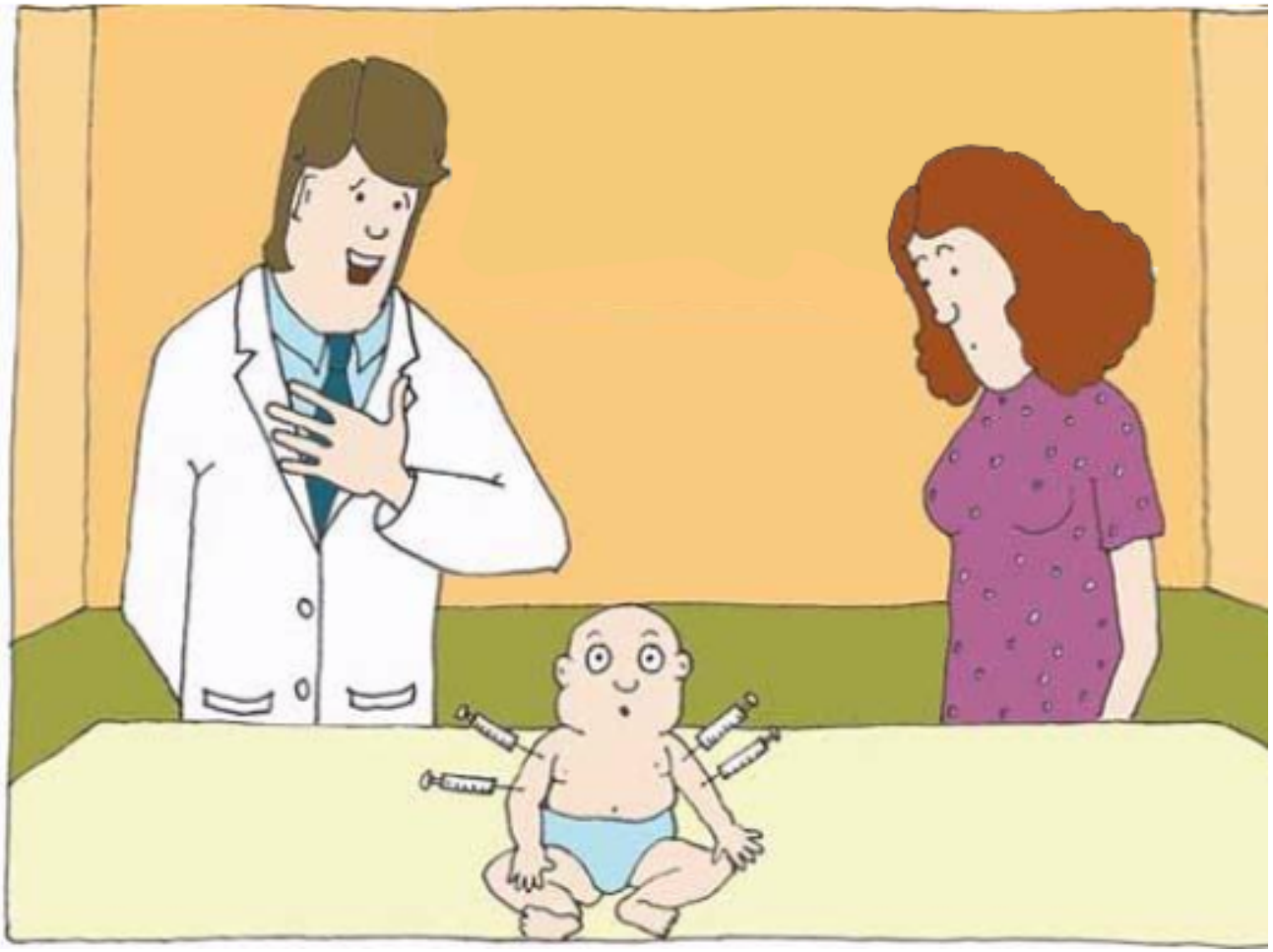
30 May 2014

- Table 1 pdf, 221kb
- Table 2 pdf, 182kb
- Table 3 pdf, 177kb
- Table 4 pdf, 118kb
- Table 1 - en français pdf, 241kb
- Table 2 - en français pdf, 214kb
- Table 3 - en français pdf, 202kb
- Table 4 - en français

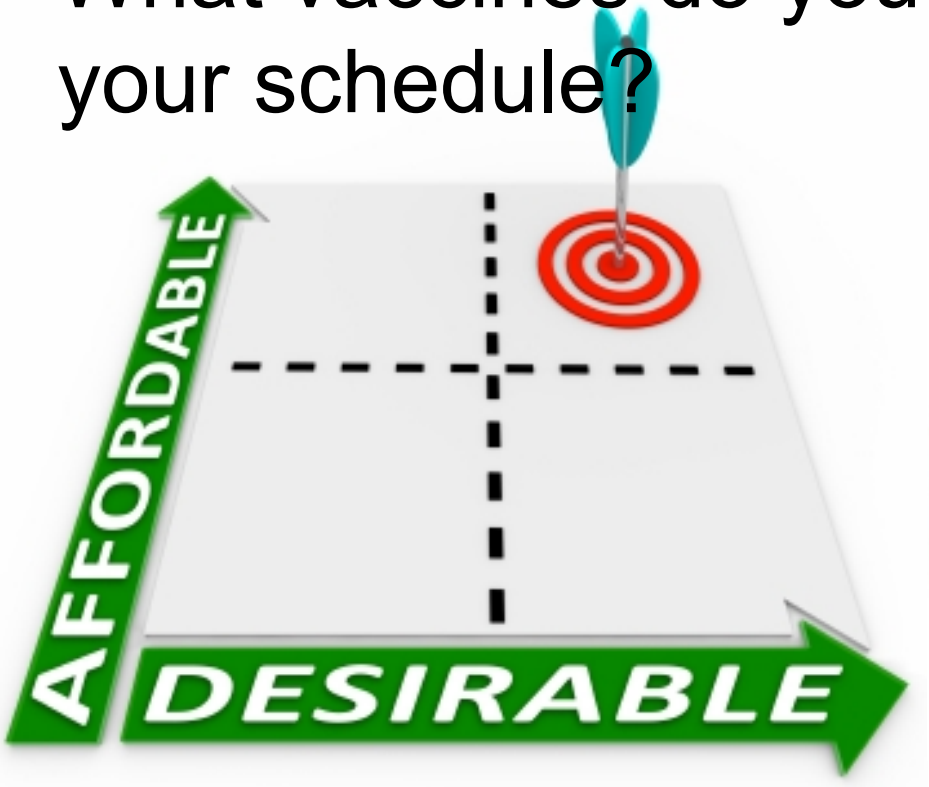
http://www.who.int/immunization/policy/immunization_tables/en/

