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TRAVELLING WITH CHILDREN AND BABIES

1. GENERAL

Children in good health – although more sensitive than adults to all sorts of infections – present no additional problems, on condition that maximum care is taken beforehand to estimate the risks of a stay in the (sub) tropics and suitable precautionary measures are taken. Parents are strongly advised to follow a first aid course in preparation of an adventurous or long-term journey. After your arrival, a few basic principles should be observed.

The most important points for attention are:

- **Adapt the pace of travelling in accordance with the adaptability of the children**
- **Basic immunisations and specific vaccinations in connection with travel:** these must be carried out prior to travelling. Special attention must be given to polio and measles where these still occur in developing countries. For infants and children under 1 year the schemes can be modified if travelling to a developing country.
- **Malaria**: It is a good idea to check first whether a trip with young children to highly endemic areas is really necessary, as malaria is more serious in young children (and become life-threatening within a few hours). In addition to a suitable chemoprophylaxis, an impregnated mosquito net is always required, as children are more easily exposed to mosquito bites. You will find more information on this in the "Malaria" section.
- **Diarrhoea**: Children are particularly susceptible to diarrhoea, hence the great importance of good hygiene and clear instructions for possible treatment. Dehydration as a consequence of diarrhoea is a particular problem among children below 2 years. They have diarrhoea more frequently and for longer. Specially compiled oral rehydration salts are an extremely effective weapon against dehydration. It is best if the doctor gives written instructions containing the correct instructions for use and a description of the first signs of dehydration. Breastfeeding offers the best protection against diarrhoea: when travelling it is thus recommended that the mother continues with breastfeeding. In hot climates extra (pure) water can spoon-feed. If the child has fever or vomits, it is imperative to find a reliable doctor as soon as possible, but this is not always possible when travelling. For the problem of **traveller's diarrhoea** in children, please see the separate leaflet on that topic for more details.
- **General preventative measures** based on good knowledge of local health issues are essential. Safe behaviour is essential regarding **drinking water, food, swimming** (is there schistosomiasis?), **animals** (stray cats and dogs, monkeys, etc.), traffic etc. **Avoid walking barefoot: sit on a towel or sheet, not directly on the ground.**

- **Watch out for sunburn: avoid excessive overexposure to the sun** during childhood, as its cumulative effect increases the risk of skin cancer (especially melanoma).
- **Air travel**:
  - Babies are usually not permitted to travel by air until they are 7 days old (air travel is discouraged for premature babies; emergency transport in an incubator, with medical supervision, can be arranged from 48 hours after birth).
  - Approximately 15% of children get earache when travelling by air (especially during the descent and landing). If in doubt, it is advisable to have their ears examined before departure. During take-off and landing, babies can be comforted and earache prevented through breastfeeding or by using a feeding bottle or dummy.
- Be alert with children in the traffic; use adapted car seats and safety belt. Be attentive with young children when they are around water. Drowning is a frequent cause of lethal accidents. Keep an eye on the children's playing area. When they play outside, make sure they do not touch all kinds of animals (see "rabies vaccination"). When playing inside, contact with dangerous objects and products has to be avoided (traveller's pharmacy, repellents, insecticides, pesticides, etc.)
- **Acute altitude sickness** occurs with approximately the same frequency in children as in adults. Symptoms are sometimes more difficult to recognise in young children, because they can be confused with other ailments. Classic symptoms of acute altitude sickness are headache, nausea, vomiting, weakness and sleeping disorders. Young children can demonstrate excitability, restlessness, muscle tension, reduced appetite, less playing, sleeping disorder and sometimes vomiting.
  Immediate descent is recommended when a child feels unwell above the altitude of 2500m. In general it is advisable not to stay overnight above 2000 m with children under 2 years old and above 3000 m with children under 10 years old. Too little is known about the use of acetazolamide in children to recommend routinely, but it can be used in certain circumstances. (5mg/kg per dose, to be divided into one or two intakes a day).
- In some countries **genital mutilation** of young girls is experienced as being a 'tradition' and 90% of women are circumcised. In Belgium and in many other countries, however, this practice is seen as child abuse and is a criminal offence, even if the girl who has been 'circumcised' returns following a trip, for example, to her parents' country of origin. Be alert for children of parents from certain 'risk countries', especially when it is only girls that are travelling. Sometimes, the local family organises the circumcision without the parents' knowledge. Informing parents about the legal context can arm them in protecting their daughter. For more info, see www.gams.be and www.intact-association.org
- In case of illness a good **self-help handbook** and a **medical travel kit** prove very useful, as they show you how to treat diarrhoea, fever, minor wounds, etc. It is not always easy to find a doctor.

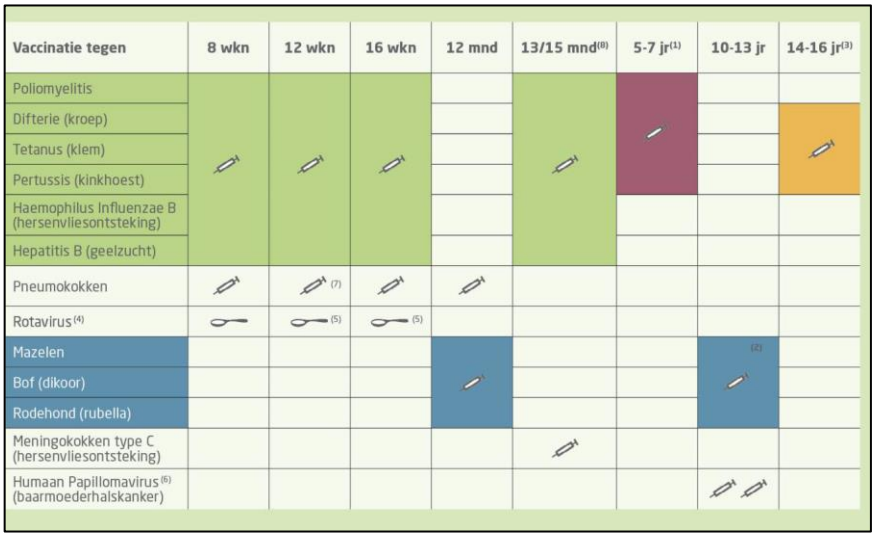
VACCINATIONS

Basic vaccination scheme:

Yearly update: see National Health Council Vaccination calendar for children

www.health.belgium.be – click: EN; search term: "CSS 8559 Basic vaccination scheme and search for the most recent revision".

