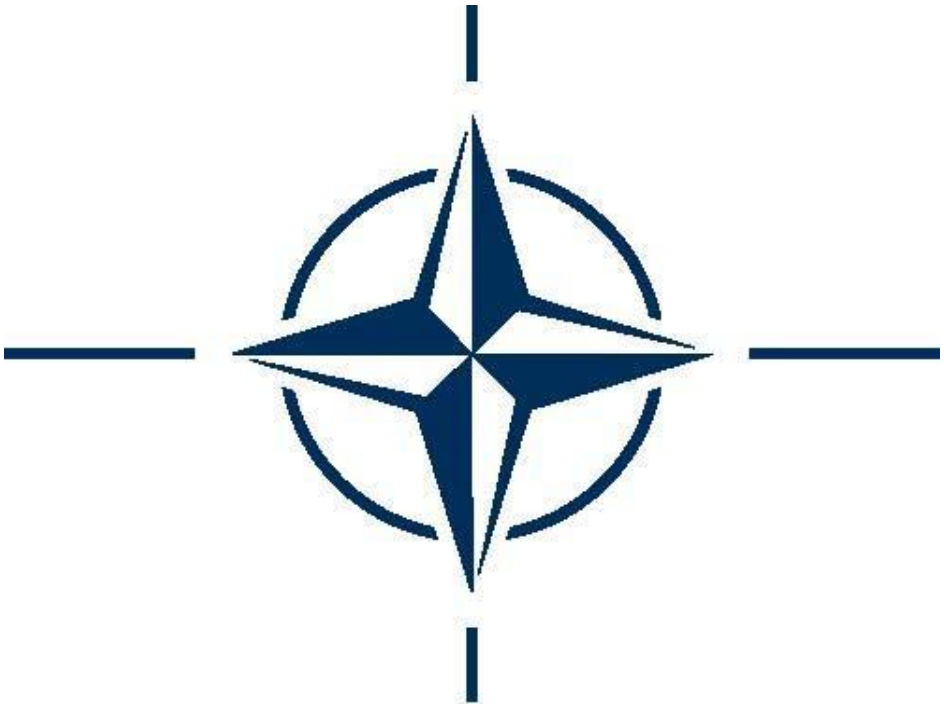
STANDARDS RELATED DOCUMENT

AJMedP-4-7

VACCINATIONS CATALOGUE WITHIN THE NATO & PfP FORCES

Edition A Version 1

JULY 2018



NORTH ATLANTIC TREATY ORGANIZATION

Published by the
NATO STANDARDIZATION OFFICE (NSO)

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

27 July 2018

1. The enclosed Standards Related Document, AJMedP-4-7, Edition A, Version 1, VACCINATIONS CATALOGUE WITHIN THE NATO & PfP FORCES, which has been approved in conjunction with AJMedP-4 by the nations in the Military Committee Medical Standardization Board, is promulgated herewith.

2. AJMedP-4-7, Edition A, Version 1 is effective upon receipt.

3.

4. This publication shall be handled in accordance with C-M(2002)60.

Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

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Content

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Chapter 1 - Introduction

Aim

This catalogue of vaccination policies provides a snapshot of the vaccination practices, regulations and policies in the NATO & PfP Forces. Within this document, the term "vaccination" is used to describe the use of biological preparations to improve the immunity of individuals against a particular infectious disease. Other terms in common parlance that may refer to this process include "immunisation", and "inoculation".

Ownership of the risk and the responsibility for vacciation policy rests with the nations, and is not a matter for standardisation within the Alliance. Notwithstanding, knowledge of the similarities and differences between the policies of nations sending personnel to multinational operations is useful to medical staffs. It may also be of interest to nations in the process of reviewing their current policies.

Therefore, to better reflect the role of the catalogue, it is now maintained as a Standards Related Document in support of AJMedP-4. It will be updated annually and replaces STANAG 2037, AMedP-23 which is to be cancelled having not been updated since 2012.

Disclaimer

The catalogue is not an authoritative statement of current vaccination policies; nor does it provide evidence to support recommendations for specific vaccination policy. The annual update cycle means that the information may not reflect changes in policy since the catalogue update.

For authoritative information about current policy, or where there is still uncertainty, please refer to the national point of contact.

Data Collection Method

The information contained within the catalogue is obtained via a standardized survey of nominated points of contact for each nation. The survey is issued in January for completion by March of the same year. The update is normally published in April each year.

Custodian

The custodian of the catalogue is the Deployment Health Surveillance Capability of NATO MILMED COE. Please email your comments and/or suggestions to **info.dhsc@coemed.org**

Classification

The information contained within the catalogue is Unclassified. It has been reproduced here with the kind permission of the nations.

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Chapter 2: Vaccinations Practices in NATO & PfP Forces

		AUT	BEL	BGR	CAN	CHE
Updated Data Catalogue		2018	2018		2018	
Adenovirus VIS						
Anthrax						
Cholera		M,S,T			T	
Dengue						
Diphteria		A	A,M,S,T		A	
Hepatitis A		A	M,S,T		A	
Hepatitis B		A	M,S,T,O		A	
HPV					A	
Influenza Seasonal		R	S,T,R,O		A	
Japanese Encephalitis		M,S,T	T		S,T	
Leptospirosis						
Measles		A	M,S,T		A	
Meningococcal Meningitis	A,C					
	B				O	
	C					
	A,C,Y,W-135	A	M,S,T		S,T	
Mumps		A	M,S,T		A	
Pertussis		A	A,M,S,T		A	
Pneumococcal Disesase		R	R		O	
Polio	live					
	inactived	A	M,S,T		A,M	
Rabies		M,S,T	M,S,T		T,O	
Rubella		A	M,S,T		A	
Smallpox						
Tetanus		A	A,M,S,T		A	
Tickborne Encephalitis		A	S,T		T	
Tuberculosis						
Typhoid	live					
	inactived	M,S,T	S,T		T	
Varicella		M,S,T,O			A	
Yellow Fever		M,S,T	M,S,T		S,T	

Codes:

A= **All** Personnel

M= All Deployable Personnel (personnel susceptible to be deployed on a (planned) **Mission**

S= Alert Forces (**Stand-by** with NTM < 2 months e.g. EUBG, NRF,...)