Vaccines available for children in developed countries

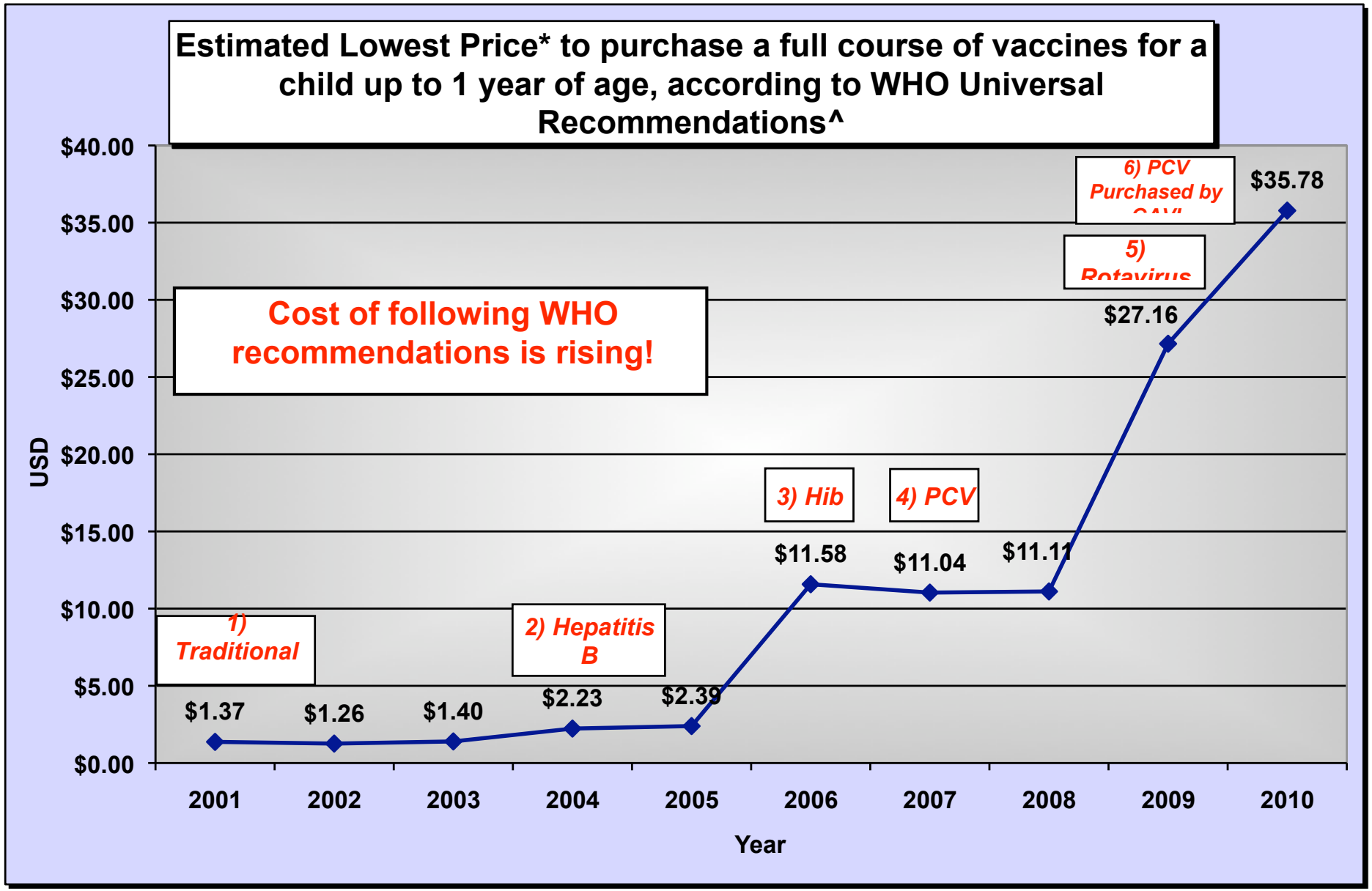




What vaccines do you include in your schedule?



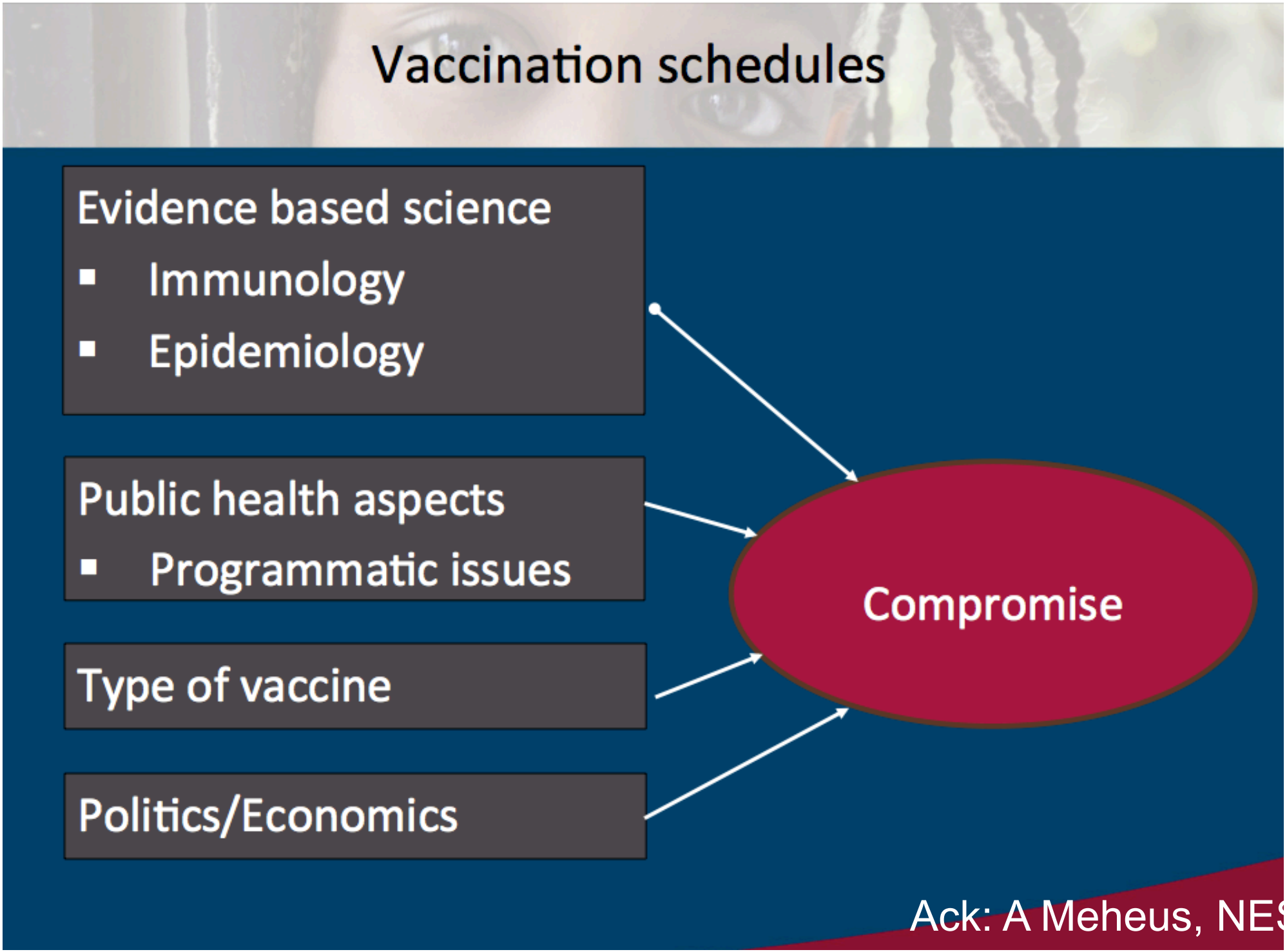
GAVI ALLIANCE


Estimated Lowest Price* to purchase a full course of vaccines for a child up to 1 year of age, according to WHO Universal Recommendations^
Cost of following WHO recommendations is rising!
1) Traditional
2) Hepatitis B
3) Hib
4) PCV
5) Rotavirus
6) PCV Purchased by
$1.37
$1.26
$1.40
$2.23
$2.39
$11.58
$11.04
$11.11
$27.16
$35.78
$0.00
$5.00
$10.00
$15.00
$20.00
$25.00
$30.00
$35.00
$40.00
USD
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Year

Vaccine costs for SA

• BCG	R4
• OPV	R2
• Measles	R8
• Hep B	R16
• Hib / DTP/IPV	R408
• Rota	R160
• Pneumo	R510
• HPV	R700
• TOTAL	R1808

Vaccination schedules



Ack: A Meheus, NES

Vaccination schedules

Age of vaccination depends on:

- Risk of disease
- Risk of complication
- Maturity of the immune system
- Potential interference by passive maternal antibodies

→ Vaccines are usually recommended for the youngest age group at risk for experiencing the disease for whom efficacy and safety have been demonstrated.

