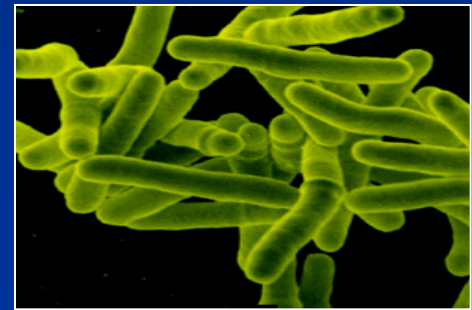
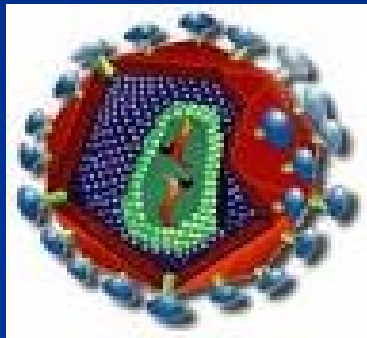


OCCUPATIONAL INFECTIONS



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Definition

Occupational infections are those human diseases caused by work-associated exposure to *microbial agents*, including

- **bacteria**
- **viruses**
- **fungi**
- **parasites** (protozoa, helminths)

What distinguishes an infection as occupational is some aspect of the work that involves contact with a biologically active organism.

Infections may be transmitted

- when people work or live in groups (daycare centers, barracks)
- when people work with ill people or with human secretions (healthcare and laboratory workers)
- when people travel (business travel, military campaigns)
- when people work with animals (farms, zoos, laboratories)
- when the spores occur (farming, constructions)
- when the water aerosol occurs (factories, treatment plants)



Kinds of occupational infections

1. Infections due to exposure to infected **human or their tissues**
2. **Zoonoses** – infections transmitted from animals to humans
3. **Travel associated** infectious diseases



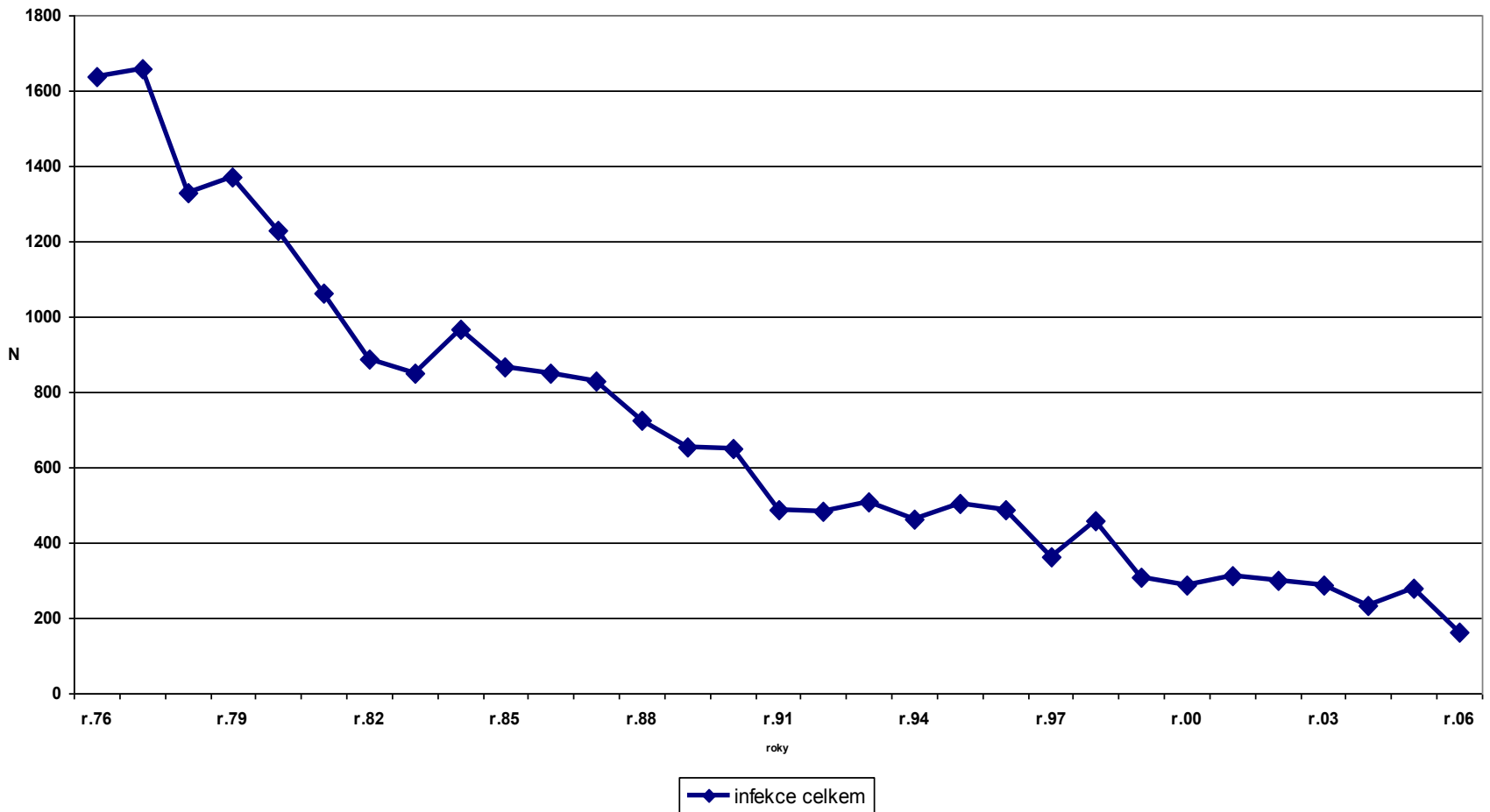
1. Infections with interhumans transmission