T= Personnel in areas at risk (e.g. **Travellers**,...)

R= **Recommended** / voluntary

O= **Occupations** at risk (e.g. Nurses,...)

		CZE	DEU	DNK	ESP	EST
Updated Data Catalogue			2018	2018	2018	
Adenovirus VIS						
Anthrax			O			
Cholera			T	S	T,R	
Dengue						
Diphteria			M,S,R	A,M,S	A,R	
Hepatitis A			M,S,T,O	A,M,S	M,R,O	
Hepatitis B			M,S,T,R,O	A,M,S	M,R,O	
HPV			R			
Influenza Seasonal			M,S,T,R,O		M,R,O	
Japanese Encephalitis			S,T	S	T,R	
Leptospirosis						
Measles			M,S,R	A,M	A,R	
Meningococcal Meningitis	A,C					
	B					
	C					
	A,C,Y,W-135		S,T	S	S,T,R	
Mumps			M,S,R		M,R	
Pertussis			M,S,R		M,R	
Pneumococcal Disesase						
Polio	live					
	inactived		M,S,T,R	M,S	M,R	
Rabies			S,T,O	S	T,R,O	
Rubella			M,S,R		A,R	
Smallpox					A,R	
Tetanus			M,S,R	A,M,S	A,R	
Tickborne Encephalitis			M,S,T,O	S	T,R	
Tuberculosis						
Typhoid	live					
	inactived		S,T	S	M,R	
Varicella						
Yellow Fever			S,T	S	T,R	

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O= **Occupations** at risk (e.g. Nurses,...)

		FRA	GBR	GRC	HUN	IRL
Updated Data Catalogue			2018			
Adenovirus VIS						
Anthrax			T			
Cholera			T			
Dengue						
Diphteria			A			
Hepatitis A			A			
Hepatitis B			A			
HPV						
Influenza Seasonal			T			
Japanese Encephalitis			T			
Leptospirosis						
Measles			A,O			
Meningococcal Meningitis	A,C					
	B					
	C					
	A,C,Y,W-135		A,S			
Mumps			A,O			
Pertussis			A			
Pneumococcal Disesase			T			
Polio	live					
	inactived					
Rabies			S,T			
Rubella			A,O			
Smallpox						
Tetanus			A			
Tickborne Encephalitis			T			
Tuberculosis			O			
Typhoid	live					
	inactived		S,T			
Varicella			O			
Yellow Fever			A			

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O= **Occupations** at risk (e.g. Nurses,...)

		ISL	ITA	LTU	LUX	LVA
Updated Data Catalogue				2018	2018	
Adenovirus VIS						
Anthrax						
Cholera					T	
Dengue					T	
Diphteria				A,M,S,O	A	
Hepatitis A				M,S	M	
Hepatitis B				M,S,O	M	
HPV						
Influenza Seasonal				A,O	R	
Japanese Encephalitis					T	
Leptospirosis					T,O	
Measles				M,S	M	
Meningococcal Meningitis	A,C					
	B			T		
	C					
	A,C,Y,W-135			M,T	M	
Mumps				M,S	M	
Pertussis					A	
Pneumococcal Disesase						
Polio	live					
	inactived			M,S	A	
Rabies				M,S	S	
Rubella				M,S	M	
Smallpox						
Tetanus				A,M,S,O	A	
Tickborne Encephalitis				A,O	M	
Tuberculosis						
Typhoid	live					
	inactived			M,S	M	
Varicella						
Yellow Fever				M	S	

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R= **Recommended** / voluntary

O= **Occupations** at risk (e.g. Nurses,...)

		NLD	NOR	POL	PRT	ROU
Updated Data Catalogue						
Adenovirus VIS						
Anthrax						
Cholera						
Dengue						
Diphteria						
Hepatitis A						
Hepatitis B						
HPV						
Influenza Seasonal						
Japanese Encephalitis						
Leptospirosis						
Measles						
Meningococcal Meningitis	A,C					
	B					
	C					
	A,C,Y,W-135					
Mumps						
Pertussis						
Pneumococcal Disesase						
Polio	live					
	inactived					
Rabies						
Rubella						
Smallpox						
Tetanus						
Tickborne Encephalitis						
Tuberculosis						
Typhoid	live					
	inactived					
Varicella						
Yellow Fever						

Codes:

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R= **Recommended** / voluntary

O= **Occupations** at risk (e.g. Nurses,...)

		SVK	SVN	SWE	TUR	USA
Updated Data Catalogue		2018				2016
Adenovirus VIS						
Anthrax						T
Cholera		T				T
Dengue						
Diphteria		A,M,S,T,O				A,M,S
Hepatitis A		A,M,S,T,O				S,R
Hepatitis B		A,M,S,T,O				S,R
HPV						R
Influenza Seasonal		M,S,T,O				A,S
Japanese Encephalitis		T				T
Leptospirosis						
Measles						A,M,S
Meningococcal Meningitis	A,C					A,M,S
	B					
	C					
	A,C,Y,W-135	A,M,S,T,O				A,M,S
Mumps						A,M,S
Pertussis		A,M,S,T,O				A,M,S
Pneumococcal Disesase						R
Polio	live					
	inactived	A,M,S,T				A,M,S
Rabies		T				O
Rubella						A,M,S
Smallpox						
Tetanus		A,M,S,T,O				A,M,S
Tickborne Encephalitis		A,M,S,T,O				O
Tuberculosis		R				T,O
Typhoid	live					
	inactived	M,S,T,O				M
Varicella						R
Yellow Fever		T				M

Codes:

A= **All** Personnel

M= All Deployable Personnel (personnel susceptible to be deployed on a (planned) **Mission**

S= Alert Forces (**Stand-by** with NTM < 2 months e.g. EUBG, NRF,...)

