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ROUTINE AND RECOMMENDED VACCINATIONS FOR TRAVELLERS

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INTRODUCTION

Travels, especially to the tropics, are connected with the risk acquiring infectious diseases, some of which may be fatal. Vaccinations may protect the traveller. Epidemiological and personal risk factors should be considered when planning such vaccinations.

The number of traveling people in the world has been increasing since 1990. The World Tourism Organization estimates that this number will exceed one billion in 2010 (1). Particularly the travel to developing, exotic countries is connected with this health hazard, and it depends on the region of the world, on the mode and duration of travel.

The traveller should be informed about the epidemiological situation in the destination country and about the necessary preventive measures, among them the vaccinations. Important is also the behaviour of the traveller and following the hygiene rules.

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Neglecting these measures may result in a serious, possibly fatal disease.

Obtaining a specialist's advice from a Travel Clinic is useful before going to the tropics.

Information about prophylactic measures can be also obtained from the sanitary-epidemiological stations, from the internet service of WHO, and in Poland - from the Institute of Maritime and Tropical Medicine in Gdynia. Such information should also be offered by travel agencies.

In recommending vaccinations, the following factors should be considered: epidemiological risk in a given area, age and the general health condition of the traveller, immunizations taken previously and their possible adverse effects (2, 3, 4). The costs of vaccinations used before travels are usually not reimbursed by the national health systems.

Vaccinations if necessary should be started 6-8 (not later than 4) weeks before the planned departure.

Vaccination against yellow fever

The only vaccination required by the International Health Regulations is yellow fever vaccination for travel to certain countries in sub-Saharan Africa and tropical South America.

The following countries require vaccination certificate from all travellers for entry to: Benin, Burkina Faso, Chad, Congo, Côte d'Ivoire (Ivory Coast), Democratic Republic of Congo, French Guiana, Gabon, Ghana, Liberia, Mali, Mauritania (exception: not required for travellers from a non-endemic zone who stay less than 2 weeks), Niger, Rwanda, Togo, Saó Tomé and Príncipe, Sierra Leone. Country requirements are subject to change at any time. Updated information on endemic countries and regulations can be obtained from the WHO and CDC websites: <http://www.who.int>, <http://www.cdc.gov/travel>.

Yellow fever is a severe, potentially fatal disease caused by viruses, transmitted by mosquito bites. Prevention is achieved by a single dose of vaccine, given at least 10-14 days before departure. Stamaril by Sanofi Pasteur is the only available vaccine (also in Poland). It contains a live, attenuated yellow fever virus, strain Dakar 17. It is given subcutaneously or intramuscularly. It can be administered with other vaccines during one visit, with separate syringe and to another part of body. A single dose confers immunity lasting 10 years or more (4, 5). If a person is at continued risk of yellow fever infection, a booster dose is needed every 10 years. The vaccination should be documented in the "International Certificate of Vaccination or Prophylaxis". The international yellow fever vaccination certificate is valid 10 days after vaccination and

remains valid for 10 years. Vaccination and documentation must be performed only in institutions licensed by WHO. Vaccination is not recommended in pregnant women (but can be administered if indicated), breastfeeding women, in persons with anaphylaxis for eggs, immunocompromised patients and children younger than 12 months. In 1960 it was stated that in special situations yellow fever vaccine can be given to children from the 9th month of life. A person who was not vaccinated and has no valid certificate before entering one of the above listed countries may be arrested or heavily fined (2, 5). If the vaccination is contraindicated for medical reasons, a medical certificate is required for exemption (in English and French).

Areas where yellow fever virus is present far exceed those officially reported. The absence of a requirement for vaccination does not imply that there is no risk of exposure to yellow fever in a country.

Vaccination against viral hepatitis A

Viral hepatitis A occurs as an endemic disease in countries of poor sanitary conditions. It is the most frequent disease acquired during travel to the developing countries. Average incidence is 300/100 000/month of travel. The risk for hepatitis A is 100 times higher than for typhoid fever or cholera. A stay in four stars hotel does not decrease the risk. Prophylactic vaccination is recommended at least 4 weeks before departure. Hepatitis A vaccines contain hepatitis A virus inactivated with formaldehyde and adsorbed to aluminum hydroxide as adjuvant. The vaccine should be administered intramuscularly in the deltoid muscle. A single dose prevents hepatitis A for a year. For a long-term protection a second dose should be given 6-12 months after the first one. No boosters are recommended. Vaccines can be used in children older than 12 months. They can be administered separately or with other vaccines during the same visit (in separate syringes and distant sites).

Hepatitis A vaccines licensed and available in Poland are presented in Table 1.