- **Healthcare and clinical laboratory workers** are at increased risk of infection by organisms whose natural hosts are humans, as in the case of viral hepatitis A,B,C, HIV, scabies, rubella, measles, mumps, varicella zoster, EB virus, epidemic keratoconjunctivitis, TBC...
- **Teachers, policemen, social workers:** rubella, measles, mumps, influenza, tuberculosis

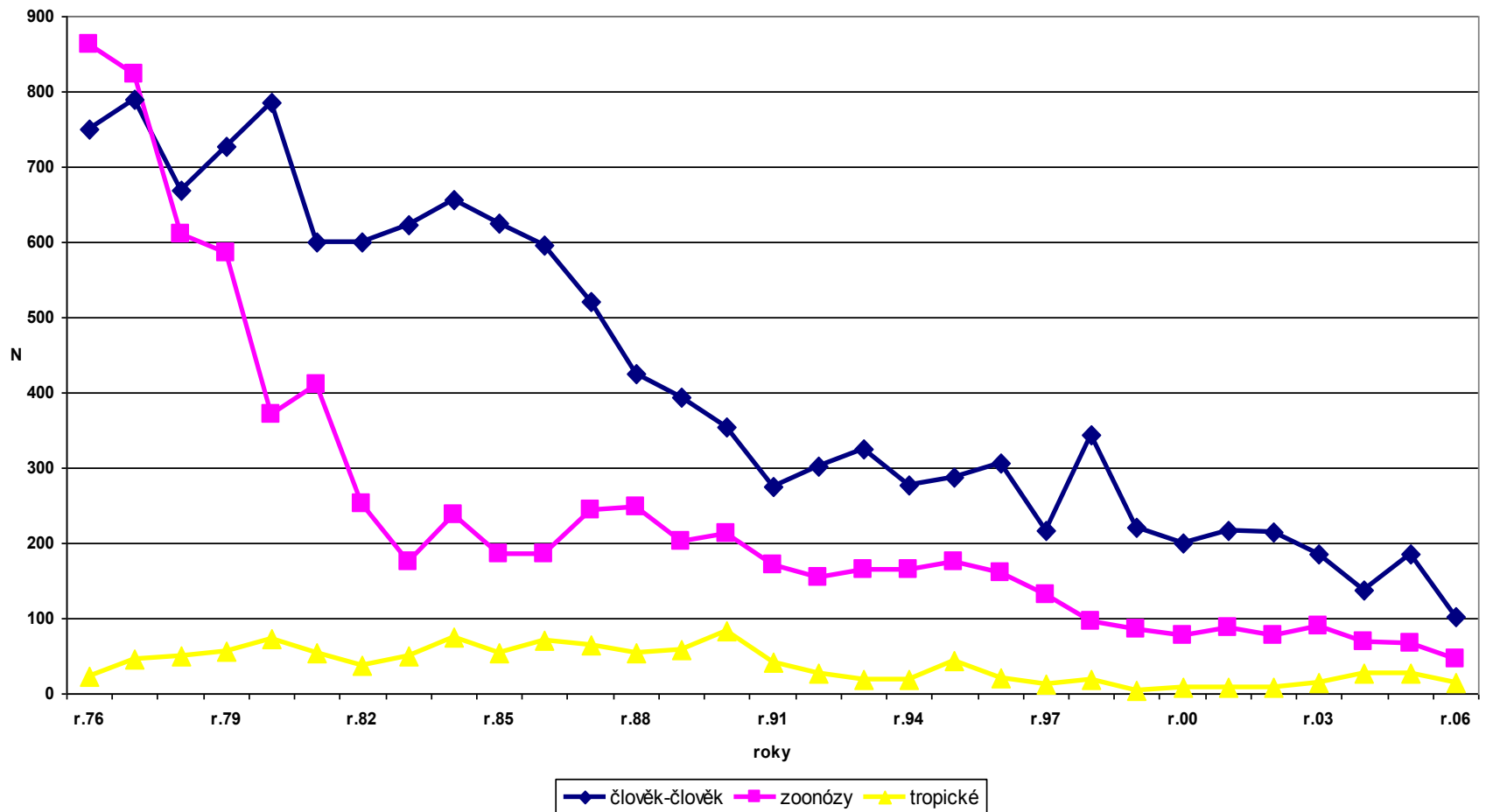
Occupational infections, Czech Republic, 1976-2006