Plotkin, Orenstein & Offit. Vaccines. 5th edition

Ack: A Meheus, NES

Spacing of multiple doses of the same vaccine

- Some vaccines may induce a protective antibody response after one dose. Most vaccines require administration of multiple doses in a primary series to develop immunity. Periodic revaccination may be necessary to maintain immunity.
- Intervals longer than recommended between doses do not impair the immunological response to vaccines that require more than one dose (immunological memory).
- Interruption of a recommended primary series does not require re-starting of the entire schedule.

Plotkin, Orenstein & Offit. Vaccines. 5th edition

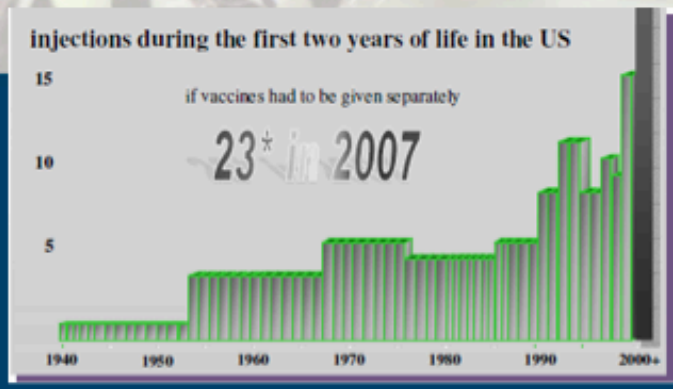
Factors that may influence seroprotection rates following vaccination

- Age – elderly and very young / premature infants
- Immune deficiency - HIV
- Genetic factors
- Dose of vaccine
- Nutritional status – malnourished / vitamin A deficient
- Route of administration – id vs im

Basic primary schedule – DTP based

- GAVI countries have the WHO EPI schedule in place: 6,10,14 weeks
- Latin America schedules are usually 2,4,6 Months of age
- Schedules vary from country to country
  - 2,3,4 months of age
  - 3,4,5 months of age
  - 3,5,12 months of age
  - 3, 4.5, 6 months of age …..

Advantages of combination vaccines



- For immunisation system
  - Cost reduction
    - *Eliminate separate vials, packaging, labeling*
    - *Eliminate cold chain storage expansion*
    - *Eliminate additional needles and syringes*
  - Simplified logistics and delivery infrastructure
    - *Delivery, central storage, and administration*
    - *Simplified vaccine handling and inoculation*
    - *Better coverage with fewer inoculations*
    - *Simplified record keeping and surveillance*
    - *Increase compliance and increased acceptance*
- For community
  - Less injections, therefore better acceptability
  - Fewer clinic visits, therefore more convenient
  - Less side effects, therefore more compliance

Rotavirus vaccines schedule – until April 2012

Rotarix®

- 2 Doses; oral administration
- The first dose of the vaccine should be administered during the period of 6 weeks to 15 weeks of age.
- The maximum age for administering the last dose of the vaccine is recommended to be at 32 weeks of age (24 weeks according to package insert).
- Recommended schedule: 6-10 weeks
- No boosters!

Rotateq®

- 3 Doses; oral administration
- The first dose of the vaccine should be administered during the period of 6 weeks to 15 weeks of age.
- The maximum age for administering the last dose of the vaccine is recommended to be at 32 weeks of age.
- Recommended schedule: 6-10-14 weeks
- No boosters!

WER 2009; 84: 533-540

WHO SAGE in April 2012 continued to advocate for early vaccination, but removed the strict age restrictions of RV vaccine doses. WER 2012; 87: 212-3.

PCV schedule

Optimal schedules: WHO recommendations

- PCV vaccines
  - 7-valent: 4, 6B, 9V, 14, 18C, 19F, 23F
  - **10-valent**: 1, 4, 5, 6B, 7F, 9V, 14, 18C, 19F, 23F
  - **13-valent**: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F
- **3p + 0**: 3 primary doses at 6, 10, 14 weeks or 2, 4, 6 months
- 3p + 1: 3 primary doses at 6, 10, 14 weeks or 2, 4, 6 months plus a booster dose at 1-2 years of age
- 2p + 1: alternative schedule of 2 doses, with the third dose between 9 and 15 months

Scott P. et al. Vaccine 2011; 29: 9711-9721
WHO position paper. WER 2012; 87: 129-144

(updated: 30 May 2014)

Table 1: Summary of WHO Position Papers - Recommendations for Routine Immunization

Antigen		Children (see Table 2 for details)		Adolescents	Adults	Considerations (see footnotes for details)
Recommendations for all						
BCG[1]		1 dose				Exceptions HIV
Hepatitis B[2]		3-4-doses (see footnote for schedule options)		3 doses (for high-risk groups if not previously immunized) (see footnote)		Birth dose Premature and low birth weight Co-administration and combination vaccine Definition high-risk
Polio[3]		3-4 doses (at least one dose of IPV) with DTP				OPV birth dose Type of vaccine Transmission and importation risk criteria
DTP[4]		3 doses	Booster (DTP) 1-6 years of age	Booster (Td) (see footnote)	Booster (Td) in early adulthood or pregnancy	Delayed/interrupted schedule Combination vaccine
***Haemophilus influenzae* type b[5]**	**Option 1**	3 doses, with DTP				Single dose if ≥ 12 months of age Not recommended for children > 5 yrs old Delayed/interrupted schedule Co-administration and combination vaccine
	Option 2	2 or 3 doses, with booster at least 6 months after last dose				
Pneumococcal (Conjugate)[6]	**Option 1**	3 doses, with DTP				Vaccine options Initiate before 6 months of age Co-administration HIV+ and preterm neonates booster
	Option 2	2 doses before 6 months of age, plus booster dose at 9-15 months of age				
Rotavirus[7]		Rotarix: 2 doses with DTP RotaTeq: 3 doses with DTP				Vaccine options Not recommended if > 24 months old
Measles[8]		2 doses				Combination vaccine; HIV early vaccination; Pregnancy
Rubella[9]		1 dose (see footnote)		1 dose (adolescent girls and/or child bearing aged women if not previously vaccinated; see footnote)		Achieve and sustain 80% coverage Combination vaccine and Co-administration Pregnancy
HPV[10]				2 doses (girls)		Target 9-13 year old girls Pregnancy Older age groups ≥ 15 years HIV and immunocompromised

Refer to http://www.who.int/immunization/documents/positionpapers/ for most recent version of this table and position papers.

