TRAVEL MEDICINE

• Recommandation before travel to tropical countries
  – Compulsary and recommended vaccination
  – Antimalarial prophylaxis
  – Mosquito nets, repelents, insecticides
  – Prophylaxis of travel diarrhea
  – Other medical and health risks
  – Travel pharmacy

• Investigation of patients after returning from tropics
WHO IS VACCINATING?

- Centers of travel medicine
- Departments of hygiene and epidemiology
- Departments of infectious diseases
- Departments of working medicine
- GPs
HEALTH PROBLEMS AFTER 1 MONTH STAY IN TROPICS

- Travel diarrhea: 30 - 80%
- ETEC diarrhea: 10%
- Malaria (W. Africa, w/o proph.): 1%
- Acute respiratory infections: 1%
- Hepatitis A: 0.1%
- Dengue (S.E. Asia): 0.1%
- Gonorrhea: 0.01%
- Animal bites w. rabies risc: 0.0001%
- Hepatitis B: 0.01%
- Typhoid fever (Indian Subcont.): 0.01%
- HIV infection: 0.001%
- Legionella: 0.001%
- Cholera: 0.001%
- Poliomyelitis: 0.0001%
- Meningococcal infection: 0.0001%

Any health problem: 100%
Subjectively ill felt: 10 000
Physician consulted: 1000
Stayed in bed: 100
Incapacity of work after ret.: 10
Stayed in hospital: 1
Air evacuation: 1
Died abroad (chronically ill): 1
Died abroad (healthy): 1
TRAVEL VACCINATION

• REQUIRED (COMPULSARY)
  – Yellow fever
  – Meningococcal meningitis, (Cholera)
• REGULAR
  – Tetanus, Pertussis, Poliomyelitis, Diphteria
• RECOMMENDED
  – Hepatitis A, B, Typhoid fever, Meningococcal meningitis, Rabies, Japanese B Encephalitis
• SPECIAL
  – Influenza, Pneumococcus, TBE
GENERAL CONTRAINDICATIONS OF VACCINATION

- Acute febrile disease
- Active infectious, tumor, autoimmune or other systemic disease
- Treatment with immunosuppresive drugs (cytostatics, glucocorticoids, interferons)
- Allergic reaction to the previous vaccination

ADVERSE EFFECTS OF VACCINATION

- Local reaction (pain, erythema in the aplication site)
- General signs: fatigue, head pain, muscle, joints pain, fever – increased body temperature
- Allergic reaction – exanthema, cough, dyspnoe
- Anaphylactic reaction (cave i.v. aplication!)
REQUIRED TRAVEL VACCINATION

- Yellow fever
- Meningococcal meningitis
- Cholera
Countries/areas where there is a risk of yellow fever transmission:

- Either yellow fever has been reported or disease has occurred in the past plus the presence of vectors, and animal reservoirs create a potential risk of infection (considered to be endemic areas).

Source: WHO, 2002
Yellow Fever Vaccination Recommendations in Africa, 2010

*Yellow Fever (YF) vaccination is generally not recommended in areas where there is low potential for YF virus exposure. However, vaccination might be considered for a small subset of travelers to these areas who are at increased risk for exposure to YF virus because of prolonged travel, heavy exposure to mosquitoes, or inability to avoid mosquito bites. Consideration for vaccination of any traveler must take into account the traveler’s risk of being infected with YF virus, country entry requirements, and individual risk factors for serious vaccine-associated adverse events (e.g. age, immune status).
ŽLUTÁ ZIMNICE - ROZŠÍŘENÍ
YELLOW FEVER VACCINE

- **STAMARIL** (Aventis-Pasteur)
- Live, attenuated strain 17D cultured on the chick embryo (contains agg proteins (albumine – cave alergy!), developed in the 30-ties of 20 centure
- Lyophilized vaccine – application during 1 hour after dissolution - 0,5 ml s.c.
- Effective 10 days after application and for 10 years
- Aplikovat min. 4 týdny po jiné živé atenuované vakcíně, odstup minimálně 2 týdny, jestliže YF předchází jiné živé vakcíně
- Application together with polysaccharide typhoid Vi vaccine increases antibody production against YF
- **Contraindications:** pregnancy, immunosupression (HIV < 400 CD\textsubscript{4}), allergy to the egg proteins, neomycine, polymyxine, children under 6 – 9 months
- **Side effects:** local (pain at the application site); general (muscle pain, headache, flu-like symptoms 5-12 days after application, mild hepatitis)
- **Indication:** Tropical Africa and America; travellers from endemic regions to Asia, America, Mediterranien
- Application is noticed to the **International Certificate of Vaccination**
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# Yellow Fever - Complications