Profesionální infekční nemoci v ČR, 1976-2006



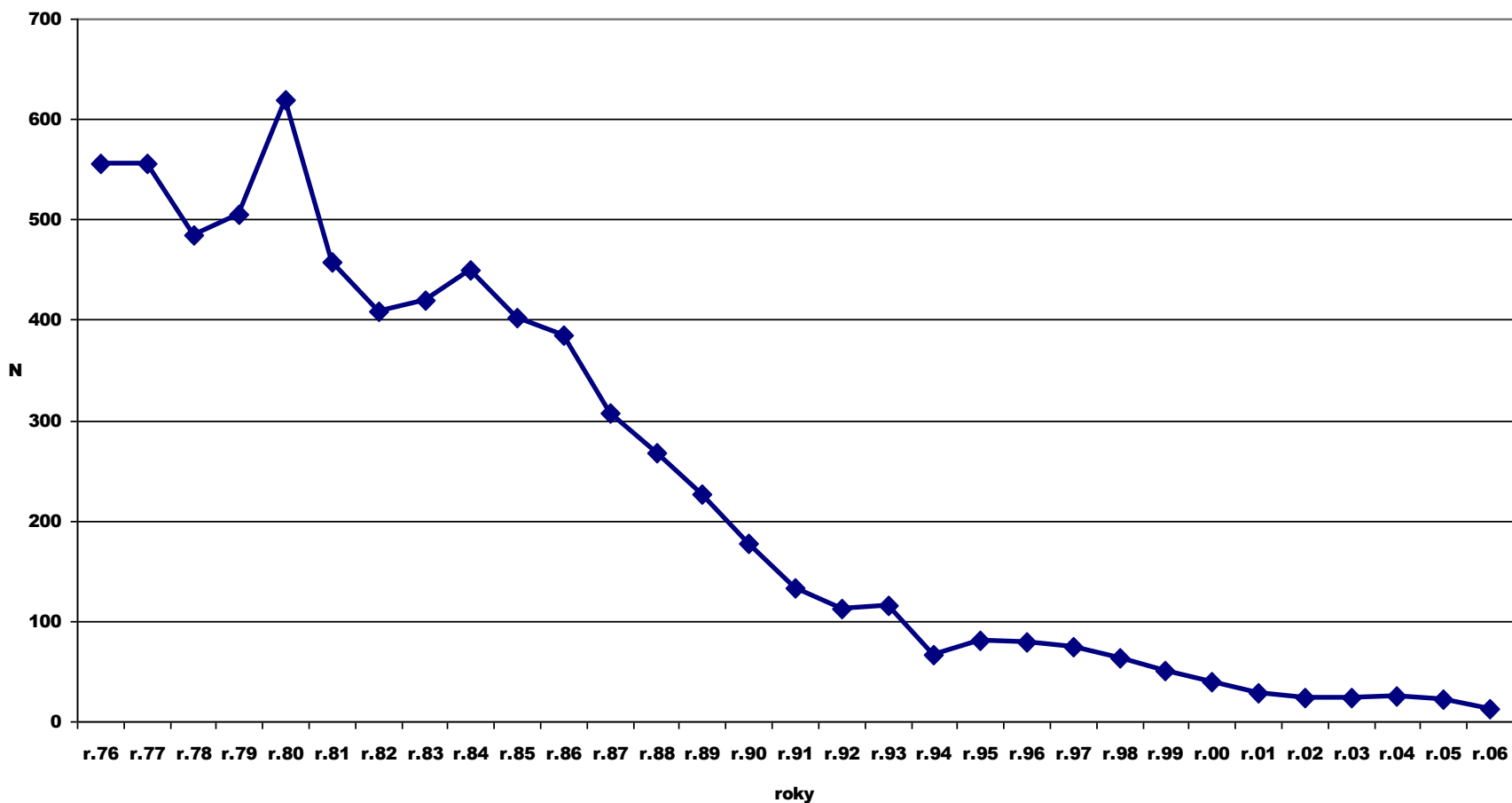
Occupational infections, Czech Republic, 1976-2006