For Flanders: http://www.zorg-en-gezondheid.be/basisvaccinatieschema/ or http://www.kindengezin.be/img/oktober2015vaccinatieschema.pdf.



Child vaccination programmes for all countries in the world can be consulted on the WHO website: http://apps.who.int/immunization_monitoring/globalsummary/schedules
Just choose the country in the "country list" and scroll down until you see the vaccination schedule.

A. BASIC VACCINATIONS

1. TETANUS-DIPHTHERIA-PERTUSSIS-POLIO

In Belgium and most of the other European countries only the injectable polio vaccine is used in ~~a~~ **paediatric combined vaccines**. Before travelling, the child should have received 3 doses of the **hexavalent** vaccine if possible. It is best to start with the paediatric DTPa-vaccine at the age of 8 weeks (valid also for prematures). In children who travel to the tropics at a very young age, basic vaccination can be started earlier, i.e., at 6 weeks. The next 2 doses may be given after that with a minimum interval of 4 weeks.

Please remember that in Belgium polio vaccination has to be registered at least in the 18th month, after complete vaccination (at least 3 doses, the last one in the 15th month).

Oral POLIO vaccine (Sabin®) is no longer given in Belgium but is still used in some of the destination countries. Infants going to the tropics prior to completing primary vaccine series in Belgium can safely take this vaccine at any age, according the destination country's vaccination schedule.

Since 2008 the National Health Council recommends a **booster vaccination against pertussis** for all adolescents (at the age of 14 to 16 years). The special vaccine "**Boostrix®** " will be used. (contains ½ Tetanusanatoxine + 1/15 Difterieanatoxine + 1/3 acellular Pertussis-antigen in paediatric dose).
The complete recommendation can be found at "vaccination against pertussis", see: www.health.belgium.be – click: EN; search term "CSS 8807 Vaccination of children and adolescents" and search for the most recent revision.

2. HAEMOPHILUS INFLUENZAE type b carries a high risk of inducing bacterial meningitis in children under the age of 5 years. Currently several vaccines are available (separately or in combination with other paediatric vaccines). For more information please consult the SCP (Summaries of the Characteristics of the Product, previously the "scientific instruction leaflets": www.fagg-afmps.be).

Vaccination scheme:

- **Less than 6 months** of age: 3 injections at 2, 3 and 4 months of age, and a repeat booster vaccination in the 15th month (in the form of the hexavalent vaccine = together with Di-Te-Pa-IPV-HB). It is best to administer 2 doses before departure; if there is not enough time left, administration may be started from the age of 6 weeks.
- **From 6 to 12 months**: 2 injections with an interval of 1 to 2 months between injections, and a repeat booster vaccination in the 15th month.
- **From 1 up to and including 5 years**: 1 single injection is enough.

The complete recommendation can be found www.health.belgium.be – click: EN; search term "CSS 8808 Vaccination of children and adolescents" and search for the most recent revision.

3. HEPATITIS B

The vaccine against hepatitis B has been part of the free basic vaccination programme for infants since 1999. A catch-up vaccination was provided at age 11-12 for people born between 1987 and 1999. This means that in principle everyone born in Flanders after 1987 has been vaccinated against hepatitis B.
(*info*: Gecommentarieerd geneesmiddelen Repertorium http://www.bcfi.be).

Vaccination schedule

- For babies 4 intramuscular injections (in the anterolateral thigh muscle) are recommended, together with the other basic vaccinations (hexavalent vaccine) at 2, 3, 4, and 15 months. This will give lifelong protection. Currently, experts see no need for a repeat (booster) vaccination.
- For children over 1 year, 3 intramuscular injections (in the anterolateral thigh muscle) are recommended at months 0-1-4 (6), the same as for adults. Protection is probably lifelong.
- If departure to the tropics cannot be postponed, and there is a real risk of infection, the accelerated scheme can also be used: 3 injections at intervals of 1 month (or with 2 weeks of interval, and if really necessary, even with 1 week interval).
- If really necessary, one can start the hepatitis B vaccination from birth: months 0 and 1.

Vaccination is strongly recommended for children who are going to live in developing countries and who will have continuous close contact with local children (who easily have open wounds). Vaccination is strongly recommended for unvaccinated children who will be staying for longer than 3-6 months in an area where hepatitis B is highly endemic.
Children of parents who are carriers of the hepatitis B virus must of course also be vaccinated. As hepatitis B vaccination is part of the basic vaccination schedule for children in general (and babies and adolescents in particular) it is clear that any long-distance trip with children is an opportunity to bring the vaccination up to date. Twinrix® Paediatric, a combined vaccine against hepatitis A and B, is available for the age category 1-15 years. However, there is no reimbursement for this vaccine.