This table summarizes the WHO child vaccination recommendations. It is designed to assist the development of country specific schedules and is not intended for direct use by health care workers. Country specific schedules should be based on local epidemiologic, programmatic, resource and policy considerations.

While vaccines are universally recommended, some children may have contraindications to particular vaccines.

(updated: 30 May 2014)

Table 1: Summary of WHO Position Papers - Recommendations for Routine Immunization

Antigen		Children (see Table 2 for details)	Adolescents	Adults	Considerations (see footnotes for details)
Recommendations for certain regions					
Japanese Encephalitis[11]		*Live attenuated vaccine*: 1 dose Booster after 1 year *Mouse brain-derived vaccine*: 2 doses Booster after 1 year then every 3 years	*Mouse brain-derived vaccine*: booster every 3 years up to 10-15 years of age		Vaccine options
Yellow Fever[12]		1 dose, with measles containing vaccine			
Tick-Borne Encephalitis[13]		3 doses (> 1 yr FSME-Immun and Encepur; > 3 yrs TBE-Moscow and EnceVir) with at least 1 booster dose (every 3 years for TBE-Moscow and EnceVir)			Definition of high-risk Vaccine options; Timing of booster
Recommendations for some high-risk populations					
Typhoid[14]		*Vi polysaccharide vaccine*: 1 dose; *Ty21a live oral vaccine*: 3-4 doses (see footnote). Booster dose 3-7 years after primary series			Definition of high-risk Vaccine options
Cholera[15]		*Dukoral (WC-rBS)*: 3 doses ≥ 2-5 yrs, booster every 6 months; 2 doses adults/children > 6 yrs, booster every 2nd year; *Shanchol & mORCVAX*: 2 doses ≥1 yrs, booster dose after 2 yrs			Minimum age Definition of high-risk
Meningococcal[16]	**MenA conjugate**	1 dose (1-29 years)			Definition of high-risk; Vaccine options
	MenC conjugate	2 doses (2-11 months) with booster 1 year after 1 dose (≥12 months)			
	Quadrivalent conjugate	2 doses (9-23 months) 1 dose (≥2 years)			
Hepatitis A[17]		At least 1 dose ≥ 1 year of age			Level of endemicity; Vaccine options; Definition of high risk groups
Rabies[18]		3 doses			Definition of high-risk; Booster
Recommendations for immunization programmes with certain characteristics					
Mumps[19]		2 doses, with measles containing vaccine			Coverage criteria > 80% Combination vaccine
Influenza (inactivated)[20]		First vaccine use: 2 doses Revaccinate annually: 1 dose only (see footnote)	1 dose from 9 yrs of age. Revaccinate annually (see footnote)		Priority targets Definition of high-risk Lower dosage for children

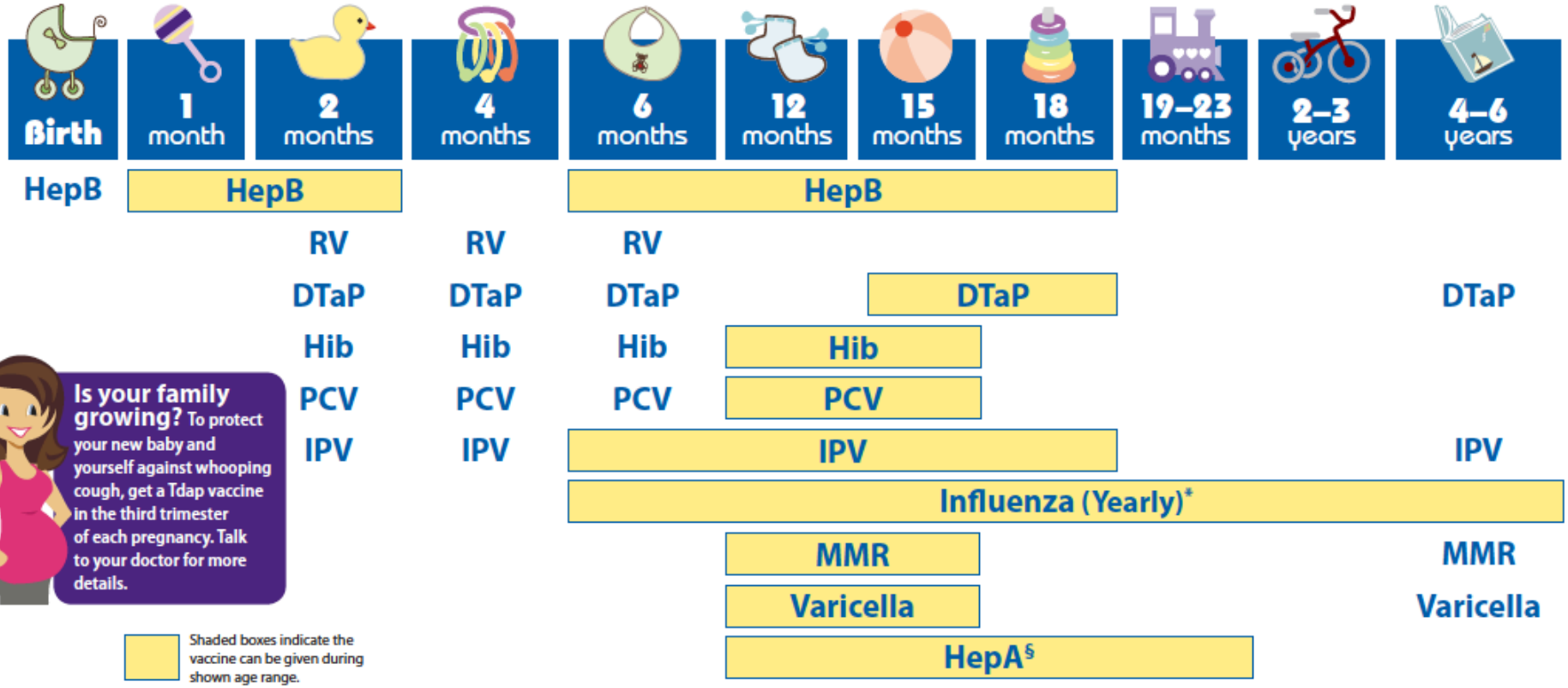
Basic EPI schedule

- Birth: BCG, HBV, OPV
- 6, 10, 14 wks: DTP/Hib/HBV, OPV
  (include 1 dose of IPV after 14 weeks)
- 9months: Measles, YF
- 18 months: Measles
- Pregnant women: TT

BCG
Polio
Diphtheria
Tetanus
Pertussis
Hep B
Measles
Rota
Pneumo
HPV

Change

2014 Recommended Immunizations for Children from Birth Through 6 Years Old



NOTE: If your child misses a shot, you don't need to start over, just go back to your child's doctor for the next shot. Talk with your child's doctor if you have questions about vaccines.

FOOTNOTES:

* Two doses given at least four weeks apart are recommended for children aged 6 months through 8 years of age who are getting a flu vaccine for the first time and for some other children in this age group.

§ Two doses of HepA vaccine are needed for lasting protection. The first dose of HepA vaccine should be given between 12 months and 23 months of age. The second dose should be given 6 to 18 months later. HepA vaccination may be given to any child 12 months and older to protect against HepA. Children and adolescents who did not receive the HepA vaccine and are at high-risk, should be vaccinated against HepA.