Hlavní typy nemocí z povolání přenosných a parazitárních v ČR, 1976-2006

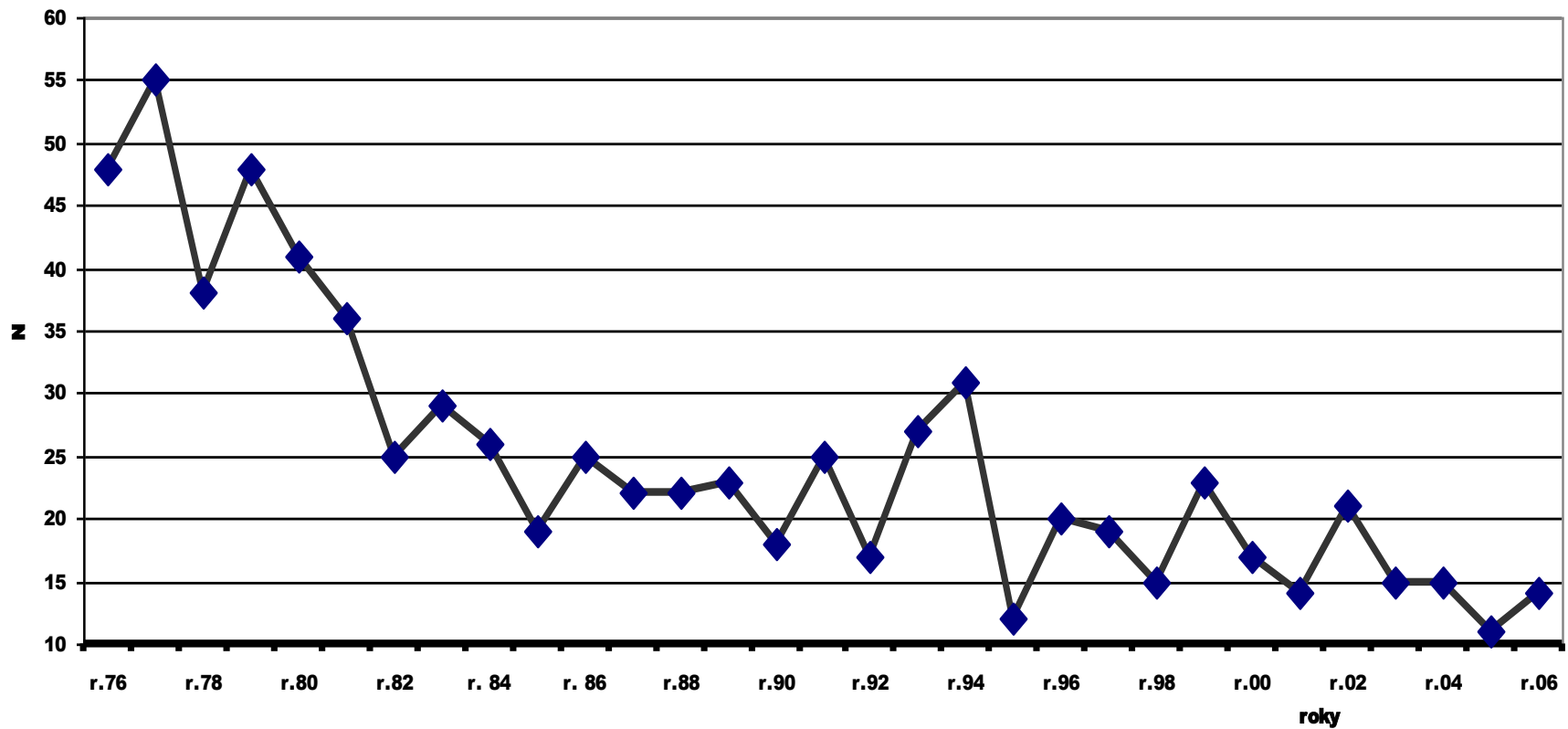


Occup. hepatitis, Czech Republic, 1976-2006

Profesionální hepatitidy v ČR, 1976-2006

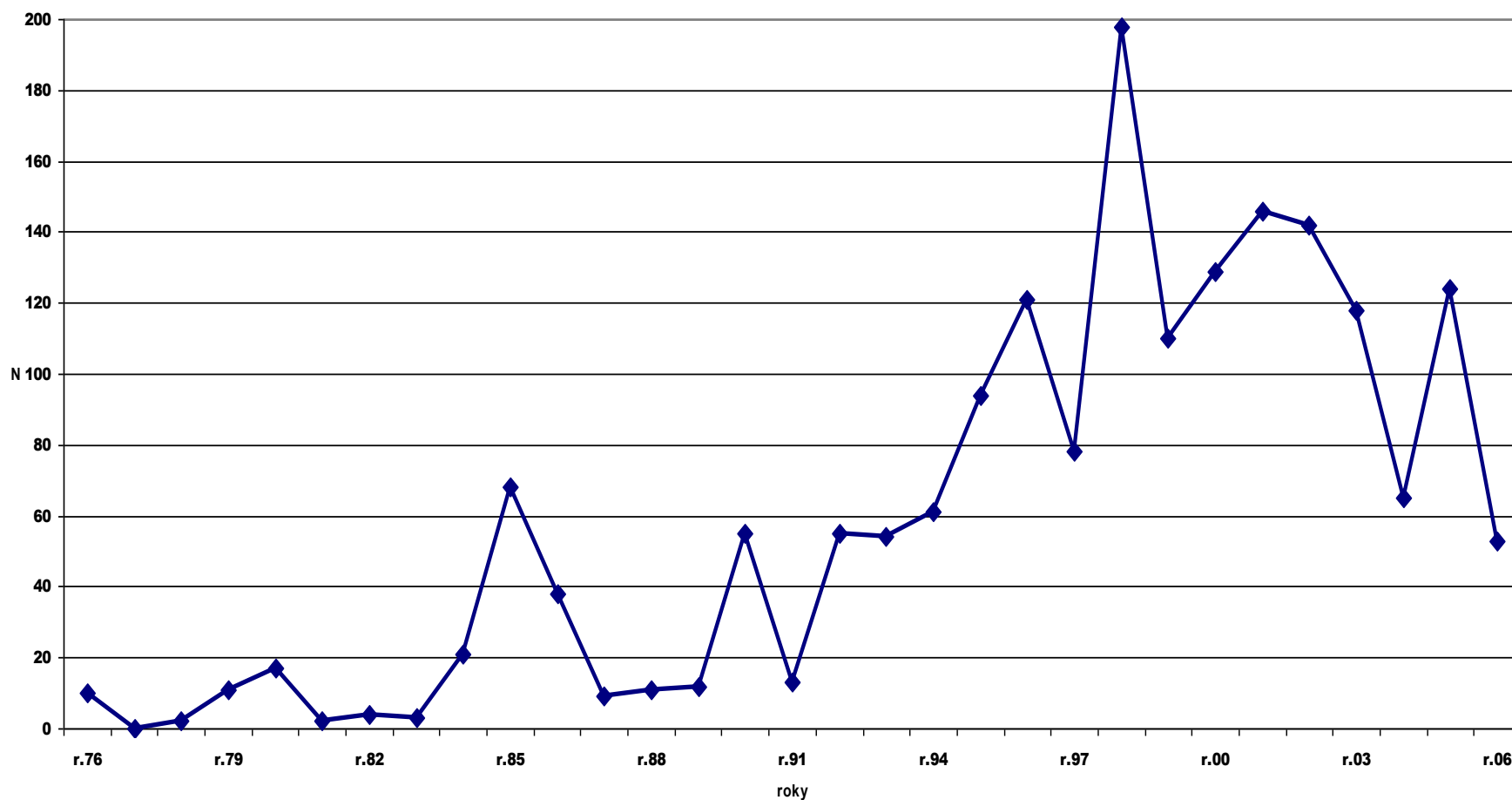


Occup. tuberculosis, Czech republic, 1976 - 2006



Ocup. scabies, Czech republic, 1976-2006

Profesionální scabies v ČR, 1976-2006



2. Zoonoses

- are defined as diseases, that infect both humans and animals.
- Occupations involving
 - contact with infected animals, their infected secretions or tissues
 - or contact with arthropod vectors from infected animals can result in occupational zoonotic disease



Bacterial zoonoses

Anthrax (*Bacillus anthracis*) may cause a cutaneous or pulmonary infection. It is a disease of **animal handlers, imported leather**

Brucellosis (*Brucella abortus, B.suis, B. recurrens, B.canis*) endangers **slaughterhouse employees, livestock producers, veterinarians, hunters**)

Tularemia (*Francisella tularensis*) – **hunters, forestry workers, farmers, veterinarians**