Havrix Junior is for persons younger than 18 years, Vaqta 25U/0,5ml – younger than 17 years. Avaxim is used in the same dose in children and adults (7). All hepatitis A vaccines are immunogenic and effective. Seroconversion was found in 79% of vaccinated 13 days after a first dose and in 99% after a month. A single dose of hepatitis A vaccine can also be administered as post exposure prophylaxis instead of immunoglobulin, as soon as possible, not later than 14 days after exposure(8).

Table 1. Hepatitis A vaccines

| Vaccine | Dose | Manufacturer |
|---------------|-------------------|----------------|
| Avaxim | 169 U/0,5ml | Sanofi Pasteur |
| Havrix Junior | 720 U ELISA/0,5ml | GSK |
| Havrix | 1440 U ELISA/1ml | GSK |
| Vaqta | 25 U/0,5ml | MSD |
| Vaqta | 50 U/1ml | MSD |

Table 2. Hepatitis B vaccines

| Vaccine | Manufacturer |
|--------------|------------------|
| Engerix B | GSK |
| HBVax II | MSD |
| HBVax PRO | MSD |
| Euvax B | LG Life Sciences |
| Hepavax-Gene | Crucell |

Vaccination against viral hepatitis B

Holidays and business travels are connected with risk of traffic or sport injuries. In hepatitis B endemic countries hospitalizations, especially with parenteral procedures, may be a source of hepatitis B virus (HBV) infection. Sex contacts and intravenous drug use are also a possible source of it and the risk for HBV infection is much higher than for HIV infection. The consequences of HBV infection are well known. Vaccination is the best prophylactic measure. Vaccines licensed in Poland are listed in Table 2. All those vaccines contain hepatitis B surface (HBs) antigen produced by recombinant DNA technology and they are free of any human or animal tissue.

Vaccines are produced in doses for children and for adults. Pediatric dose is used in children younger than 15 years. Primary vaccination consists of 3 intramuscular doses of hepatitis B vaccine administered at 0, 1, and 6 months. There is a rapid immunization schedule (0, 7, 21 days and 12 months), licensed only for Engerix B in adults. According to CDC recommendations boosters are not routinely administered. In persons not previously immunized against hepatitis A and hepatitis B combined vaccine can be used. Twinrix Adult (GSK) contains 720 IU of hepatitis A virus and 20µg of recombinant HBs antigen. Primary vaccination consists of 3 doses at 0, 1 and 6 months. Rapid immunization schedule is also licensed: 0, 7, 21 days and 12 months (2, 4, 7).

Vaccination against typhoid fever

The disease is caused by *Salmonella typhi*. Routine vaccination against typhoid fever has not been used in Poland since 1968. Infections with *Salmonella typhi* are common in the tropics. Transmission is by fecal-oral route. The highest risk for infection is in India. It is estimated that incidence there is 30/100 000 travelers (2). Travelers have acquired typhoid fever even during brief visits of less than 1 week to countries where the disease is endemic. Vaccination is recommended for travelers to Asia, Africa and South America. It is particularly recommended for those who will be traveling in smaller cities, villages, and rural areas off the usual tourist itineraries, where food and beverage choices may be more limited. The most commonly used vaccine is Typhim Vi (Sanofi Pasteur). It contains polysaccharide antigen. A single dose provides 3 years lasting protection. The vaccine is not immunogenic in children younger than 2 years (there is no vaccine for children <2 years). In Poland 2 typhoid fever vaccines are produced (by Biomed Krakow): Ty - containing suspension of bacilli *Salmonella typhi* inactivated with formaldehyde and TyT – with tetanic toxoid. Primary vaccination consists of 3 doses: 0, 4-6 weeks, 12 months. In some countries combine vaccines against typhoid fever and hepatitis A (e.g. Hepatyrix, GSK) and live attenuated oral vaccine against typhoid fever (Oral Typhoid Vaccine Ty21a, Vivotif Berna) are available.

Vaccination against poliomyelitis

Polio vaccination is routinely made in children in most countries worldwide. In Poland the last dose is administered in the 6th year of life. Vaccination is recommended in persons older than 30 years traveling to endemic regions: sub-Saharan Africa, India. There are two kinds of vaccines: OPV – live attenuated oral vaccine and IPV – inactivated vaccine, for intramuscular administration. Currently only IPV is used in travel medicine (4). In Poland inactivated vaccine Imovax polio (GSK) is used. It is safe also in immunocompromised patients. Vaccination is valid for 10 years.