If your child has any medical conditions that put him at risk for infection or is traveling outside the United States, talk to your child's doctor about additional vaccines that he may need.

For more information, call toll free
1-800-CDC-INFO (1-800-232-4636)
or visit
http://www.cdc.gov/vaccines

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

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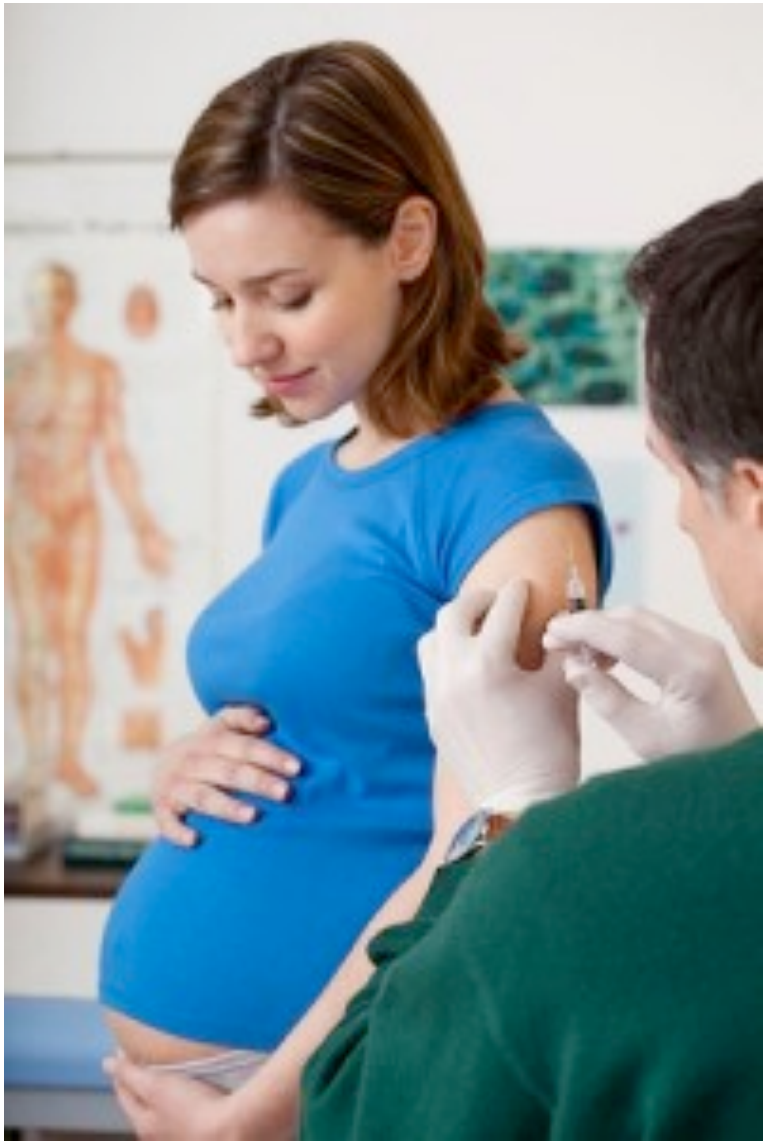
American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™

Global Immunisation Vision and Strategy (GIVS)

Four strategic areas

1. Protecting more people
   → **Expand immunisation beyond infancy to older age groups**
2. Introducing new vaccines and technologies
3. Integration with other interventions in health system context
4. Global interdependence



Vaccination of pregnant women: tetanus

Pregnant women with no previous immunization (or unreliable immunization information) – Femmes enceintes n'ayant jamais été vaccinées (ou dont la vaccination est douteuse)	dT	dT	dT	dT	dT
	As early as possible in first pregnancy – Dès que possible au cours de la première grossesse	At least 4 weeks later – Au moins 4 semaines plus tard	At least 6 months later, or in next pregnancy – Au moins 6 mois plus tard ou au cours de la grossesse suivante	At least 1 year later, or in next pregnancy – Au moins 1 an plus tard ou au cours de la grossesse suivante	At least 1 year later, or in next pregnancy – Au moins 1 an plus tard ou au cours de la grossesse suivante
Pregnant women with 3 childhood DTP doses – Femmes enceintes ayant reçu 3 doses de DTC durant l'enfance	dT	dT	dT		
	As early as possible in first pregnancy – Dès que possible au cours de la première grossesse	At least 4 weeks later – Au moins 4 semaines plus tard	At least 1 year later – Au moins 1 an plus tard		

WHO position paper on Tetanus vaccine

World Health Organization

Organisation mondiale de la Santé

Weekly epidemiological record
Relevé épidémiologique hebdomadaire

23 NOVEMBER 2012, 87th YEAR / 23 NOVEMBRE 2012, 87e ANNÉE
No. 47, **2012**, **87**, 461–476
http://www.who.int/wer

Contents

Vaccines against influenza WHO position paper – November 2012

Note de synthèse de l'OMS concernant les vaccins antigrippaux – novembre 2012

Pregnant women should be vaccinated with TIV at any stage of pregnancy. This recommendation is based on evidence of a substantial risk of severe disease in this group and evidence that seasonal influenza vaccine is safe throughout pregnancy and effective in preventing influenza in the women as well as in their young infants, in whom the disease burden is also high. Additional considerations for targeting pregnant women include the operational feasibility, given existing mechanisms for delivering tetanus toxoid vaccine to pregnant women in low- and middle-income countries and the opportunity to strengthen maternal immunization programmes.

Tdap for Pregnant Women: Information for Providers

For Healthcare Professionals

On this Page

Pregnant women should receive a dose of Tdap during each pregnancy, ideally between 27 and 36 weeks gestation.

In October 2012, the Advisory Committee on Immunization Practices (ACIP) voted to recommend that healthcare personnel should administer a dose of Tdap during each pregnancy irrespective of the patient's prior history of receiving Tdap (or Td). To maximize the maternal antibody response and passive antibody transfer to the infant, optimal timing for Tdap administration is between 27 and 36 weeks gestation. This recommendation is supported by the American College of Obstetricians and Gynecologists (ACOG) and the American College of Nurse-Midwives [4 pages].

Effectiveness of maternal pertussis vaccination in England: an observational study

Gayatri Amirthalingam, Nick Andrews, Helen Campbell, Sonia Ribeiro, Edna Kara, Katherine Donegan, Norman K Fry, Elizabeth Miller, Mary Ramsay

Summary

Background In October, 2012, a pertussis vaccination programme for pregnant women was introduced in response to an outbreak across England. We aimed to assess the vaccine effectiveness and the overall effect of the vaccine programme in preventing pertussis in infants.

Methods We undertook an analysis of laboratory-confirmed cases and hospital admissions for pertussis in infants between Jan 1, 2008, and Sept 30, 2013, using data submitted to Public Health England as part of its enhanced surveillance of pertussis in England, to investigate the effect of the vaccination programme. We calculated vaccine effectiveness by comparing vaccination status for mothers in confirmed cases with estimates of vaccine coverage for the national population of pregnant women, based on data from the Clinical Practice Research Datalink.

Lancet 2014; 384: 1521–28

Published Online
July 16, 2014
http://dx.doi.org/10.1016/S0140-6736(14)60686-3

See Comment page 1484

Immunisation, Hepatitis and Blood Safety Department (G Amirthalingam MFPH, H Campbell MSc, S Ribeiro BA, E Kara MBBS,

Vaccine effectiveness was 90% (95% CI 82 to 95) when the analysis was restricted to cases in children younger than 2 months.