Leptospirosis (*L. icterohaemorrhagiae, L.grippothypohosa, L. canicola, L.pomona*) **field agricultural workers, abattoir workers, farmers, sewer and canal workers, veterinarians, miners, fishermen**

Tetanus (Clostridium tetani)— gardeners, horse breeders, farmers

Lyme disease (Borrelia burgdorferi) forestry workers, lumberjacks

Ornithosis –psitacosis is caused by *Chlamydia psittaci* and may be confused with hypersensitivity pneumonitis, for example, pigeon or parrot breeders, zoo attendants, poultry workers

Q fever is caused by *Coxiella burneti*. Exposures: farmers, ranchers, veterinarians, slaughterhousemen, laboratory workers, wool processors

Plaque *Yersinia pestis* and *Pasteurella multocida* are additional bacterial zoonoses



Viral zoonoses

Include

- Tick-born encephalitis (flavivirus) – forestly workers
- Rabies (lyssa virus) – laboratory workers, veterinarians, trappers, hunters, persons who handle wild or unidentified animals)
- Hantavirus - farmers, geodesists



Rabies in Czech Republic

Rabies is a viral disease of the central nervous system transmittable from infected animals to humans

- **Human rabies** occur very rarely in CR.
Only 3 cases were diagnosed during last 40 years. Source of exposure: fox, dog in India, unknown in Vietnam
- **Domestic animals**
Preventive vaccination of domestic carnivores is the principal method for protecting

Rabies in Czech Republic



- Wild animals

In 2001, 35 animals cases were reported, and only 3 cases of fox rabies in 2002. Those were the last known cases of rabies in the CR.

- oral vaccination of foxes

- 25 millions vaccine baits were used during the period 1989 - 2004. The vaccination program was exceptionally effective and resulted in the total elimination of rabies.

- 2002: due to absence of rabies for over 2 years, the CR qualifies as **a rabies free country.**

Protozoal zoonoses

- Toxoplasmosis (*Toxoplasma gondi*) – laboratory workers, veterinarians, cat handlers
- Toxocarosis (*Toxocara canis*) veterinarians

Fungal zoonoses

- Coccidiomycosis (*Coccidioides immitis*) – farm workers, archeologists, excavation workers, construction workers



3. Occupational tropical and subtropical infectious and parasite diseases

occured to Czechs working abroad (2000-2008)

year	2000	2001	2002	2003	2004	2005	2006	2007	2008	celkem
Malaria	7	5	3	5	11	8	5	2	5	51
Lambliosis	0	0	0	1	2	4	3	13	0	23
Amebosis	1	2	2	2	11	4	2	1	1	26
Diseases caused by worms	1	0	1	1	0	2	0	1	0	6
salmonellosis	0	1	2	0	0	0	0	1	0	4
other inf. diarrheas	0	0	1	1	2	3	3	4	0	14
arbovirosis	0	1	0	1	0	6	2	2	2	14
others	0	0	0	2	2	0	0	0	0	4
total	9	9	9	13	28	27	15	24	8	142

Travel medicine



- Travel forms an important part of the occupational activities of many people these days, be they **engineers, executives or manual workers**.
- It is, therefore, possible to subsume almost any tropical infectious disease under the heading of occupationally related disorders.
- Occupational physicians need to be aware of the problems encountered both by workers based here who travel overseas, and by workers who enter this country to work, either on a temporary or permanent basis.

Travel – asiccoated infectious diseases

- All travelers should have **routin immunisations updated**
- **Additional preventive measures** may be required for persons travelling to developing countries, thoses who will be working outside of urban locations and those, who many be in contact with animals.
- **Educational programs** for health and safety should include information on common sense prevention, specific immunisations or chemoprofylaxis, source of medical care, and medical clearence based on particular hazards that may be present in the destination country as well as availability of appropriate healt care.



Preventive measures

Passive immunisation - prompt, but short-term effect

HBIG (Hepatect) – VHB, hyperimmun. globulin-
lyssa, tetanus

Active immunisation

Chemoprophylaxis

- as with malaria prophylaxis, or following exposure
- as with ATB following meningococcal exposure
- INH following tuberculosis bacilli exposure
- AZT following HIV exposure

Vaccination

3 databases available worldwide:

CDC - [Centers for Disease Control and Prevention](#)

IAMAT – [Int. Association for Medical Assistance to Travellers](#)

CRM - [Centrum für Reisemedizin](#)

- Compulsory or urgent recommended vaccinations
- Other recommended vaccinations in specific circumstances
- Antimalarial prophylaxis
- Other infection risk