4. MEASLES

The risk of measles is very high in less developed countries. The morbidity (viral pneumonia, encephalitis), mortality and late consequences are considerable. Children on a journey need to be protected.
Usually measles vaccination is administered to children from the age of 12 months.
For children staying in developing countries (now also in a number of countries in Europe where there is an epidemic) who come in contact with the local population, an extra vaccination can be given in advance from the age of **6 months** on (measles-mumps-rubella combination vaccine, there is no separate measles vaccine available in Belgium). This initial vaccination provides an immediate, but not an indefinite protection ensured for some months.. A vaccine administered before the age of 12 months does not count in the vaccination scheme. The child must follow the normal vaccination scheme afterwards: 1 dose at 12 months (or at least 4 weeks after the extra vaccination) and 1 dose at 11-12 years.

Remarks:

- After vaccination the child is best kept under observation for at least 15 minutes.
- The measles vaccine may be given together with any other vaccine. Yellow fever and measles vaccination are given with a 4-week interval; exceptionally, when the interval is not possible, they can be given simultaneously but in different limbs (the immune response on the yellow fever vaccination is possibly suboptimal).
- The child may show mild measles symptoms 1 week to 10 days after administration of the vaccine.
- Contra-indications are hypersensitivity to neomycin or other components of the vaccine. A non-anaphylactic allergy to eggs is no contra-indication. For other contra-indications we refer to SCP (Summaries of the Characteristics of the Product: www.fagg-afmps.be).

5. MEASLES-MUMPS-RUBELLA

Since 1985 the trivalent measles-mumps-rubella vaccine has been available free of charge for children up to the age of 2 years. **A first vaccination** is normally given at the age of 12 months (or from the age of 6-9 months if indicated – see (4)); and a **booster** vaccination is given at the age of 10-12 years (routinely administered after 1994 and also free of charge), as seroconversion after a first vaccination does not occur in 5 to 10% of cases (primary failure) and in a further 5% the antibodies have disappeared after ten years (secondary failure).

Individuals born before 1970 almost certainly have antibodies to measles and mumps as a result of natural exposure to the virus.

In individuals **born after 01-01-1970** the following options are available to anyone going to stay in or go on a long trip to developing countries:

1. Vaccination with the trivalent measles-mumps-rubella vaccine - 2 injections with a minimum interval of 1 month - strongly recommended if there has been no earlier vaccination or past infection. The chance of acquiring immunity via natural exposure has become smaller.

2. An earlier booster vaccination may be administered to young children, **from the age of 5-6 years on**.

There are no risks associated with administering the vaccine, even if the person already has antibodies against one or more of these conditions, for example, as a consequence of a sub-clinical infection or as a consequence of a previous vaccination.

This means that a catch-up vaccine can be safely administered among persons older than 18 years, where there is doubt about the immune status. It is generally not economical to start testing for antibodies against each of these infectious diseases in advance.

6. CONJUGATED MONOVALENT MENINGOCOCCUS-C VACCINE

Since January 2001 a monovalent conjugated vaccine against Meningococcus C has been available on the Belgian market (Meningitec® - Menjugate® - Neisvac-C®). This vaccine is recommended at the age of 15 months, together with the hexavalent DTPa-HBV-IPV-Hib-vaccine, but at different injection sites.
The High Commission for Health recommends this vaccination for all children older than 1 year and adolescents up to and including 18, for whom one dose is enough. For children who will be staying in Sub-Saharan Africa in the 'meningitis belt', this can be replaced by the 4-valent conjugate meningitis vaccine.
For updates - see: High Commission for Health: www.health.belgium.be click: Eng, search term: CSS 8810 'Vaccination of children and adolescents' and search for the most recent revision.

7. PNEUMOCOCCAL 13-VALENT CONJUGATE VACCINE

A conjugate vaccine has been used against pneumococcal disease since September 2004. A 10-valent conjugate vaccine, Synflorix, has been used against pneumococcal disease since September 2015. Pneumococcus cause a.o. bacterial meningitis, severe pneumonia and blood contagion. In Belgium all infants up to 2 years are systematically vaccinated (for free).

From the age of 24 months until the age of 59 months, only children with high susceptibility for invasive pneumococcal infection will be vaccinated (the vaccine is expensive and not always reimbursed completely).
For updates - see: High Commission for Health: www.health.belgium.be click: Eng, search term: CSS 8757 'Recommendations for vaccination for the prevention of S. pneumonia infections with children with an elevated risk of invasive pneumococcal disease' and search for the most recent revision.

The schedule varies depending on the age of starting the vaccination schedule:

- from 2-6 months: 2 doses with an interval of 2 months (month 2 & 4 together with the other basic vaccinations) and a booster at month 12 (3 injections in total)
- from 7-11 months: 2 doses with an interval of 1-2 months and a booster in the first year of life (3 injections in total)
- from 12-23 months : 2 doses with an interval of 1-2 months (2 injections in total)
- from 2 – 4 years 1 dose is sufficient.
- beyond the age of 5 the vaccine will not be administered anymore.

Update: High Commission for Health: vaccination calendar for children www.health.belgium.be – click: EN; search term "CSS 8559 Basic vaccination scheme and search for the most recent revision".

8. ROTA VIRUS VACCINE

The oral vaccine against the rotavirus is advised for all children under the age of 6 months. Depending on the kind of used vaccine, the schedule consists of 2 doses (Rotarix®) or 3 doses (Rotateq®) with an interval of 1 month (to be administered in a medical setting).
The first dose has to be administered as early as possible, from the age of 6 weeks on. The entire vaccination schedule has to be finished before the age of 6 months; beyond this age the vaccine against the rotavirus will not be administered anymore.
Update see: High Commission for Health: www.health.belgium.be - click: ENG; search term 'CSS 8812 rota virus' and search for the most recent revision.