T= Personnel in areas at risk (e.g. **Travellers**,...)

R= **Recommended** / voluntary

O= **Occupations** at risk (e.g. Nurses,...)

Nations Comments		
1	**AUT**	No comment reported.
2	**BEL**	Belgian Scientific Study Group on Travel Medicine Last consensus was obtained during the "12th National seminar on Travel Medicine" which took place on 25th January 2018 in Brussels. "Belgian Military Guidelines" about vaccination will also be adapted following these consensus (release July 2018).
3	**BGR**	---
4	**CAN**	1.Anthrax and smallpox vaccines would be provided only in a the case of a deliberate release. However, we are re-examining the threshold to use BW vaccines based on threat assessments 2.Adenovirus, dengue, leptospirosis and tuberculosis vaccines are not offered. 3.Menincococcal B and pneumococcal vaccines are offered to personnel at higher risk for the disease.
5	**CHE**	---
6	**CZE**	---
7	**DEU**	Category T: All vaccinations that are justified by travel medical reasons*, as long as they are not part of public vaccination recommendation Category R: Vaccinations that are recommended in EVERY federal state within the federal republic of Germany Category O: Vaccinations that are justified by occupational health reasons, as long as they are not part of public vaccination recommendation (*Depending on perspective, a vaccination because of occupational health reasons can be justified by travel medical arguments as well)
8	**DNK**	Danish defence vaccination policy in general ads-on to the common civilian vaccination programme in Denmark. Row A: - Excempt from below are drafted personel from army and air force, which falls under the civilian health board vaccination policy. - Servicemen in specific areas in Denamrk will be TBE immunized as well. Row M: - Planned mission vaccinations depends on the AOR and are relevant add-ons to row A. As soon personel are pointed out they will be vaccinated accordingly. Row S: The alert forces vaccination policy depends on expected AOR. The actual vaccinations indicated in row M, are the one given to servicemen who can be expected to be globally operational. Row T, R and O: - Follows the policies depicted in row A and M.
9	**ESP**	Due to Spanish regulations vaccines are all recommended and cannot be compulsory, even to take part in an operation. In the event that somebody doesn´t give his/her consent to be vaccinated prior to deployment, it is the commander´s decision wether to take this person to the operation or not.
10	**EST**	---
11	**FRA**	---

Nations Comments		
12	**GBR**	1. All personnel and all deployable personnel are not differentiated in Lflt 7-1-1. 2. Stanby troops not differentiated in Lflt 7-1-1 BUT have highlighted by CDSG and FHPB as requiring the annotated vaccines. 3. Included Anthrax in the Personnel in areas of risk. 4. Smallpox included under occupational but it is only a defined (Technically “at risk”). 5. All vaccines are Recommended/Voluntary. 6. Vaccines recommended for "All personnel" are checked at recruitment and offered if there are any gaps in the vaccination history of the recruit. There may be personnel who joined before these vaccines became recommended for "All personnel". GBR does not systematically offer catch-up vaccination to these individuals unless there is an operational, travel, or occupational requirement.
13	**GRC**	---
14	**HUN**	---
15	**IRL**	---
16	**ISL**	---
17	**ITA**	---
18	**LTU**	Notes of vaccination in categories by codes: A: During extraordinarily situations all personnel get vaccination against Anthrax, Smallpox and etc. M: Deployable personnel vaccination depends on region of mission. T: Soldiers of compulsory military service (conscripts) get additional vaccination against Meningococcal B and A, C, Y, W-135 infections.
19	**LUX**	No comment.
20	**LVA**	---
21	**NLD**	---
22	**NOR**	---
23	**POL**	---
24	**PRT**	---
25	**ROU**	---
26	**SVK**	Head sanitarian of Ministry of Defence guidance is in line with STANAG 2037 (Ed.9,2012) AMedp - 23 and as well as with currend WHO guidance.
27	**SVN**	---
28	**SWE**	---
29	**TUR**	---
30	**USA**	---

National Guidelines References

AUT		No data
BEL	2018	Belgian Military Guidelines (release July 2018)
BGR		
CAN	2007	Immunization Standards for the Canadians Forces
CHE		
CZE		
DEU	2014	A-840/8 & A1/840/8-400
DNK	2017	Danish Defense Vaccination Policy
ESP	2018	ESP Technical Instruction 18 + STANAG 2037
EST		
FRA		
GBR	2018	JSP 950 Lflt 7-1-1
GRC		
HUN		
IRL		
ISL		
ITA		
LTU	2016	Order of the Minister of National Disease
LUX	2018	Internal SOP
LVA		
NLD		
NOR		
POL		
PRT		
ROU		
SVK	2008	Head sanitarian of Ministry of Defence guidance
SVN		
SWE		
TUR		
USA	2013	Immunizations and Chemoprophylaxis of Infections Diseases

Diseases Description and Vaccines

Sources: http://www.who.int/immunization/en/ - https://www.cdc.gov/ - http://www.phac-aspc.gc.ca

Adenovirus

Adenoviruses are common causes of respiratory illness, but most infections are not severe. They can cause cold-like symptoms, sore throat, bronchitis, pneumonia, diarrhea, and pink eye (conjunctivitis). You can get an adenovirus infection at any age, but infants and people with weakened immune systems are more likely than others to develop severe illness from adenoviruses...
There is currently no adenovirus vaccine available to the general public.
A vaccine against adenovirus types 4 and 7 was approved by the U.S. Food and Drug Administration in March 2011, for U.S. military personnel only.