The recommended procedure for choices of vaccination

- Check the status of current vaccinations - particularly against tetanus, diphtheria, measles and polio
- Assess the planned stay in the destination:
 - the nature of residence (work, study, humanitarian assistance, recreation, sports, adventure)
 - the length of stay (short term = 2-4 weeks, medium = 1-3 months, long term = more than 3 months),
 - the method of travel (local transport: bus, train, boat)



Appropriate time for vaccination

- the optimal time (1 month before departure)
- the minimum time (7-14 days before departure)
- refrain from vaccination, less than 3 days (7 more days) before departure

Category vaccination

Cat. I (high mortality disease): vaccination against yellow fever and rabies

Cat. II (easily portable, alimentary or faecal oral disease) vaccination against viral hepatitis A, typhoid fever and cholera

Cat. III (severe, but specifically transmitted diseases): vaccination against meningococcal diseases, Japanese encephalitis, tick-borne encephalitis and viral hepatitis B.

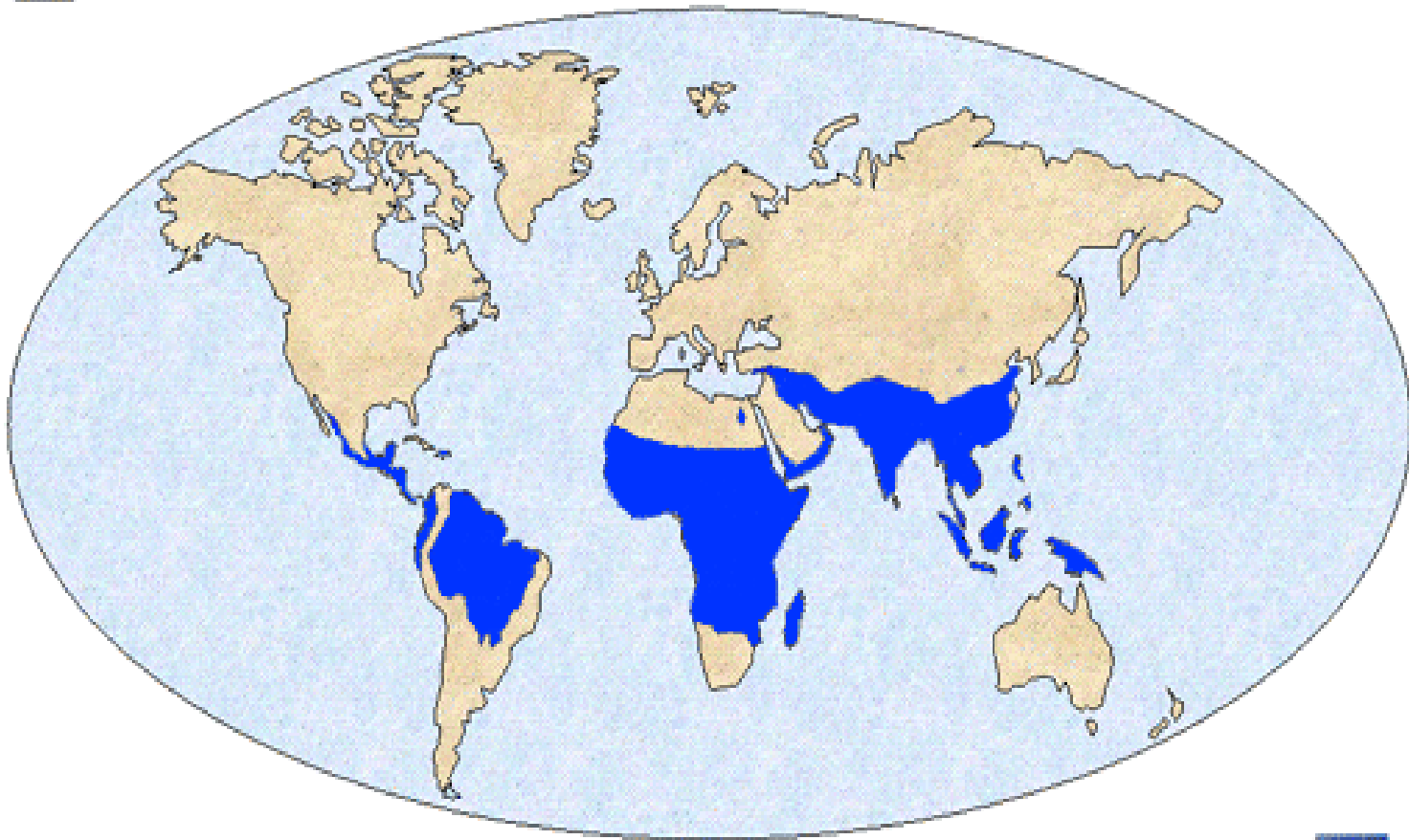


Legionellosis

- Travellers who visit developed settings (e.g., hotels, even in developing countries) **are exposed to aerosolized, warm water** are at risk for infection.
- Despite the presence of *Legionella* bacteria in many aquatic environments, the risk of developing legionellosis for most individuals is low. Elderly and immunocompromised travellers are at higher risk.
- Exposures can occur during activities such as recreation in or near a whirlpool spa, while showering in a hotel, or touring in cities with buildings that have **cooling towers**.
- The largest outbreak (449 cases) ever reported was traced to a cooling tower on the roof of a city hospital in Murcia, Spain, in 2001.