9. HUMAN PAPILLOMA VIRUS VACCINE (HPV)

3 vaccines for the prevention of HPV-related diseases are available on the Belgian market.

- **Cervarix®** is a recombinant vaccine consisting of the capsid proteins of HPV types 16 and 18 (responsible for 70% of the cases of cervical cancer).
- **Gardasil® 4** is a recombinant vaccine consisting of the capsid proteins of HPV types 6, 11, 16 and 18. Infection with HPV types 6 and 11 are responsible for about 90% of the genital warts.
- **Gardasil® 9** is a recombinant vaccine consisting of capsid proteins of 9 HPV types, with the 4 types being present in Gardasil 4 and 5 other HPV types that are associated with cervical cancer.

These vaccines are approved for administration to girls between **9 and 15 years old** (Cervarix) or **14 years** (Gardasil). Since 2010 the Flemish Community makes the vaccines available for free for girls from the first year of secondary education through the Pupil Guidance Center. In order to gain maximum protection from the vaccine, they should be vaccinated before they become sexually active. Since the school year of 2014 the vaccine is administered in a scheme of 2 doses: 0-6. In case of immune depression or older girls 3 doses are recommended (0,1,6 for Gardasil® and 0,2,6 for Cervarix®). For girls who cannot get the vaccine for free through the Pupil Guidance Center, it can be administered by a family doctor of your choice. In that case the vaccine is only reimbursed (category b) for girls who are at least 12 years old (but younger than 19 years) at the moment of the first administration. The maximum number of reimbursed vaccines is limited to 3 vaccines per claimant and "first administration", "second administration" and "third administration" must be mentioned on the prescription, for the 2nd and 3rd administration the date of the first, respectively the second administration should also be mentioned.

Fever and local reactions at the site of injection are the most frequent side effects. Other reported side effects are allergic reactions, nausea and dizziness.

A protective effect until 5 years after the vaccination is currently acknowledged; no further long-term facts are known, it is not clear, whether a booster vaccination will be necessary or not.
Systematic screening for cervical cancer remains necessary.

The vaccination should always fit in health encouraging initiatives regarding sexuality and safe sexual contact. Simultaneous administration of a HPV vaccine and other vaccines are under study and can only be confirmed for Gardasil® and the hepatitis B vaccine HBVAXPRO® (separate injection places).

Vaccination of boys is also recommended by the WHO, but is (not yet) reimbursed.

Sources: www.emedex.be and www.bcfi.be. For further information (also about vaccination in other age groups) and later updates, see: National Health Council:
www.health.belgium.be – click: EN; search term: "CSS 8460 HPV" and search for the most recent revision.
http://www.zorg-en-gezondheid.be/ search term: HPV vaccination.

10. VARICELLA VACCINE

At this moment this live-attenuated vaccine is generally not being used. The indication is not travel related. On the other hand questions about preventive or post-exposition vaccination rise before a planned trip by airplane (active disease means a prohibition to get in the plane): the varicella vaccine is 70 to 100% effective in the prevention of illness or a decrease in the seriousness of the symptoms when it is being administered within 3 days after possible contagion – more than 5 days after exposure, the vaccine loses its prophylactic effect (but will obviously increase immunity if the person was not infected).
A combination vaccine against measles-mumps-rubella-varicella is available as Priorix tetra®; it's place in the basic vaccination scheme has not been decided yet.
To be followed on the website of the National Health Council – vaccination calendar for child and adolescent: www.health.belgium.be – click: EN; search term: "vaccination".

11. INFLUENZA (FLU)

In the Northern hemisphere flu epidemics appear between November and March, in the southern hemisphere between April and September. In the tropics flu can be seen the whole year through.
Vaccination is recommended for children (6 months and older) with a chronic disorder of bronchial tubes, heart, kidneys or liver, with an impaired lower immunity or with daily aspirin intake.
Children younger than 9 years, who are being vaccinated against influenza for the first time, should receive 2 doses of the vaccine with an interval of at least 1 month. Half a dose is given to children under the age of 3 years, after the age of 3 years a full dose can be administered.

B. OTHER VACCINATIONS

1. YELLOW FEVER

Most of the children that are vaccinated against yellow fever after the age of 24 months will have lifelong protection. A single booster however is recommended (2 vaccines in total) in case of continuous exposure to yellow fever. For a small minority of children one single vaccine gives no durable immunity. A second vaccine is then necessary to protect this small group of children. Normally the vaccine is not administered to children under 9 months (WHO 2010: not recommended for children under 9 months). In a high-risk situation, it can

be administered – according to SCP (Summary of the Characteristics of the Product www.fagg-afmps.be) - to children of 6 months or older (never younger than 6 months!). Some cases of encephalitis have been registered after vaccination with children younger than 6 months. The only real contraindications are an allergy to chicken and egg proteins ("anaphylactic type"), or a state of immunosuppression.
The vaccines against yellow fever and measles are – if indicated – with an interval of 4 weeks. When this is not possible or when there is a required indication to administer the vaccines together, they can be administered simultaneously but in different limbs (the immune response on the yellow fever vaccination is possibly suboptimal).
If the vaccine is administered before the age of 24 months, or within 4 weeks before or after the measles-mumps-rubella vaccine, the yellow fever vaccine needs to be repeated before next travel. On the international certificate of vaccination, a validity of 1 year will be stated.