Anthrax

Anthrax is a serious infectious disease caused by gram-positive, rod-shaped bacteria known as Bacillus anthracis. Although it is rare, people can get sick with anthrax if they come in contact with infected animals or contaminated animal products.
Anthrax can be found naturally in soil and commonly affects domestic and wild animals around the world. People can get sick with anthrax if they come in contact with infected animals or contaminated animal products. Contact with anthrax can cause severe illness in both humans and animals.
Anthrax is not contagious.
The type of illness a person develops depends on how anthrax enters the body. Typically, anthrax gets into the body through the skin, lungs, or gastrointestinal system. All types of anthrax can eventually spread throughout the body and cause death if they are not treated with antibiotics.
While there is a vaccine licensed to prevent anthrax, it is not typically available for the general public. Anthrax Vaccine Adsorbed (AVA) protects against cutaneous and inhalation anthrax, according to limited but well researched evidence. The vaccine is approved by the Food and Drug Administration (FDA) for at-risk adults before exposure to anthrax. The vaccine does not contain any anthrax bacteria and cannot give people anthrax.
Currently, FDA has not approved the vaccine for use after exposure for anyone. However, if there were ever an anthrax emergency, people who are exposed might be given anthrax vaccine to help prevent disease. This would be allowed under a special protocol for use of the vaccine in emergencies.

Cholera

Cholera is an acute intestinal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*. It is a disease of poverty, closely linked to poor sanitation and lack of clean drinking water. It has a short incubation period of a few hours to five days, and is characterized in the majority of cases by acute, profuse watery diarrhoea lasting from one to a few days. In its extreme form, cholera can be

rapidly fatal. The disease occurs in both endemic and epidemics patterns. Cholera incidence worldwide has increased steadily since 2005 with outbreaks affecting several continents. Further, its impact can be dramatic in areas where basic environmental infrastructures are disrupted or have been destroyed and provision of potable water and sanitation is challenging. As such acute humanitarian emergencies are a particular risk factor for cholera outbreaks. The annual burden of cholera has been estimated at 1.4 to 4.3 million cases and 28 000 to 142 000 deaths worldwide (2012).
Two types of oral cholera vaccines (OCVs) are currently recommended for use by WHO. The first, a monovalent vaccine based on formalin and heat-killed whole cells of *V. cholerae* O1 plus recombinant cholera toxin B subunit, provides short-term protection in all age groups evaluated at 4-6 months following vaccination. It also provides short-term protection against enterotoxigenic *E coli* (ETEC).
The second type is a bivalent vaccine based on V. *cholerae* serogroups O1 and O139 for which evidence of efficacy persisting over 5 years follow-up in children under five years of age at vaccination has been reported (2013).
WHO recommends cholera vaccination should be used in conjunction with other prevention and control strategies in endemic settings and in areas at risk for outbreaks. A global OCV stockpile has been created to increase access to OCVs in outbreak situations and in endemic settings.

Dengue

Dengue is a mosquito-borne flavivirus found in tropical and sub-tropical regions of the world, mostly in urban and semi-urban settings. Day-biting Aedes mosquitos spread disease. It is the fastest spreading vector-borne viral disease and is now endemic in over 100 countries, resulting in 40% of the world's population living in an area at risk for dengue. It is caused by one of four distinct serotypes (dengue 1-4). While the first infection with one of the four dengue serotypes is typically non-severe or asymptomatic, individuals who are subsequently exposed in later years to one of the other serotypes are more likely to develop severe dengue. Non-severe dengue illness often presents as flu-like illness, with symptoms included high fever, severe headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, swollen glands, or rash. Severe dengue, including dengue hemorrhagic fever or dengue shock syndrome, is characterized by severe abdominal pain, persistent vomiting, rapid breathing, bleeding gums, fatigue, restlessness, and blood in vomit, and may be fatal due to plasma leakage, fluid accumulation, respiratory distress, severe bleeding, or organ impairment. Although there is no specific treatment for dengue, case fatality rates can be below 1% with proper case management. In its absence, the case fatality rate can be has high at 20% in patients with severe dengue.
The first dengue vaccine, Dengvaxia (CYD-TDV) by Sanofi Pasteur, was first licensed in December, 2015, in Mexico. It has been registered for use in individuals 9-45 years of age living in endemic areas. CYD-TDV is a live recombinant tetravalent vaccine based on the yellow fever 17d backbone and is registered as a 3-dose vaccine given on a 0/6/12 month schedule. Several other vaccine candidates are in clinical or pre-clinical development.
WHO recommends prevention of dengue through vector control methods such as mosquito habitat removal and use of insecticides. WHO recommends that countries should consider introduction of the dengue vaccine CYD-TDV only in geographic

settings (national or subnational) where epidemiological data indicate a high burden of disease.
The development of a safe and effective dengue vaccine is a high priority and WHO supports this effort through technical guidance and advice.

Diphteria

Diphtheria is an infection caused by the bacterium Corynebacterium diphtheriae. Diphtheria causes a thick covering in the back of the throat. It can lead to difficulty breathing, heart failure, paralysis, and even death.
Diphtheria vaccines are based on diphtheria toxoid, a modified bacterial toxin that induces protective antitoxin antibodies of the IgG type. Toxin-producing C. diphtheriae is grown in liquid media and the toxin converted to the inactive toxoid by treatment with formalin. This toxoid is adsorbed to aluminium salt as an adjuvant and thiomersal added as a preservative for multi-dose vials. Diphtheria toxoid combined with tetanus and pertussis vaccines (DTP) has been part of the WHO Expanded Programme on Immunization (EPI) since its inception in 1974. A reduced dose formulation is generally administered to individuals over 7 years of age. Diphtheria toxoid is one of the safest vaccines available. Individuals with an anti-diphtheria toxin antibody level of more than 0.1 IU/mL are considered fully protected from disease. DTP-containing multi-antigen vaccines (with Hep B, Hib, or IPV) are increasingly being used in national immunization campaigns.

