Methods of immunization

active:

•natural - during infection

•vaccination - e.g. tetanus toxoid

passive:

•natural - maternal IgG

•passive immunization - tetanus antitoxin

Antigenic preparations in vaccines

•Live, attenuated microbe *e.g. M. bovis (BCG)*

•Killed/inactivated microbe *e.g. Salmonella typhi*

•Toxoid (inactivated toxin) *e.g. Clostridium tetani*

•Subunit vaccines

- surface antigens *e.g. hepatitis B virus*

- capsular polysaccharide *e.g. Haemophilus influenzae*

Live attenuated vaccine	**Non-live vaccine types**
Mimics natural infection	Single dose – single antigenic stimulus
Single dose is sufficient	Multiple doses + booster stimulations
Low infectious doses required, it will replicate in the body it can spread to other persons	High amount of antigen required
risk of virulent reversion	infectious safety
Storage conditions are critical	Less specific and cheaper storage
Apply at the natural portal of entry	Parenteral adminstration
Elicits complete immunity (sIgA, cell mediated immunity)	Elicits only serum IgG antibodies

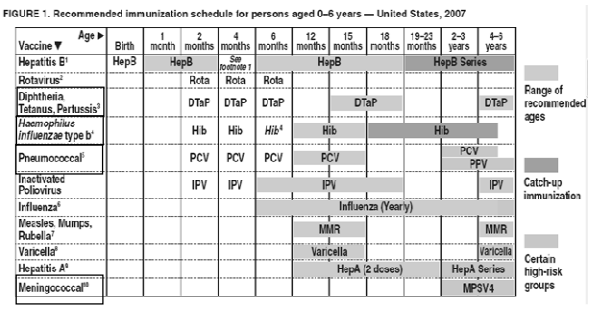


FIGURE 1. Recommended immunization schedule for persons aged 0–6 years — United States, 2007

Vaccine ▼ / Age ▶	Birth	1 month	2 months	4 months	6 months	12 months	15 months	18 months	19–23 months	2–3 years	4–5 years
Hepatitis B[1]	HepB	HepB		See footnote 1	HepB					HepB Series	
Rotavirus[2]			Rota	Rota	Rota						
Diphtheria, Tetanus, Pertussis[3]			DTaP	DTaP	DTaP		DTaP				DTaP
Haemophilus influenzae type b[4]			Hib	Hib	*Hib*[4]	Hib		Hib			
Pneumococcal[5]			PCV	PCV	PCV	PCV				PCV	PCV
Inactivated Poliovirus			IPV	IPV		IPV					IPV
Influenza[6]						Influenza (Yearly)					
Measles, Mumps, Rubella[7]						MMR					MMR
Varicella[8]						Varicella					Varicella
Hepatitis A[9]						HepA (2 doses)					HepA Series
Meningococcal[10]											MPSV4

Range of recommended ages

Catch-up immunization

Certain high-risk groups

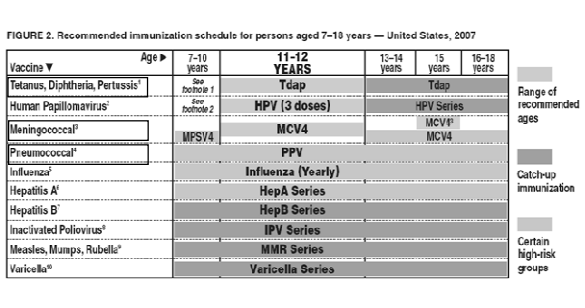


FIGURE 2. Recommended immunization schedule for persons aged 7–18 years — United States, 2007

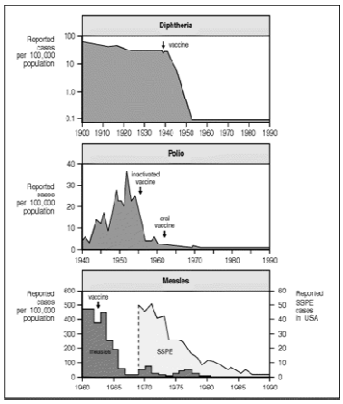
Vaccine ▼ / Age ▶	7–10 years	11–12 YEARS	13–14 years	15 years	16–18 years
Tetanus, Diphtheria, Pertussis[1]	See footnote 1	Tdap	Tdap		
Human Papillomavirus[2]	See footnote 2	HPV (3 doses)	HPV Series		
Meningococcal[3]	MPSV4	MCV4	MCV4[3] MCV4		
Pneumococcal[4]		PPV			
Influenza[5]		Influenza (Yearly)			
Hepatitis A[6]		HepA Series			
Hepatitis B[7]		HepB Series			
Inactivated Poliovirus[8]		IPV Series			
Measles, Mumps, Rubella[9]		MMR Series			
Varicella[10]		Varicella Series			

Range of recommended ages

Catch-up immunization

Certain high-risk groups

Sikeres vakcinációs kampányok



Preventive effect of vaccines

- either
  infectious immunity (e.g. MMR):
  The microbial colonization & replication is prevented in the immunized host.
- or
  only the clinical disease is prevented, but the microbe can replicate in the host and spread between the hosts (e.g.diphteria toxoid)

Herd immunity

- In case of high level infectious immunity (>95%-98%), the non-immune members of the population are **virtually protected** due to lack of infectious source.
- see
  vaccination compliance,
  vaccination at increased infectious risk such as travel, certain occupations !

Methods of immunization

active:

- •natural - during infection
- •vaccination - e.g. tetanus toxoid

passive:

- •natural - maternal IgG
- •passive immunization - tetanus antitoxin

Passive immunization

- Immunoglobulin transfer
  origin : human or animal
- Specific immunglobulin preparations
  e.g. tetanus (TETIG)
  botulism, diphtheria
  hepatitis B virus
  tick-born encephalistis)
- Normal immunoglobulin (only human)
  e.g. hepatitis A virus (in endemic area)

Serum sickness

- Allergic reaction upon heterologous (animal) immunoglobulin preparation
- <u>Manifestation:</u>

1. Immediate (anaphylactic shock – animal/human)
2. Early (after 2-3 days, type III. hypersensitivity)
3. Late (after 10-12 days, type III. hypersensitivity)
4. Atopic serum sickness
   already after 1st application of the preparation
   type I. hypersensitivity