## Severe Viscerotropic Complications Associated with Vaccination of Elderly Persons (Over 60 Years)

- 36 cases recorded (5 cases per 1 million vaccinated) since 1996
- Isolated virus of YF genetically identical with vaccination 17D strain
- 2 – 8 days after vaccination; risk factors:
  - Age over 60 years (20 cases per million vaccinated)
  - Thymectomy 2 – 20 years before vaccination) or thymoma in history
- Many cases with fever, elevation of LFT and renal dysfunction

## Severe Neurologic Complications

- 28 cases recorded (4 cases per 1 million vaccinated)
- 4 – 28 days after vaccination: headache, fever
- Risk factors:
  - Higher age; first application
MENINGITIS BELT IN AFRICA

Meningitis Belt, 2004

Areas Outside the Meningitis Belt With Epidemics of Meningococcal Meningitis, 2000-2004
MENINGOCOCCAL MENINGITIS

Tetravalent conjugated vaccine: A, C, Y, W135 (MENVEO, Novartis)
- Recommended for travellers and in endemic countries
- Effective for 10 years, children over 11 years

Tetravalent polysachrideride vaccine: A, C, Y, W135 (MENOMUNE, Aventis)
- Required for travellers to Mecca and Medina
- Limited availability in Europe (30-50 €), effective for 3 years
- Used during epidemics in Africa

MENINGOCOCCAL VACCINE A + C (Aventis); MENCEVAX A+C (SKB)
- Inactivated bivalent polysaccharide vaccine
- Children over 2 years, 1 dose, 0.5 ml s.c.; effective 10–14 days after application for 3 years

New conjugated vaccines: against type C
- NeisVac-C – polysaccharide C conjugated with tetanic toxoid (Aventis)
- Meningitec – conjugated with diphteric toxoid (Weith)
- Menomune
- Menjugate – conjugated with diphteric toxoid (Chiron)
- Not used in travellers to tropics, where epidemic type A dominate
- Effective at least for 8 years, application at children under 1 year possible
CHOLERA DISTRIBUTION
CHOLERA

- Not required by WHO
- Some countries may require (Tanzania, Kenya, Egypt, Saudi Arabia – travelers to Mekka a Medina)
- Inactivated, parenteral vaccines no more recommended (low effectiveness, severe side effects)
- New oral vaccines for persons over 2 years
  - ORACHOL (MUTACHOL), Berna – live, attenuated
    - Minimal effectiveness 80%, cover for 6 mo after 1 dose
    - DUKORAL (distribuce Behringer-Chiron): inactivated, buněčná + rekombinantní beta podjednotka cholerového toxinu
  - DUCORAL (Chiron) – inactivated, Vibrias + recombinant beta subunit of cholera toxine
    - 2 doses (in the U.S.A. 3 doses) with 1-6 weeks interval
    - after 2 doses cover for 1-2 years against cholera (protection of 85% at 6 mo and 50% at 3 years);
    - 6 months protection against enterotoxic *E. coli* strains travel diarrhea (**2,2 – 6 % of protection after recent studies**)

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EPIDEMICS OF CHOLERA IN WEST AFRICA IN 2005
HEPATITIS A HIGH RISC AREAS
HEPATITIS A

• Hepatitis A
  – Inactivated
  – 2 doses of 0.5 ml s.c. in the interval of 6 to 18 months, protection 2 weeks after first dose
  – Immunity minimal for 20 years, probably life-long
    • HAVRIX (SKB)
    • AVAXIM (Aventis)
    • VAQTA (Merck)
    • EPAXAL (Berna)
HEPATITIS B HIGH RISC AREAS
HEPATITIS B VACCINES

• Hepatitis B
  – rekombinant HBsAg
  – Long-life immunity after 3 doses (0, 1, 6 months)
    • ENGERIX-B (SKB)
    • RECOMBIVAX (MSD)

• Combine hepatitis A + B vaccine
  – TWINRIX (SKB) – 3 doses (0, 1, 6 months)
Whole-cell inactivated parenteral vaccines are not more used – severe side effects, low effectivity

**TYPHIM Vi (Aventis), TYPHERIX (SKB)**
- Inactivated polysaccharide vaccine *S.typhi* Ty2; for persons older than 2 years
- 1 dose, 0.5 ml i.m. or deep s.c. application, effective 1 - 2 weeks after vaccination
- Immunity for 2 – 3 years (protection 60 - 80 %); booster after 3 years (at high risc after 1-2 years)
- Well tolerated, around 1 % of side effects