Hepatitis A

Hepatitis A is a liver infection caused by the Hepatitis A virus (HAV). Hepatitis A is highly contagious. It is usually transmitted by the fecal-oral route, either through person-to-person contact or consumption of contaminated food or water. Hepatitis A is a self-limited disease that does not result in chronic infection. More than 80% of adults with Hepatitis A have symptoms but the majority of children do not have symptoms or have an unrecognized infection. Antibodies produced in response to Hepatitis A last for life and protect against reinfection. The best way to prevent Hepatitis A is by getting vaccinated.
Hepatitis A occurs sporadically and in epidemics worldwide, with a tendency for cyclic recurrences. The hepatitis A virus is one of the most frequent causes of foodborne infection. Epidemics related to contaminated food or water can erupt explosively, such as the epidemic in Shanghai in 1988 that affected about 300 000 people[1]. Hepatitis A viruses persist in the environment and can withstand food-production processes routinely used to inactivate and/or control bacterial pathogens.
The disease can lead to significant economic and social consequences in communities. It can take weeks or months for people recovering from the illness to return to work, school, or daily life. The impact on food establishments identified with the virus, and local productivity in general, can be substantial.
Several injectable inactivated hepatitis A vaccines are available internationally. All are similar in terms of how well they protect people from the virus and their side-effects. No vaccine is licensed for children younger than 1 year of age. In China, a live oral vaccine is also available.

Hepatitis A-containing vaccines

- AVAXIM® (adult formulation) and AVAXIM®-Pediatric (paediatric formulation) (inactivated hepatitis A vaccine), Sanofi Pasteur SA (manufacturer), Sanofi Pasteur Ltd. (distributor) (HA)
- HAVRIX® 1440 (adult formulation) and HAVRIX® 720 Junior (paediatric formulation) (inactivated hepatitis A vaccine), GlaxoSmithKline Inc. (HA)
- TWINRIX® (adult formulation) and TWINRIX® Junior (paediatric formulation) (combined hepatitis A and hepatitis B [HB] vaccine), GlaxoSmithKline Inc. (HAHB)
- VAQTA® (inactivated hepatitis A vaccine), Merck Inc. (HA)
- ViVAXIM® (combined purified Vi polysaccharide typhoid and inactivated hepatitis A vaccine), Sanofi Pasteur Ltd. (distributor) (HA-Typh-I)

Hepatitis B

Hepatitis B is a liver infection caused by the Hepatitis B virus (HBV). Hepatitis B is transmitted when blood, semen, or another body fluid from a person infected with the Hepatitis B virus enters the body of someone who is not infected. This can happen through sexual contact; sharing needles, syringes, or other drug-injection equipment; or from mother to baby at birth. For some people, hepatitis B is an acute, or short-term, illness but for others, it can become a long-term, chronic infection. Risk for chronic infection is related to age at infection: approximately 90% of infected infants become chronically infected, compared with 2%–6% of adults. Chronic Hepatitis B can lead to serious health issues, like cirrhosis or liver cancer. The best way to prevent Hepatitis B is by getting vaccinated.

Hepatitis B-containing vaccines

- ENGERIX®-B (hepatitis B vaccine, recombinant), GlaxoSmithKline Inc. (HB)
- INFANRIX hexa™(adsorbed vaccine containing diphtheria and tetanus toxoids, acellular pertussis, hepatitis B [recombinant], inactivated poliomyelitis and conjugated *Haemophilus influenzae* type b vaccine), GlaxoSmithKline Inc. (DTaP-HB-IPV-Hib)
- RECOMBIVAX HB® (hepatitis B vaccine, recombinant), Merck Inc. (HB)
- TWINRIX® and TWINRIX®Junior (combined hepatitis A and hepatitis B vaccine), GlaxoSmithKline Inc. (HAHB)

Human Papillomavirus (HPV)

Human papillomavirus (HPV) causes cervical cancer, which is the fourth most common cancer in women, with an estimated 266,000 deaths and 528,000 new cases in 2012. A large majority (around 85%) of the global burden occurs in the less developed regions, where it accounts for almost 12% of all female cancers.

Although most infections with HPV cause no symptoms, persistent genital HPV infection can cause cervical cancer in women. Virtually all cervical cancer cases (99%) are linked to genital infection with HPV and it is the most common viral infection of the reproductive tract. HPV can also cause other types of anogenital cancer, head and neck cancers, and genital warts in both men and women. HPV infections are transmitted through sexual contact.

Two HPV vaccines are now being marketed in many countries throughout the world - a bivalent and a quadrivalent vaccine. Both vaccines are highly efficacious in preventing infection with virus types 16 and 18, which are together responsible for approximately 70% of cervical cancer cases globally. The vaccines are also highly efficacious in preventing precancerous cervical lesions caused by these virus types. The quadrivalent vaccine is also highly efficacious in preventing anogenital warts, a common genital disease which is virtually always caused by infection with HPV types 6 and 11. Data from clinical trials and initial post-marketing surveillance conducted in several continents show both vaccines to be safe.
The primary target group in most of the countries recommending HPV vaccination is young adolescent girls, aged 9-13. For both HPV vaccines, the vaccination schedule depends on the age of the vaccine recipient.