Vaccination against diphtheria and tetanus

Diphtheria and tetanus vaccination is a routine vaccination (8). The last dose is administered in the 19th year of life. Diphtheria has been eliminated in most countries, but it still occurs. During diphtheria outbreak in the ex-Soviet Union countries in 1990-1997 there were fatal cases among non-immunized tourists (2). 99% cases of tetanus occur in the tropics. If the last diphtheria and tetanus vaccination was done 9-10 years before the travel, it is recommended to administer booster dose of TD vaccine. Immunity is then prolonged for the next 10 years (5).

Vaccination against meningococcal disease

Invasive meningococcal disease (IMD) caused by *Neisseria meningitidis* is characterized by sudden onset, rapid course and potential fatal outcome. For most cases 5 serogroups are responsible: A, B, C, W135, Y; distribution of them depends on the geographic region. Vaccination is recommended for children and adults traveling to meningitis belt in sub-Saharan Africa (from Senegal in the west to Ethiopia in the east) during the dry season (December through June). Saudi Arabia requires that visitors – Hajj or Umra pilgrims - have a certificate of vaccination with a tetravalent (A,C,Y,W-135) meningococcal vaccine before entering (4, 5). Before travel to other endemic/epidemic regions vaccination can be indicated depending on current epidemiologic situation. Information is available on the CDC website <http://www.cdc.gov/travel>. Meningococcal vaccines licensed in Poland are listed in Table 3. Polysaccharide vaccine is not efficient in children younger than 2 years. Conjugate vaccines can be used in children from the 2nd month of life. There is no vaccine against meningococcal serogroup B.

Table 3. Meningococcal vaccines

| Vaccine | Type of vaccine | Manufacturer |
|-------------|--|----------------|
| Meningo A+C | polysaccharide | Sanofi Pasteur |
| NeisVac-C | Conjugated with tetanic toxoid | Baxter |
| Meningitec | Conjugated with CRM197 (diphtheria toxoid) | Wyeth |

Vaccination against tick borne encephalitis (TBE)

TBE is an endemic disease occurring in some regions of 27 European countries. Non specific prophylactic methods (avoidance of exposure to tick bites, proper clothing, repellents) are insufficient. Vaccination provides protection and it is recommended for

person residing and travelling to endemic regions (9). Vaccines FSME-Immun and FSME-Immun Junior (Baxter) are available in Poland. Pediatric dose is for 1-16 years old children. Primary vaccination consists of 3 doses: 0, 1-3, 9-12 months. Vaccination should be started before tick activity season (late winter, early spring). Rapid vaccination schedule is also licensed: 0, 14 days and 12 months. For long-term immunity booster doses are required: first after 3 years and next ones every 5 years (every 3 years for persons older than 65 years).

Other vaccinations

Vaccination against cholera is currently recommended only for persons working in high risk conditions (4). Vaccine Verorab (Sanofi Pasteur) against rabies is used as a pre-exposure prophylaxis only in persons with occupational contacts with animals and in cave explorers. Vaccination includes then 3 primary doses at 0, 7, 28 days and booster after a year. Vaccine against Japanese encephalitis is not available in Poland. For travellers to Asia, particularly Middle and Far East, influenza vaccination is recommended. Persons older than 65 years should be vaccinated against pneumococcal disease (vaccines: Pneumo23, Sanofi Pasteur and Pneumovax, MSD) (2, 7).

The important problem in travel medicine is malaria. So far there is no sufficient vaccine against that dangerous disease. Prophylaxis is based on drugs. Choice of prophylactic drug depends on the region, length of stay and drug-resistance of plasmodia (4, 5). Information and advice are given in outpatient clinics of tropical diseases.

Prevention of travellers` diarrhea (TD)

Diarrhoea affects 20-50% of travellers to the tropics. The most common cause is enterotoxigenic Escherichia coli (ETEC). The course is usually afebrile, with loose stools (no blood or mucus) and cramps. Treatment is symptomatic with oral rehydration, proper diet, probiotics, chemiotherapeutics are not usually recommended. TD is generally self-limited and lasts 3-4 days, but persistent symptoms may occur in a small percentage of travelers. Prevention includes food and beverage selection. Foods should be freshly cooked or fried and served hot. Foods washed in non-potable water such as salads, raw fruits and vegetables should be avoided. Bottled, canned and carbonated beverages may be safely consumed (with noi ice cubs), as well as boiled beverages. Consumption of food or beverages from street vendors poses a particularly high risk. It is important to wash hands with soap before meals and wash teeth with boiled water (5).

SUMMARY

Travel risks should not be neglected. Health hazard is unprofitable. Adequately planned, individually adjusted prophylaxis makes travel not only pleasant, but safe as well.

It is worth to emphasize that fever in person coming back from the tropics requires quick exclusion (or confirmation) of malaria.

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