Timeliness of vaccinations

- Timely immunisation is crucial for direct protective effects during infancy and early childhood, when disease and mortality are highest.
- Other vaccines, such as the new oral rotavirus vaccines, are currently recommended to be given before a child reaches a certain age, because of potential safety concerns in older infants.

Lancet 2009

Timing of children's vaccinations in 45 low-income and middle-income countries: an analysis of survey data

Andrea Bar-Zeev, Colin Sanderson

Summary

Background Vaccinations are often delayed until well after the recommended ages, leaving many children exposed for longer than they should be. We estimated vaccination coverage at different ages, and delays in administration, in 45 low-income and middle-income countries.

Methods We used data for 217 706 children from Demographic and Health Surveys between 1995 and 2005 (median 2002), which provided data for vaccination of children on the basis of events recorded on vaccination cards and interviews with mothers, with imputation of missing values and survival analysis. We devised an index combining coverage and delay.

Findings For vaccinated children, the median of the median delays in the 45 countries was 2·3 weeks (IQR 1·4–4·6) for bacille Calmette-Guérin (BCG); 2·4 weeks (1·2–3·3) for diphtheria, tetanus, and pertussis (DTP1); 2·7 weeks (1·7–3·1) for measles-containing vaccine (MCV1); and 6·2 weeks (3·5–8·5) for DTP3. However, in the 12 countries with the longest delays for each vaccination, at least 25% of the children vaccinated were more than 10 weeks late for BCG, 8 weeks for DTP1, 11 weeks for MCV1, and 19 weeks for DTP3. Variation within countries was substantial: the median of the IQRs in the 45 countries for delay in DTP3 was 10·9 weeks, 7·9 weeks for MCV1, 5·4 weeks for BCG, and 5·3 weeks for DTP1. The median of the national coverage rates for DTP1 increased from 57% in children aged 12 weeks to 86% at 12 months, and for DTP3 from 65% at 12 months to 76% at 3 years.

Lancet 2008; 371: 1969–79

Published Online March 20, 2008 DOI:10.1016/S0140-6736(08)60817-2

See Comment page 1909

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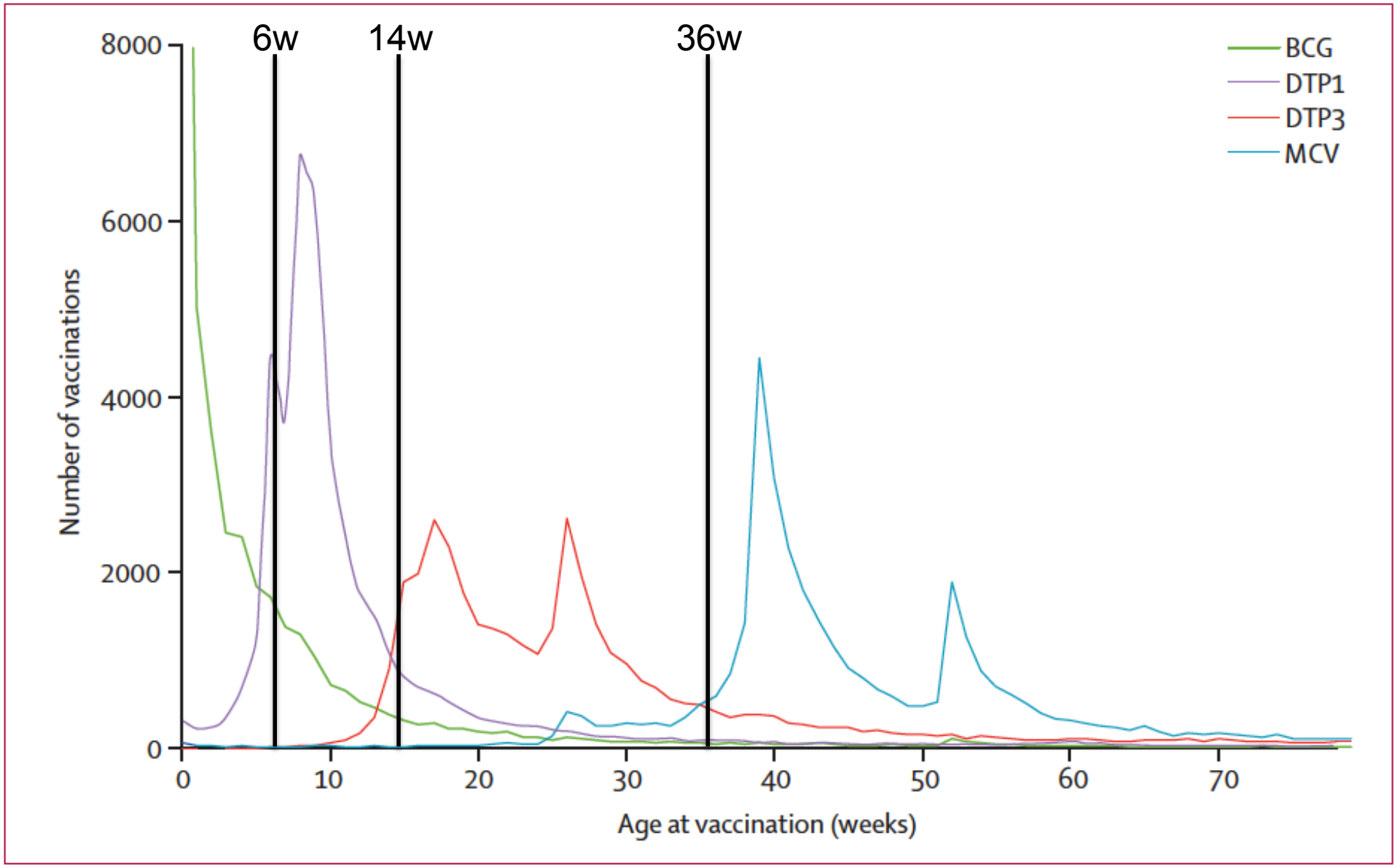


Figure 2: **Age distributions for administration of BCG, DTP1, DTP3, and MCV1 vaccines, based on card dates only in children aged 18–35·9 months**

BCG=bacille Calmette-Guérin. DTP=diphtheria, tetanus, and pertussis. MCV=measles-containing vaccine.