- *Females <15 years at the time of first dose:* a 2-dose schedule (0, 6 months) is recommended.
    - If the interval between doses is shorter than 5 months, then a third dose should be given at least 6 months after the first dose.
- *Females ≥15 years at the time of first dose:* a 3-dose schedule (0, 1-2, 6 months) is recommended.

Influenza (Seasonal)

Influenza is a viral infection that affects mainly the nose, throat, bronchi and, occasionally, lungs. Infection usually lasts for about a week, and is characterized by sudden onset of high fever, aching muscles, headache and severe malaise, non-productive cough, sore throat and rhinitis.
The virus is transmitted easily from person to person via droplets and small particles produced when infected people cough or sneeze. Influenza tends to spread rapidly in seasonal epidemics.
Most infected people recover within one to two weeks without requiring medical treatment. However, in the very young, the elderly, and those with other serious medical conditions, infection can lead to severe complications of the underlying condition, pneumonia and death.
Vaccination is the principal measure for preventing influenza and reducing its impact.
Since 1973, WHO has provided formal recommendation for the composition of influenza vaccines based on the information provided by the WHO Global Influenza Surveillance Network (GISN), now the WHO Global Influenza Surveillance and Response System. High yield candidate vaccine viruses are developed by collaboration of laboratories involved in developing reassortants and WHO Collaborating Centres (CCs). Once developed, these candidate reassortants are sent to WHO CCs for characterization of their antigenic and genetic properties before being released to interested institutions on request. Reference reagents are subsequently developed and standardized by Essential Regulatory Laboratories (ERLs), in collaboration with vaccine manufacturers and made available to manufacturers worldwide upon request.
For the 2016-2017 season, CDC recommends use of the flu shot (inactivated influenza vaccine or IIV) and the recombinant influenza vaccine (RIV). The nasal spray flu vaccine (live attenuated influenza vaccine or LAIV) should not be used during 2016-2017.

Japanese Encephalitis

Japanese encephalitis (JE) virus is the leading cause of vaccine-preventable encephalitis in Asia and the western Pacific. For most travelers to Asia, the risk for JE is very low but varies based on destination, duration of travel, season, and activities. JE virus is maintained in a cycle involving mosquitoes and vertebrate hosts, mainly pigs and wading birds. Humans can be infected when bitten by an infected mosquito. Most human infections are asymptomatic or result in only mild symptoms. However, a small percentage of infected persons develop inflammation of the brain (encephalitis), with symptoms including sudden onset of headache, high fever, disorientation, coma, tremors and convulsions. About 1 in 4 cases are fatal. There is no specific treatment for JE. Patient management focuses on supportive care and management of complications. Steps to prevent JE include using personal protective measures to prevent mosquito bites and vaccination.

- IXIARO®: inactivated, Japanese encephalitis vaccine, Vero cell culture-derived, adsorbed. Intercell AG (manufacturer), Novartis Pharmaceuticals (distributor) (JE)

Leptospirosis

Leptospirosis is a bacterial disease that affects both humans and animals. Humans become infected through direct contact with the urine of infected animals or with a urine-contaminated environment. The bacteria enter the body through cuts or abrasions on the skin, or through the mucous membranes of the mouth, nose and eyes. Person-to-person transmission is rare.

In the early stages of the disease, symptoms include high fever, severe headache, muscle pain, chills, redness of the eyes, abdominal pain, jaundice, haemorrhages in the skin and mucous membranes, vomiting, diarrhoea, and rash.

Although human vaccines have been used in some countries with varying degrees of success, there are no WHO pre-qualified vaccines currently available.

Mealses (Rubeola)

Measles is a highly contagious viral disease. It remains an important cause of death among young children globally, despite the availability of a safe and effective vaccine.

Measles is transmitted via droplets from the nose, mouth or throat of infected persons. Initial symptoms, which usually appear 10–12 days after infection, include high fever, a runny nose, bloodshot eyes, and tiny white spots on the inside of the mouth. Several days later, a rash develops, starting on the face and upper neck and gradually spreading downwards.

The measles vaccine has been in use since the 1960s. It is safe, effective and inexpensive. WHO recommends immunization for all susceptible children and adults for whom measles vaccination is not contraindicated. Reaching all children with 2 doses of measles vaccine, either alone, or in a measles-rubella (MR), measles-mumps-rubella (MMR), or measles-mumps-rubella-varicella (MMRV) combination, should be the standard for all national immunization programmes.

Meningococcal Meningitis

Meningococcal disease can refer to any illness that is caused by the type of bacteria called Neisseria meningitidis, also known as meningococcus [muh-ning-goh-KOK-us]. These illnesses are often severe and include infections of the lining of the brain and spinal cord (meningitis) and bloodstream infections (bacteremia or septicemia).
Meningococcus bacteria are spread through the exchange of respiratory and throat secretions like spit (e.g., by living in close quarters, kissing). Meningococcal disease can be treated with antibiotics, but quick medical attention is extremely important. Keeping up to date with recommended vaccines is the best defense against meningococcal disease.
Currently there are several polysaccharide and conjugate vaccines available for protection from the most common serogroups of meningococcal disease. Polysaccharide vaccines are available in bivalent (A, C), trivalent (A, C, W135), and quadrivalent (A, C, W135, Y) formulations. Conjugate vaccines, which are more immunogenic and can provide herd protection, are available in monovalent (A or C), quadrivalent (A, C, W135, Y), or combination (serogroup C and Haemophilus influenzae type b) formulations. Two protein-based vaccines are available for immunization against serogroup B invasive disease. There are no vaccines available against serogroup X disease.

Mumps

Mumps is best known for the puffy cheeks and swollen jaw that it causes. This is a result of swollen salivary glands.
The most common symptoms include: fever, headache, muscle aches, tiredness, loss of appetite, swollen and tender salivary glands under the ears on one or both sides (parotitis)
Symptoms typically appear 16-18 days after infection, but this period can range from 12-25 days after infection.
Some people who get mumps have very mild or no symptoms, and often they do not know they have the disease.
Most people with mumps recover completely in a few weeks.