**VIVOTIF (Berna), TYPHORAL L (Chiron)**
- Oral live attenuated vaccine *S.typhi* Ty21a
- 3-4 capselIn every other day 1 hour before meal; liquid form for children of 2 – 6 years
- Effective 7 days after last dose
- Immunity last for 1 - 3 years; (5 years after 4 doses)
- Do not combine with mefloquine, antibiotics, chemotherapeutics
TYPHOID FEVER IMPORTED TO THE EUROPE

• TRENDS: Decreased number of imported cases to the Europe:
  – Indian subcontinent dominates
  – Decrease of cases from northern Africa and Peru
• Vaccination has 60-80% effectivity

Number of notified cases of the typhoid fever to the CZ (CEM):

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JAPANESE B ENCEPHALITIS DISTRIBUTION

Japanese encephalitis, 2003

Source: WHO, 2003

- All-year transmission
- Seasonal transmission
JAPANESE B ENCEPHALITIS VACCINE

- JE-VAX (Biken, Japonsko) – limited availability in Europe
- Inactivated, purified virus cultured in mice brain (Nakayama strain)
- Application of 1 ml (children of 1 – 3 years old 0.5 ml) s.c.
- Schema: 0, 7, 14 or 0, 7, 28 day, effective after 2nd dose (91% effectivity)
- Booster after 1 - 2 years and then every 3 years
- Up to 20% side effects:
  - Local: 1 – 31% (average 20%); pain, erythema, oedema
  - General: 10%; fever, headache, rash; encephalopathy (1:2,3 mil.)
- Indication: India, China, S.E. Asia; stay for more than 1 month in the forestry regions in rainy season
LYSSA = RABIES

• Etiology: Lyssavirus ssRNA-, 6 „strains“

• Pre-expose prophylaxis 3 doses
  – VERORAB (Pasteur)
  – RABIPUR, RABA VERT (Chiron)

• After biting with a risk of infection:
  – Immune globulin +
  – 3 doses of vaccine
REGULAR VACCINATION IN TRAVELERS

- Tetanus, pertussis, diphteria
- Poliomyelitis
- Measles, parotitis (mumps), rubella (MMR)
- Hepatitis B
- *Haemophilus influenzae* B conjugated vaccine
- Meningococcal C conjugated vaccine
- Varicella (chickenpox) – USA, Japan
PERTUSIS

- Whole-cell, inactivated, parenteral vaccine – side effects
- Acellular – detoxicated pertussis toxin
- Adult persons are not vaccinated (side effects), but may represent the source of infection

TETANUS

- Revaccination in the Czech Republic every 10 - 15 years
Vaccination of adults:

- **Diphtheric anatoxin:**
  
  **Absorbed Diphtheria adult** (Diphterie – Adsorbat – Impfstoff Behring fur Erwachsene) – persons older than 6 years

  **Td-pur** = (diphteria + tetanus) for adult person

- Booster at adult travellers over 30 - 40 years travelling to regions with pertussis (tropics, Ukrainien, Russia)

- Booster in persons in contact with refugies from endemic countries

- Revaccination every 10 years – 1 dose i.m.
INCREASED RIS OF TUBERCULOSIS
TUBERCULOSIS VACCINES

- Recommended for routine vaccination by WHO
- Regular universal vaccination in the Cz, Slovakia, Finland
- In the EC countries at persons in the risk
- BCG vaccination recommended for long stay in tropics
- USA do not vaccinate → tuberculin i.d. test is used for diagnostics of tuberculosis
RESISTANCE OF MALARIC PLASMODIA
I – bez chemoprofylaxe
II – chlorochin
III – chlorochin + proguanil
IV – meflochin, Malarone (A/P), doxycyklin
ANTIMALARIAL PROFYLAXIS

• Zone II:
  – Central Amerika, Haiti, Dominican Republic
  – chloroquine (PLAQUENIL, 150 mg tbl.) – 2 tbl weekly
    • Start 1 week before departure continue 4 weeks after returning

• Zone III:
  – India, Sri Lanca
  – Chloroguine + proguanil (PALUDRINE)
    • proguanil: 2 tbl daily
    • Start 1 week before departure continue 4 weeks after returning

• Zone IV:
  – Tropical Africa, South America, SE Asia, Oceania
  – mefloquine (LARIAM) – 1 tbl weekly
    • Start 1 week before departure continue 4 weeks after returning
  – atovaquon + proguanil (MALARONE) - 1 tbl daily
    • Start 1 day before departure continue 7 days after returning
  – Doxycykline 100 mg tbl./day - 1 week before - 4 weeks after