2. HEPATITIS A

Opinion differs about prevention of hepatitis A in children. The disease usually proceeds much more mildly and more frequently asymptomatically in children - certainly in those under 5 years old - than in adults. Fulminant hepatitis can occur, although extremely rare, and clinically manifest hepatitis A can spoil the trip. Children with hepatitis A, even if this is subclinical, can moreover be a major source of infection for their environment after returning home (family, relatives, kindergarten, school) and cause local epidemics with important morbidity within the group of secundary cases in older children and adults. It is therefore advisable to vaccinate all children of migrants visiting their country of origin. In the United States vaccination is recommended for all children from the age of 1 year. The individual indications for vaccination should be discussed with the parents.
The vaccine is easily administered from the age of 1 year. The vaccination scheme consists of 1 injection of 0.5 ml followed by a second injection 6 months, but preferably 1 year, later.

- Epaxal® IM or SC: from the age of 1 year - the same dose for both children and adults.
- Havrix® junior IM: an adapted vaccine for the age category from 1 to 15 years (regardless of the body weight).
- Vaqta® Junior IM or SC: an adapted vaccine for the age category from 1 to 17 years (included) regardless of the body weight.
- In the age category from 1 to 15 years, Twinrix® Paediatric, a combined vaccine against hepatitis A and B, is available. More information is given in chapter 7 "recommended vaccinations for travellers".

It is possible to administer the vaccine to children between 6 and 12 months (like with a hepatitis A epidemic in a day-care centre). When the vaccine is administered before the age of 1 year, the complete vaccination against hepatitis A will require 2 additional doses after the age of 1 year (advice National Health Council, September 2003). Full vaccination gives protection for more than 25 years and as a principle, lifelong.

3. TYPHOID

- **Parenteral vaccines** (Typherix® and Typhim Vi®) are not administered to children under the age of 2 years, as the immune response under this age (as with polysaccharide vaccines in general) is too low. Typhoid is in any case exceptional under the age of 2 years. A conjugated vaccine that works below the age of 2 can be expected on the market in the future.
  It has not yet been proven that the **oral vaccine** Vivotif® is efficient and harmless in children under 5

years of age. This does not mean that it must not be administered to younger children when there is a real risk of typhoid while travelling. The child must be able to swallow the entire capsule without biting it, which is normally only possible from the age of 5 years.

4. BACTERIAL MENINGITIS

Vaccination with the tetravalent meningococcal vaccine (against the **4 serogroups A,C,Y and W135**) is indicated for travellers visiting the **countries of the sub-Saharan meningitis** belt **during the dry season** (from the end of December until the end of June) **with possible close contact with the local population (travelling by public transport, staying in local guesthouses, migrants travelling to their country of origin and staying there with family) or** staying there for **more than 4 weeks**.

- **Persons without spleen** or a malfunctioning spleen must be vaccinated, even when they are only staying for a short period in one of the risk countries.
- Vaccination is mandatory for **pilgrims to Mecca** (from the age of 2 years).

In Belgium there are 2 **conjugated polysaccharide vaccines** for travellers which protect simultaneously against the 4 serogroups A, C, Y and W 135: **Menveo**® and **Nimenrix**®

- **Nimenrix**® can be administered **from the age of 6 weeks**
  For babies between 6 and 12 weeks the following vaccination scheme is recommended:
  M0-m2 and the 3rd dose at m12
  For babies between 12 weeks and 12 months: there are no recommendations of the producer. It is best to follow the same vaccination scheme as with the younger group of age, awaiting more information: m0-m2 (and the 3rd dose at 12m)
  From the age of 12 months: 1 injection.

- **Menveo® can be administered from the age of 2 years.** In some countries (since 2010 in the UK), Menveo® is administered from the age of 2 months, with a second dose one month after the first dose and (if the risk persists) a third dose after the age of 12 months. One dose is enough after the age of 1 year.

In case of continuous exposure, a booster is recommended after 5 years and after 3 years with children who had their last vaccine before the age of 7 years (conform the directives of the United States).

There is also a **non-conjugated** meningococcal vaccine Mencevax® that is cheaper and can be used from the age of 2 years, but its protection is noticeably shorter (presumably only 2 years).

NB:

- The **conjugated monovalent meningococcal-C-vaccine** (mentioned in the group of basic vaccines) protects only against the **C-serogroup**. It is not applicable in travel medicine, for the risk of meningococcal-C-infection is not greater abroad than in Belgium, probably even less. In Belgium this vaccine is administered to all children at the age of 15 months (together with the hexavalent vaccine). When a child had this vaccine before and an indication for Menveo® or Nimenrix® occurs, it is possible to administer it after a one month interval.

- Menveo® or Nimenrix® can replace the conjugate monovalent meningococcal-C-vaccine around the age of 15 months.
- A vaccine against meningitis **serogroup B** (an important cause of meningococcal meningitis in the industrialised countries) has recently been allowed in Belgium, Bexsero®**.** At present the value of this vaccine is difficult to predict because different essential data are missing (because of the "match" of in Belgium circulating vaccine antigens; because of a possible protective effect against meningitis or sepsis; because of the effect on support or inducing the group immunity ("herd immunity"); because of the length of the immune response and the necessity of later booster doses; to be followed on www.bcfi.be/ (situation on 29/04/16).

5. BACTERIAL PNEUMONIA

The 23-valent non-conjugated pneumococcal vaccine (Pneumovax 23®) is not part of the basic vaccination scheme of the baby and the indication remains strictly limited to certain risk groups (including asplenia) in a scheme where first the basic series with the conjugated vaccine is administered. (see text below in 'Basic vaccinations' point 7).
For updates - see: High Commission for Health: www.health.belgium.be click: Eng, search term: CSS 8757 'Recommendations for vaccination for the prevention of S. pneumonia infections with children with an elevated risk of invasive pneumococcal disease' and search for the most recent revision.