Hepatitis B

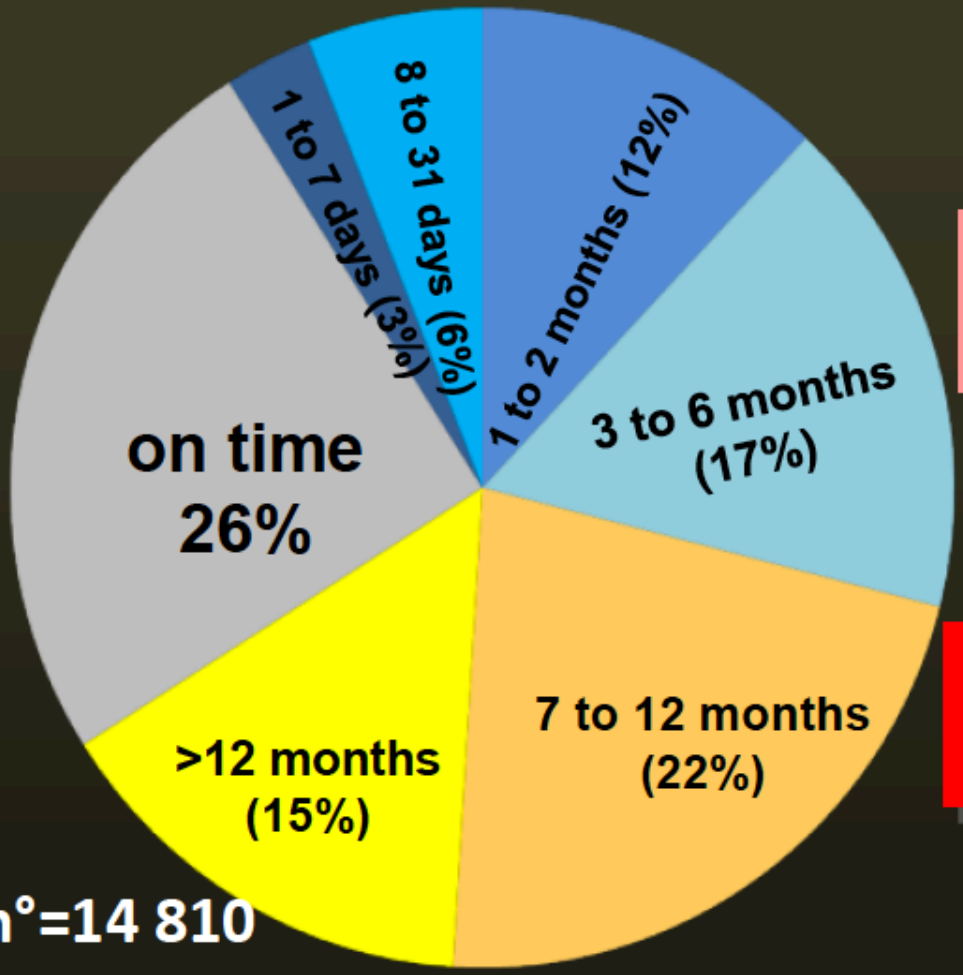
- The hepatitis B vaccine is recommended by WHO for universal implementation, and administration at the same time as BCG vaccine at or soon after birth.
- Yet the median time of administration of BCG was beyond 1 week of age in more than 75% of countries surveyed by Clark and Sanderson.

Pertussis

- The greatest burden of mortality due to pertussis is in the first 6 months of life and vaccine efficacy improves considerably with increasing doses.
- Their survey found median coverage of the first dose (scheduled at 6–8 weeks) was 57% by 12 weeks of age, rising to 80% by 5 months, and for the third dose (scheduled at 14 weeks), coverage was 27% and 65% by 5 and 12 months, respectively.

Few childhood vaccinations in the US are timely

Vaccines: DTaP, polio, MMR, Hib, HepB, varicella



delayed < 6months 37%

delayed ≥7 months 37%

n°=14 810
24 to 35 month-olds

1. Luman *et al*. *JAMA* 2005;293:1204–11

Vaccination of Premature infants

- The immune response to vaccination is a function of postnatal rather than gestational age. Transplacentally acquired maternal antibody is present in lower concentrations in prems and persists for shorter period.
- Infants born prematurely, regardless of birth weight, should be vaccinated at the same chronological age and according to the same schedule and precautions as full-term infants and children.
- Exception: HBV - Decreased seroconversion rates might occur among certain preterm infants with birth weights of less than 2,000 g after administration of hepatitis B vaccine at birth. DON'T COUNT HBV1 DOSE.
- Several studies suggest that the incidence of adverse events after vaccination of preterm infants is the same as or lower than that of full-term infants vaccinated at the same chronological age.

Vaccination of ill infants

- Mild illness is not a contra-indication for vaccination.
- Postponing vaccination in children with minor febrile or afebrile illness constitutes a missed opportunity to protect a child from disease, can contribute to outbreaks of vaccine-preventable disease.
- Vaccination usually is deferred in persons who have moderate or severe illness.

Vaccine Schedules for South Africa for 2015

Compiled by Amayeza Info Services' Vaccine Helpline:

Age of child	EPI schedule (6-10-14 wks)	Private (6-10-14 wks)	Private (6-10-14 wks + HepB at Birth)	Age of child	Option 3 in Private (2-4-6 months)
At birth	OPV(0)	OPV(0)	OPV (0)	**At birth**	OPV(0)
	BCG	BCG	BCG		BCG
			HBV[1]		
6 weeks	OPV(1)	OPV(1)	OPV(1)	**2 months**	OPV(1)
	RV (1)	RV (1)	RV (1)		RV (1)
	PCV(1)	PCV(1)	PCV (1)		PCV (1)
	DTaP-IPV/Hib (1)[1] + HBV(1), **or** DTaP-IPV-Hib-HBV (1)[1]	DTaP-IPV-Hib-HBV (1)[2]	DTaP-IPV-Hib-HBV (1)[2] **or** DTaP-IPV-HBV/Hib (1)[2]		DTaP-IPV-Hib-HBV (1) **or** DTaP-IPV-HBV/Hib (1)
10 weeks		RV[3] (2)	RV[3] (2)	**3 or 4 months**	RV[3](2)
		PCV (2)	PCV (2)		PCV (2)
	DTaP-IPV/Hib (2) + HBV(2) **or** DTaP-IPV-Hib-HBV (2)	DTaP-IPV/Hib (2) + HBV (2) **or** DTaP-IPV-Hib-HBV (2)	DTaP-IPV-Hib-HBV (2) **or** DTaP-IPV-HBV/Hib (2)		DTaP-IPV-Hib-HBV(2) **or** DTaP-IPV-HBV/Hib (2)
14 weeks	RV (2)	RV[3] (2 or 3)	RV[3] (2 or 3)	**4 or 6 months**	RV[3] (2 or 3)
	PCV(2)	PCV (3)	PCV (3)		PCV (3)
	DTaP-IPV/Hib (3) + HBV(3) **or** DTaP-IPV-Hib-HBV (3)	DTaP-IPV/Hib (3) + HBV (3) **or** DTaP-IPV-Hib-HBV (3)	DTaP-IPV-Hib-HBV (3) **or** DTaP-IPV-HBV/Hib (3)		DTaP-IPV-Hib-HBV(3) **or** DTaP-IPV-HBV/Hib (3)
9 months	Measles (1)	Measles (1)	Measles (1)	**9 months**	Measles (1)
	PCV(3)	MCV (1	MCV (1)		MCV (1)

http://www.amayeza-info.co.za/wp-content/uploads/2011/08/2015-Newschedule-products-final-15102014.pdf