Mumps can be prevented with MMR (measles-mumps-rubella) vaccine. MMR vaccine prevents most, but not all, cases of mumps and complications caused by the disease. Two doses of the vaccine are 88% (range: 66-95%) effective at preventing mumps; one dose is 78% (range: 49%−92%) effective.
The first vaccine against mumps was licensed in the United States in 1967. By 2005, mumps rates declined by more than 99% thanks to high two-dose vaccination coverage among children.

Pertussis

Pertussis, also known as whooping cough, is a highly contagious respiratory disease. It is caused by the bacterium Bordetella pertussis.
Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe. After fits of many coughs, someone with pertussis often needs to take deep breaths which result in a "whooping" sound. Pertussis can affect people of all ages, but can be very serious, even deadly, for babies less than a year old.
The best way to prevent pertussis (whooping cough) is to get vaccinated. There are vaccines for babies, children, preteens, teens, and adults. The childhood vaccine is called DTaP, and the pertussis booster vaccine for preteens, teens, and adults is called Tdap.

Pneumococcal

Streptococcus pneumoniae is a bacterium that is the cause of a number of common diseases, ranging from serious diseases such as meningitis, septicaemia and pneumonia to milder but commoner infections such as sinusitis and otitis media. Pneumococcal diseases are a common cause of morbidity and mortality worldwide, though rates of disease and death are higher in developing countries than in industrialized country settings, with the majority of deaths occurring in sub-Saharan Africa and Asia. Disease is most common at the extremes of age, i.e, in young children and among the elderly. The organism is transmitted mainly through respiratory droplets and colonizes the back of the nose (nasopharynx). Infection of other parts of the body, resulting in disease, occur through direct spread or through invasion of the blood stream. Out of over 90 serotypes, only a small minority cause most disease. There are 2 available pneumococcal conjugate vaccines (PCV) that target either 10 or 13 of the most prevalent serotypes.
Currently available PCVs are safe and efficacious. WHO recommends the inclusion of PCVs in childhood immunization programmes worldwide. In particular, countries with high childhood mortality (i.e. under 5 mortality rate of >50 deaths/1000 births) should make the introduction of these multicomponent PCVs a high priority.
In many countries, the routine use of pneumococcal conjugate vaccines has dramatically reduced the incidence of serious diseases due to the organism with virtual disappearance of disease due to serotypes of the organism in the vaccines used.

Polio

Polio, or poliomyelitis, is a crippling and potentially deadly infectious disease. It is caused by the poliovirus. The virus spreads from person to person and can invade an infected person’s brain and spinal cord, causing paralysis (can’t move parts of the body). Polio vaccine protects children by preparing their bodies to fight the polio virus. Almost all children (99 children out of 100) who get all the recommended doses of vaccine will be protected from polio.
There are two types of vaccine that can prevent polio: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). Only IPV has been used in the United States since 2000; OPV is still used throughout much of the world.

Rabies

Rabies is a preventable viral disease of mammals most often transmitted through the bite of a rabid animal. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in wild animals like raccoons, skunks, bats, and foxes.
The rabies virus infects the central nervous system, ultimately causing disease in the brain and death. The early symptoms of rabies in people are similar to that of many other illnesses, including fever, headache, and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hyper salivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.
Two vaccines against rabies are available, Imovax® Rabies, made by Sanofi Pasteur Ltd and RabAvert®, made by Novartis. The vaccines are very effective, cause few adverse reactions, and both provide immunity to rabies when administered for protection before an exposure (pre-exposure prophylaxis) or after an exposure (post-exposure prophylaxis).

Rubella

Rubella is a contagious disease caused by a virus. Most people who get rubella usually have a mild illness, with symptoms that can include a low-grade fever, sore throat, and a rash that starts on the face and spreads to the rest of the body. Rubella can cause a miscarriage or serious birth defects in an developing baby if a woman is infected while she is pregnant. The best protection against rubella is MMR (measles-mumps-rubella) vaccine.
The best way to prevent rubella is to get rubella vaccine. Rubella vaccine is included in the combination measles-mumps-rubella (MMR) vaccine, which provides protection against all three diseases. MMR vaccine is safe and effective. One dose of MMR vaccine is about 97% effective at preventing rubella.

Smallpox

Smallpox is an acute contagious disease caused by the variola virus, a member of the orthopoxvirus family. It was one of the world's most devastating diseases known to humanity. The last known natural case was in Somalia in 1977. It was declared eradicated in 1980 following a global immunization campaign led by the World Health Organization.
Smallpox is transmitted from person to person via infective droplets during close contact with infected symptomatic people.
After human-to-human transmission of smallpox had been interrupted the likelihood of reintroduction or re-emergence of smallpox was negligible. Nevertheless a Smallpox Vaccine Emergency Stockpile was created to ensure that smallpox vaccine is immediately available should there be a need.

Tetanus

Tetanus is different from other vaccine-preventable diseases because it does not spread from person to person. The bacteria are usually found in soil, dust and manure and enter the body through breaks in the skin - usually cuts or puncture wounds caused by contaminated objects.
Tetanus vaccines are recommended throughout your life. There are four combination vaccines used to prevent tetanus: DTaP, Tdap, DT, and Td. Two of these (DTaP and DT) are given to children younger than 7 years of age, and two (Tdap and Td) are given to older children and adults. Several other combination vaccines contain DTaP along with other childhood vaccines.
Upper-case letters in these abbreviations denote full-strength doses of diphtheria (D) and tetanus (T) toxoids and pertussis (P) vaccine. Lower-case "d" and "p" denote reduced doses of diphtheria and pertussis used in the adolescent/adult-formulations. The "a" in DTaP and Tdap stands for "acellular," meaning that the pertussis component contains only a part of the pertussis organism.