6. RABIES

Children who play outside in third world countries run a real risk of rabies. They are more likely to get bitten in the face or neck (with big risk of more serious injuries), which can greatly shorten the incubation period for rabies. The advice not to stroke any unfamiliar animals in the street or "tame" animals living in the wild is especially applicable to children. Vaccination should in any case be considered for a prolonged stay in a remote rural area. The vaccine may even be administered to infants under the age of 6 months, (there is no age limit) though in practice vaccination is usually given only from the age of 1 year, the age at which the child begins to walk. The risk of rabies should be non-existent at this age. Vaccination scheme: Day 0 – Day 7 - Day 21 or 28 (see chapter on Rabies).

7. TUBERCULOSIS

Tuberculosis is an infectious disease caused by the *Mycobacterium tuberculosis* bacterium. Transmission occurs through inhalation of coughed up contagious drops/particles.

The number of tuberculosis cases has strongly decreased in Belgium during the second half of the twentieth century. Since 1993 this decrease has slowed down. Since 2010 1115 new cases of active tuberculosis have been reported in Belgium. The disease is strongly related to poverty and poor living conditions. Risk groups are underprivileged, homeless persons, detained persons, new migrants from high incidence countries, refugees, drug users, … everyone living in extreme poverty.

In case of infection, the risk for healthy adults to develop tuberculosis is estimated to be 5-8% in the first 2 years after infection, and another 5% spread over the rest of one's life *(approximately 10% "lifetime risk" in*

case of normal immune response). In 90% of the cases, nothing happens. There's only a **latent** (sleeping) infection. The risk may however increase up to 40 % in children up to 2 years old.
The risk developing active tuberculosis disease may increase up to 10 % per year in persons with immune depression.

*A study in the Netherlands of the incidence of tuberculin conversion (measure for the risk of contagiosity) in several hundred **travellers** who spent between 3 and 12 months in one or more countries of high incidence, showed a risk of 3,5 per 1000 travel months or an annual risk of approximately 4%. These travellers came into relatively close contact with the local population: 55% were travelling for work or as part of their training and almost all had used local public transport or stayed in "local guesthouses".*
*The risk of tuberculin infection was established by tuberculin conversion (CTT; Mantoux intradermal testing). For people who had worked in the healthcare sector during their stay this was **7,9/1000** travel months compared to **2,8/1000** for the others (annual risk appeared to be about 3% per year). The risk of infection also increased with the length of stay. For this category of travellers, the risk is comparable with the risk of TB infection among the local population, estimated at 1.0-2.5% per year. People who take organised holidays in tourist areas probably have hardly any of the types of contact necessary for infection and their TB risk is considerably lower. (Cobelens, Lancet 05/08/2000).*

Vaccination
The BCG vaccine is a live, attenuated bovine tuberculosis bacillus-based vaccine. It is administered intradermally, thus producing a local infection. This induces cellular immunity (no protective antibodies), which attenuate a virulent infection (it does not prevent the actual infection).
It produces a certain degree of protection against tuberculous-induced pathology, but mainly to severe post-primary complications like general ("milair") tuberculosis and tubercular meningitis. This protective effect has clearly been proven in children and not in adults.

The vaccine does not reduce the infection risk and only offers an incomplete protection against the development of tuberculosis, but it protects against severe forms. A protective effect of 80% is assumed for meningitis and miliairy TB and of 50% for respiratory TB with children until the age of 2 years. The maximum protection period is estimated at 10 to 15 years. Vaccination or repeat vaccinations of adults are not considered to be effective. The disadvantage of the tuberculin cutaneous test (Mantoux) is that it is more difficult to interpret in the years to come and that it is less usable as a diagnostic remedy after (until ten years) vaccination. In the future the blood tests measuring the T-cell reaction on specific antigens of *'Mycobacterium tuberculosis"* will be used ('interferon-gamma release assays' (IGRA)). These tests are not influenced by former BCG-vaccination.
The vaccine may be administered from birth, in the postero-external side of the upper arm. In case of correct intradermal administration, a skin weal of +/- 8 mm ("orange skin") will appear and then disappear after 1-2 hours.

After 3 weeks a hard nodule appears, that sometimes ulcerates and after 3 to 4 weeks heals with a permantent scar. Postvaccinal side-effects are observed in 1 to 10% of the vaccinated persons, mainly as a regional lymph node swelling (armpit or neck) that disappears automatically after 2-3 months.

The vaccination is given preferably 8 to 10 weeks before departure to a risk area. The immunity will thus have reached its maximum (the protective effect of the BCG vaccine starts after 5 to 10 weeks) and any local abcesses or inflammation of the armpit and/or neck glands resulting from vaccination can still be treated in Belgium.
The BCG vaccine may be given together with **inactivated** ("killed") vaccines, but for the innoculation with **live** vaccines (measles, rubella, mumps, yellow fever) one month of interval should be taken into account.
The normal paediatric basic vaccination schedule can continue unchanged.
Contraindications include extensive dermatoses, immunosuppressive disorders, immunosuppressive medication and pregnancy. Persons with previous positive tuberculin cutaneous test, will not be vaccinated.
The vaccine is no longer commercialized in Belgium and not or very difficult to obtain, but can be ordered by a pharmasist outside the country.