12-15 months		PCV (4)[4]	PCV (4)[4]	**12-15 months**	PCV (4)[4]
		MMR (1)	MMR (1)		MMR (1)
		Varicella[5] (1)	Varicella[5] (1)		Varicella[5] (1)
		Hepatitis A (repeat 6 months later)	Hepatitis A (repeat 6 months later)		Hepatitis A (repeat 6 months later)
		MCV (2)	MCV (2)		MCV (2)
18 months	DTaP-IPV/Hib (4) **or** DTaP-IPV-Hib-HBV (4)	DTaP-IPV/Hib (4) **or** DTaP-IPV-Hib-HBV (4) **or** DTaP-IPV-HBV/Hib (4)	DTaP-IPV/Hib or DTaP-IPV-Hib-HBV (4) or DTaP-IPV-HBV/Hib (4)	**18 months**	DTaP-IPV/Hib or DTaP-IPV-Hib-HBV (3) or DTaP-IPV-HBV/Hib (3)
	Measles (2)				
5-6 years	Td vaccine (**6 years**)	DTaP **or** Tdap -IPV	DTaP **or** Tdap-IPV	**5-6 years**	DTaP **or** Tdap-IPV
		MMR (2)	MMR (2)		MMR (2)
		Varicella (2)	Varicella (2)		Varicella (2)
9 years	HPV[6]	HPV[7] (from 9 years)	HPV7[8] (from 9 years)	**9 years**	HPV[7](from 9 years)
12 years	Td vaccine	Tdap-IPV [8]	Tdap-IPV [8]	**12 years**	Tdap-IPV [8]

References for vaccine schedule:

A. Expanded programme of immunisation (EPI) (From April 2009)
B. Package inserts: Infanrix-Hexa, Hexaxim, Prevenar, Varilrix, Gardasil, Cervarix, Adacel quadra, Synflorix, Boostrix Tetra, Priorix Tetra, Trimovax, Priorix, Pentaxim, Rotateq, Rotarix, Menactra.
C. Personal communication with GSK (Upper age limit of Infanrix-Hexa®)
D. CDC pink book http://www.cdc.gov/vaccines/Pubs/pinkbook/pink-chapters.htm

Vaccine Schedules for South Africa for 2015

General:
(0) Birth dose which doesn't count as part of primary series
(1) First dose in a series
(2) Second dose in a series
(3) Third dose in a series
(4) Fourth dose - a booster

Abbreviations:

- **OPV:** Oral polio vaccine,
- **BCG:** Bacille Calmette Guerin vaccine,
- **HBV:** Hepatitis B vaccine,
- **RV:** Rotavirus vaccine
- **Td vaccine:** Tetanus & reduced amount of diphtheria vaccine
- **Tdap-IPV:** (Quadrivalent): Tetanus & reduced amounts of diphtheria and acellular pertussis with inactivated polio vaccine
- **DTaP:** Diphtheria, tetanus and acellular pertussis vaccine
- **DTaP-IPV/Hib:** (Pentavalent): Diphtheria, tetanus, acellular pertussis / inactivated polio & *haemophilus influenzae* type b vaccine
- **DTaP-IPV-Hib-HBV:** (Hexavalent): Diphtheria, tetanus, acellular pertussis / inactivated polio / *haemophilus influenzae* type b and hepatitis B vaccine, fully liquid.
- **DTaP-IPV-HBV/Hib:** (Hexavalent): Diphtheria, tetanus, acellular pertussis / inactivated polio / *haemophilus influenzae* type b and hepatitis B vaccine, requiring constitution
- **HPV:** Human papillomavirus vaccine
- **MCV:** Meningococcal (Groups A, C, W and Y) polysaccharide diphtheria toxoid conjugate vaccine
- **MMR:** Measles, mumps and rubella vaccine
- **PCV:** Pneumococcal conjugated vaccine

Referenced notes (superscripts)

1. The pentavalent vaccine (Pentaxim®) is going to be phased out.
2. If the hexavalent vaccine -Infanrix-hexa® is given according to the EPI schedule (6, 10 and 14 weeks), then a birth dose of HBV is required. However, if Hexaxim® is used according to the EPI schedule, a birth dose of HBV is NOT required.
3. If pentavalent rotavirus vaccine is used, then 3 doses are required, 6, 10 and 14 weeks. If monovalent vaccine is used, only 2 doses are given – 6 and 14 weeks
4. When Synflorix® is used, the 4th dose can be given from 9.5 months provided it has been 6 months since the last dose.
5. Chickenpox vaccine can be given any time from 9 months of age, but is probably most effective if given over the age of 12 months. If not given on the sam day as measles vaccines, must then be separated by at least one month.
6. HPV – bivalent vaccine for girls only. 2 doses six months apart. From March 2014 given to grade 4 girls in public schools only as the start of the programm
7. HPV - quadrivalent vaccine – for boys and girls. Course consists of 2 doses, six months apart for children 9 -13 years of age or 3 doses – 0, 2 and 6 months for older adolescents. Bivalent vaccine – for girls only. Course consists of 2 doses, six months apart for girls 9 -14 years of age or 3 doses – 0, 1 and 6 months for older girls.
8. If not given at six years, as products are currently only licensed as a single dose

TRADE NAMES

ANTIGEN	TRADE NAME	AGE GROUP
BCG	BCG®	Usually at birth only but in certain cases up to 1 year
CHICKENPOX	VARILRIX®	9 months and older
DTaP	INFANRIX®	6 weeks to 7th birthday (not usually used for < 2 years of age
DTaP-IPV-HBV/Hib DTaP-IPV-Hib-HBV	INFANRIX-HEXA® HEXAXIM®	Children 8 weeks to 2 years 6 weeks to 5 years
DTaP-IPV/Hib	PENTAXIM®	Children 6 weeks to 2 years. **This product will be phased out in 2015**
HEPATITIS A	AVAXIM 80® or HAVRIX JUNIOR®	1 – 15 years
HEPATITIS B (HBV)	HEBERBIOVAC®, EUVAX® or ENGERIX-B®	0-adulthood (dose according to age)
HPV	GARDASIL® (quadrivalent) or CERVARIX® (bivalent)	Gardasil ages 9-45 years (girls and women) Gardasil ages 9-26 years (boys and men) Cervarix 9 years and older
MCV (A,C,W,Y)	MENACTRA®	9 months – 23 months; 2 doses 3 months apart. ≥ 2years – 55 years – a single dose
MEASLES	ROUVAX®	9 months and older
MEASLES, MUMPS, RUBELLA (MMR)	TRIMOVAX® or PRIORIX®	1 year - adulthood
OPV	OPV-MERIEUX® or POLIORAL®	0-Adulthood (not generally recommended in adulthood due to VAPP – vaccine associated paralytic polio)
PNEUMOCOCCAL (PCV)	PREVENAR-13® SYNFLORIX®	Children 6 weeks to 5 years Children 6 weeks to 5 years
ROTAVIRUS (RV)	ROTARIX® ROTATEQ®	First dose from 6 weeks, second before 24 weeks First dose from 6 weeks of age and by 12 weeks, last dose before 32 weeks
Td	DIFTAVAX®	6 years and older
Tdap-IPV	ADACEL QUADRA® BOOSTRIX TETRA®	from 3 Years of age from 4 years of age

Other paediatric vaccines available, for use in certain situations.

- Hiberix® (Hib - *Haemophilus influenzae* type b): Used up to 5 years of age.
- Infanrix® (DTaP- Diphtheria, tetanus, acellular pertussis): can be used up to 7 years of age
- Menactra® (Conjugated meningococcal vaccine) : individuals from 2 to 55 years of age can receive a single dose of the vaccine
- Twinrix® (Hepatitis A + hepatitis B)

For more information call 0860 160 160

Conclusion

- Immunisation is an evolving science
- Vaccination schedules are not set in stone.
- Given the differences in epidemiology, health infrastructure and resources, it will be difficult to develop a single immunisation schedule for all countries.
- Optimising schedules for new vaccines could reduce cost and streamline their integration with other vaccines.
- WHO has recommended vaccination schedules; they are very useful, particularly in low- and middle-income countries.