Tick-borne Encephalitis

Tickborne encephalitis (TBE) virus is a single-stranded RNA virus that belongs to the genus Flavivirus. TBE virus has 3 subtypes: European, Siberian, and Far Eastern.
TBE virus is transmitted to humans through the bite of an infected tick of the Ixodes species, primarily I. ricinus (European subtype) or I. persulcatus (Siberian and Far Eastern subtypes). The virus is maintained in discrete areas of deciduous forests. Ticks act as both vector and virus reservoir, and small rodents are the primary amplifying host. TBE can also be acquired by ingesting unpasteurized dairy products (such as milk and cheese) from infected goats, sheep, or cows. TBE virus transmission has infrequently been reported through laboratory exposure and slaughtering viremic animals. Direct person-to-person spread of TBE virus occurs only rarely, through blood transfusion or breastfeeding.
Viral encephalitis is inflammation of the brain, caused by any one of a number of viruses. Symptoms include high fever, headache, sensitivity to light, stiff neck and back, vomiting, confusion and, in severe cases, seizures, paralysis and coma. Infants and elderly people are particularly at risk of severe illness.
Two inactivated cell culture-derived TBE vaccines are available in Europe, in adult and pediatric formulations: FSME-IMMUN (Baxter, Austria) and Encepur (Novartis, Germany). The adult formulation of FSME-IMMUN is also licensed in Canada. Two other inactivated TBE vaccines are available in Russia: TBE-Moscow (Chumakov Institute, Russia) and EnceVir (Microgen, Russia). Immunogenicity studies suggest that the European and Russian vaccines should provide cross-protection against all 3 TBE virus subtypes. At least 1 other TBE vaccine is produced in China, but information regarding this vaccine is not available in the English literature.
For both FSME-IMMUN and Encepur, the primary vaccination series consists of 3 doses. The specific recommended intervals between doses vary by country and vaccine. Although no formal efficacy trials of these vaccines have been conducted, indirect evidence suggests that their efficacy is >95%. Vaccine failures have been reported, particularly in people aged ≥50 years.

BCG (Tuberculosis)

In 2014, 9.6 million people fell ill with tuberculosis (TB)—a contagious, bacterial airborne disease—and approximately 1.5 million people died. TB poses a significant health risk to poor and malnourished people living in developing countries, with over 95 percent of TB cases and deaths in developing countries.
Tuberculosis most frequently strikes people during their most economically productive years: between the ages 18 and 59. But, in 2014, an estimated 1 million children became ill with TB and 140,000 children died of it. TB now ranks alongside HIV/AIDS as a leading cause of death worldwide. In most instances, TB is a preventable and curable disease.
Bacille Calmette-Guérin (BCG) is a vaccine for tuberculosis (TB) disease. This vaccine is not widely used, but it is often given to infants and small children in other countries where TB is common. BCG does not always protect people from getting TB.

BCG vaccination should only be considered for children who have a negative TB test and who are continually exposed, and cannot be separated from adults who

- Are untreated or ineffectively treated for TB disease, and the child cannot be given long-term primary preventive treatment for TB infection; or
- Have TB disease caused by strains resistant to isoniazid and rifampin.

Typhoid

Typhoid fever is a systemic infection caused by Salmonella Typhi, usually through ingestion of contaminated food or water. The acute illness is characterized by prolonged fever, headache, nausea, loss of appetite, and constipation or sometimes diarrhoea. Symptoms are often non-specific and clinically non-distinguishable from other febrile illnesses. However, clinical severity varies and severe cases may lead to serious complications or even death. It occurs predominantly in association with poor sanitation and lack of clean drinking water. According to the most recent estimates (published in 2014), approximately 21 million cases and 222 000 typhoid-related deaths occur annually worldwide. A similar but often less severe disease, paratyphoid fever, is caused by Salmonella Paratyphi A, B or C.
Two typhoid vaccines are currently recommended for use by:

- an injectable polysaccharide vaccine based on the purified Vi antigen (known as Vi-PS vaccine) for persons aged two years and above;
- and a live attenuated oral Ty21a vaccine in capsule formulation for those over five years of age.

Varicella-Zoster (Chickenpox)

Chickenpox is a very contagious disease caused by the varicella-zoster virus (VZV). It causes a blister-like rash, itching, tiredness, and fever. The rash appears first on the stomach, back and face and can spread over the entire body causing between 250 and 500 itchy blisters. Chickenpox can be serious, especially in babies, adults, and people

with weakened immune systems. The best way to prevent chickenpox is to get the chickenpox vaccine.
CDC recommends two doses of chickenpox vaccine for children, adolescents, and adults. Children should receive two doses of the vaccine—the first dose at 12 through 15 months old and a second dose at 4 through 6 years old.
There are two chickenpox vaccines currently available. The brand names of the chickenpox vaccine are VARIVAX and VARILRIX.

Yellow Fever

Yellow fever virus is found in tropical and subtropical areas in South America and Africa. The virus is transmitted to people by the bite of an infected mosquito. Yellow fever is a very rare cause of illness in U.S. travellers. Illness ranges in severity from a self-limited febrile illness to severe liver disease with bleeding.
Yellow fever disease is diagnosed based on symptoms, physical findings, laboratory testing, and travel history, including the possibility of exposure to infected mosquitoes. There is no specific treatment for yellow fever; care is based on symptoms. Steps to prevent yellow fever virus infection include using insect repellent, wearing protective clothing, and getting vaccinated.
Yellow fever vaccine is a live-virus vaccine that has been used for several decades. A single dose provides lifelong protection for most people.