Indications for vaccination as part of travel health:

a) There is no indication for BCG-vaccination for ordinary tourists.
b) BCG-vaccination for **migrants's children to 5 years** who travel (yearly and/or for a longer period) to relatives in the country of origine is to be considered seriously (or not to be discouraged) – at least 8 to 10 weeks before departure.
c) The WHO advises vaccination for **children and young adults living in countries with low TB-prevalence** and who are going to live in an endemic area for a long time (at least a few months). If there is a substantial risk of exposure (prolonged stay in a third world country, regular close contact with the local population, using public transport, staying in "local guesthouses", in an area with high TB prevalence) and the local medical infrastructure is of a very low standard. This is also recommended for aid workers (especially those working in the health sector). Vaccination is also required by some French high schools in overseas areas.
d) For other people the following applies:

- Tuberculin cutaneous test negative before departure + stay of a minimum of 6 months in a third-world country: **tuberculin cutaneous test 2 months after returning home**.
- Tuberculin cutaneous test negative before departure + high risk stay in a third-world country (e.g. medical personnel, social workers, in certain cases also children under 5 years of age, etc.): consider **BCG –** at least 8 -10 weeks before departure.

The advice to vaccinate a child for an extend stay in risk areas is a complex process where one should take into account the costs, the inconveniences of vaccination and the risk of side effects in function of a very incomplete and uncertain protection. You can contact the Flemish "Respiratory Healthcare and Anti-Tuberculosis Association" (VRGT) or the French "Fonds des Affections Respiratoires" (FARES) on telephone number 02/512.54.55 or 02/512.29.36 for additional advice and information on the indications for vaccination. The dispensaries of the VRGT and FARES no longer administer vaccines and do not have them in stock.

Regular intradermal cutaneous tuberculin testing (perhaps to be replaced by interferongamma-test in the future) before departure, then annually or once every two years; two months after finally returning home is still an excellent alternative.

When this test appears to be positive, a radiology of the thorax is indicated; if this result is normal, a treatment with one anti tubercular medicine during 6-9 months will be applied.

The risk of tuberculosis infection evolving into an active tuberculosis is thus reduced with 80 to 90 %. More info: see www.vrgt.be or www.fares.be. Furthermore it is important to **diminish the risk of exposure** by avoiding dark, small and crowded rooms with poor fresh oxygen supply (**direct sunlight and good ventilation** diminish the contagion of cought up bacilli drastically and immediately). Persons having a nasty cough with sputum for more than 3 weeks may have contagious tuberculosis. A simple **radiology of the lungs** might exclude the diagnosis immediately (for example with domestic house staff).

8. JAPANESE ENCEPHALITIS

http:// www.reisgeneeskunde.be/ITG/Uploads/MedServ/njapenc.pdf

For the moment **Ixiaro®** (2 injections with an interval of 28 days) is used **from the age of 2 months**.

Half a dose of Ixiaro® is administered twice to children **between 2 months to 2 years of age** with an interval of 28 days – the same syringe is used for adults, but a clear red line indicates the exact quantity of liquid to be administered to children (0.25 m).

For children from 3-17 years the new vaccine (adult dose) is still in a test phase and temporary results are very encouraging: in this age category two adult doses of Ixiaro® are administered with an interval of 28 days. A first booster injection will be given after 12 to 24 months. No data are yet available about further boosters, but the advice about administering a booster injection (after 3 doses) will be at the earliest after 10 years is to be expected. The vaccine against Japanese encephalitis is available at the pharmacy.

9. FRUHSOMMER MENINGO-ENZEPHALITIS OR EUROPEAN TICK BORNE ENCEPHALITIS (TBE)

This vaccine is preferably not administered to children under 1 year. It avoids giving too many vaccinations and the risk to this age group is thought to be very low.

Children between 1 and 16 years old: **FSME-IMMUN ® Junior 0,25 ml** (=half of the adult dose) is used. A protection of at least 98% is acquired after two injections.

	Conventional scheme	**Rapid scheme°**
1e dose	D0	D0
2e dose	1-3 m	D14
3e dose	5-12 m after 2e vaccine	5-12m after 2e vaccine
1e booster	3y	3y
Next booster	5y* to 10 years	5y* to 10 years

° in case of lack of time

* in persons older than 60 years the booster has to be administered every 3 years

C. MALARIA

1. External protective measures against mosquito bites

External protective measures against mosquito bites are also very important preventive measures for children and are the only way to protect children under 5 kg.

As there is a chance of slight absorption through the skin and, in exceptional cases, side effects have been reported (mainly with the use of large quantities), the repellents should be applied to children with the necessary caution. Irritation of the skin is a frequent side effect.

Avoid contact with lips, mouth, eyes and mucous membranes. Avoid rubbing the hands with the product in order to prevent unintentional contact with eyes and mouth. The product acts for at most a few hours, so the use of a repellent alone does not guarantee sufficient protection for the whole night! Avoid prolonged use! To limit contact with the product as much as possible it is advisable to rinse off the residue from the skin when further protection is no longer needed. A bath can be given before putting the child to bed under a mosquito net.

The following products may be used by children:

- **DEET** 20%: from the age of 6 months
- **IR3535** 20%: from the age of 6 months
- **(p)Icaridin** 20%-25% from the age of 2 years
- Products based on **citrodiol extract from eucalyptus oil** (also known as p-menthane 3.8 diol or PMD) 20%-25% from the age of 6 months.

2. Chemoprophylaxis

The tablets for adults can easily be divided into 2 or 4 parts with a pill splitter, such as **Pilomat® (KELA Pharma).**

For children over 5 kg the daily dose of **Atovaquone/Proguanil®** - **Malarone®** or **Malarone Junior®** is adapted as follows:

Atovaquone/Proguanil - Malarone®	
Bodyweight (Kg)	**Daily dose in tablets**
5 – 7,9 kg	½ tablet Malarone® Junior
8 – 10,9 kg	¾ tablet Malarone® Junior
11 – 20 kg	¼ tablet of Atovaquone/Proguanil - Malarone® for adults or 1 tablet of Malarone® Junior
21 – 30 kg	½ tablet of Atovaquone/ Proguanil - Malarone® for adults or 2 tablets of Malarone® Junior
31 – 40 kg	¾ tablet of Atovaquone/Proguanil - Malarone® for adults or 3 tablets of Malarone® Junior
From 40 kg	1 tablet of Atovaquone/Proguanil - Malarone for adults

You can ask the pharmacist to make up capsules with the correct dose of Atovaquone/Proguanil - Malarone®.

(2) For children from 5 kg the weekly **mefloquine** - **Lariam®** dose (4-5 mg/kg) is adapted as follows:

Mefloquine - Lariam®	
Bodyweight (kg)	**Weekly dose in 250 mg tablets**
<5	Not applicable
5 - 10	1/8
11 – 20	¼
21 – 30	½
31 – 45	¾
>45	1(*)

You can ask the pharmacist to make up capsules containing the correct dosage of Mefloquine. On average, children suffer less from side effects, though a tolerance test before departure is recommended, as it is for adults. If the child vomits within 30 minutes after taking the tablet, it is sufficient to simply give a fresh dose.

(*) Experience tells us that slender girls/women, up to 50 – 55 kg, run a higher risk of side effects if they take an adult dose: a careful 3-week tolerance test is recommended. It is probably best to keep taking a lower dose of Lariam. Lariam is not contra-indicated for children who in the past suffered febrile convulsions or for children with ADHD.

(3) For **chloroquine** - **Nivaquine®**: no longer available on the Belgian market since 7/2016. Chloroquine can still be prepared by a compounding pharmacy; the dose is 5 mg/kg, 1x/week, to be started 1 week in advance and to stop 4 weeks after the malaria risk. However, this product is now rarely used for malaria prevention in zone A/B. If necessary Plaquenil® (hydroxychloroquine) can be used for children > 30 kg: maximum dose of 6.5 mg/kg, 1/week. Overdoses can be fatal, so the tablets should be stored far out of reach of children!

(4) Doxycycline as prevention is allowed from the age of 8 years: (1,5 mg/kg/day without exceeding 100 mg/day).

Breastfeeding mothers: the prophylactic medication does not cross into the milk in sufficient quantities to protect the baby and should therefore be administered to the baby. Chloroquine means no risk for the baby. According to the WHO and CDC mefloquine is safe during breastfeeding, also among infants weighing under 5kg.

According to the British Guidelines (www.gov.uk/phe - Guidelines for malaria prevention in travellers from the UK 2013) Mefloquine can be used during breastfeeding, also with children under 5 kg.
According to the British Guidelines (www.gov.uk/phe - Guidelines for malaria prevention in travellers from the UK 2013) and France (www.lecrat.org) Atovaquone/Proguanil – Malarone® can be used during breastfeeding, also with children under 5 kg, when there is a required necessity for chemoprophylaxis and there is no alternative.
Basically breastfeeding is a contraindication for doxycycline, but according the British Guidelines (www.gov.uk/phe - Guidelines for malaria prevention in travellers from the UK 2013) doxycycline can be used during breastfeeding when there is a required necessity for chemoprophylaxis and there is no alternative. Also the American Academy of Paediatrics in the United States declares that the intake of doxycycline can be combined with breastfeeding, because there are only very small substances that end up in the breastfeeding.

3. Treatment

Fever in a child in an endemic area (and up to 3 months after leaving that area) must always be considered as malaria in the first instance. You are advised to rapidly seek adequate medical assistance (in order to be able to make a correct diagnosis, as the condition is often not malaria).

Fever itself may be absent in babies, but malaria must be considered if there are other symptoms of illness.

In principle the same medication used in adults can be used in children

1) Atovaquone/Proguanil - Malarone® (250 mg of atovaquone and 100 mg of proguanil) is the first choice and can be used when bodyweight is above 5 kg; **always with some food** (crushed and mixed with a spoon of nice food). The intake can sometimes induce vomiting.

Atovaquone/Proguanil - Malarone®	
5 – 8 kg	2 paediatric tablets/day, in one intake, for 3 executive days
9 – 10 kg	3 paediatric tablets/day, in one intake, for 3 executive days
11 – 20 kg	1 tablet for adults/day, in one intake, for 3 executive days
21 – 30 kg	2 tablets for adults/day, in one intake, for 3 consecutive days
31 – 40 kg	3 tablets for adults/day, in one intake, for 3 consecutive days
From 40 kg	4 tablets for adults/day, in one intake, for 3 consecutive days = adult dose
1 paediatric tablet Malarone Junior® contains 62,5 mg of atovaquone and 25 mg of proquanil.	

2) Quinine can be given for 3 to 7 days (10 mg/kg 3x per day for 5 days) combined with **clindamycine** (5 mg/kg 4 x day during 5 days). Doxycycline is contraindicated for children younger than 8.

3) Artemisinine derivatives may be given to children. **Eurartesim**® (a combination of 40 mg of artenimol and 320 mg of piperaquinetetraphosphate) and **Riamet**® (a combination of 20 mg of artemether and 120 mg of lumefantrine) are effective oral medication, now available in Belgium, for the treatment of uncomplicated malaria with children and babies from 5 kg. For the details we refer to SCP (Summaries of the Characteristics of the Product): see www.fagg-afmps.be.

4) Mefloquine- Lariam® in a dose of 15 mg/kg, followed by 10 mg/kg after 8-12 hours. Mefloquine (LARIAM®) is hardly used now in practice as malaria treatment and may never be used without medical supervision. Mefloquine- Lariam® should not be administered to children younger than 3 months and/or below 5 kg. Infants will however, often first need to be treated with intravenous quinine therapy!