Malaria in the world

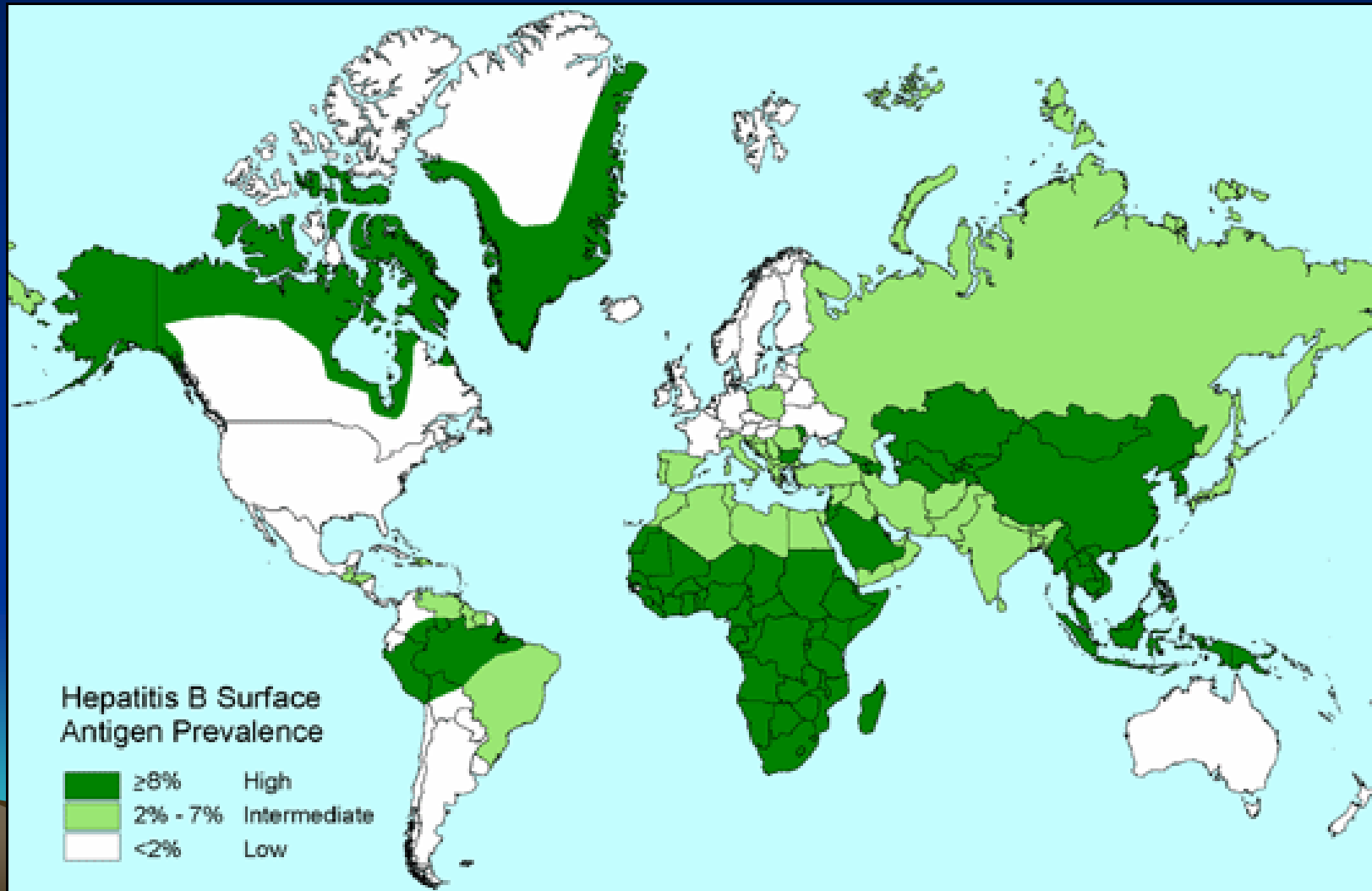
 Distribution of Malaria



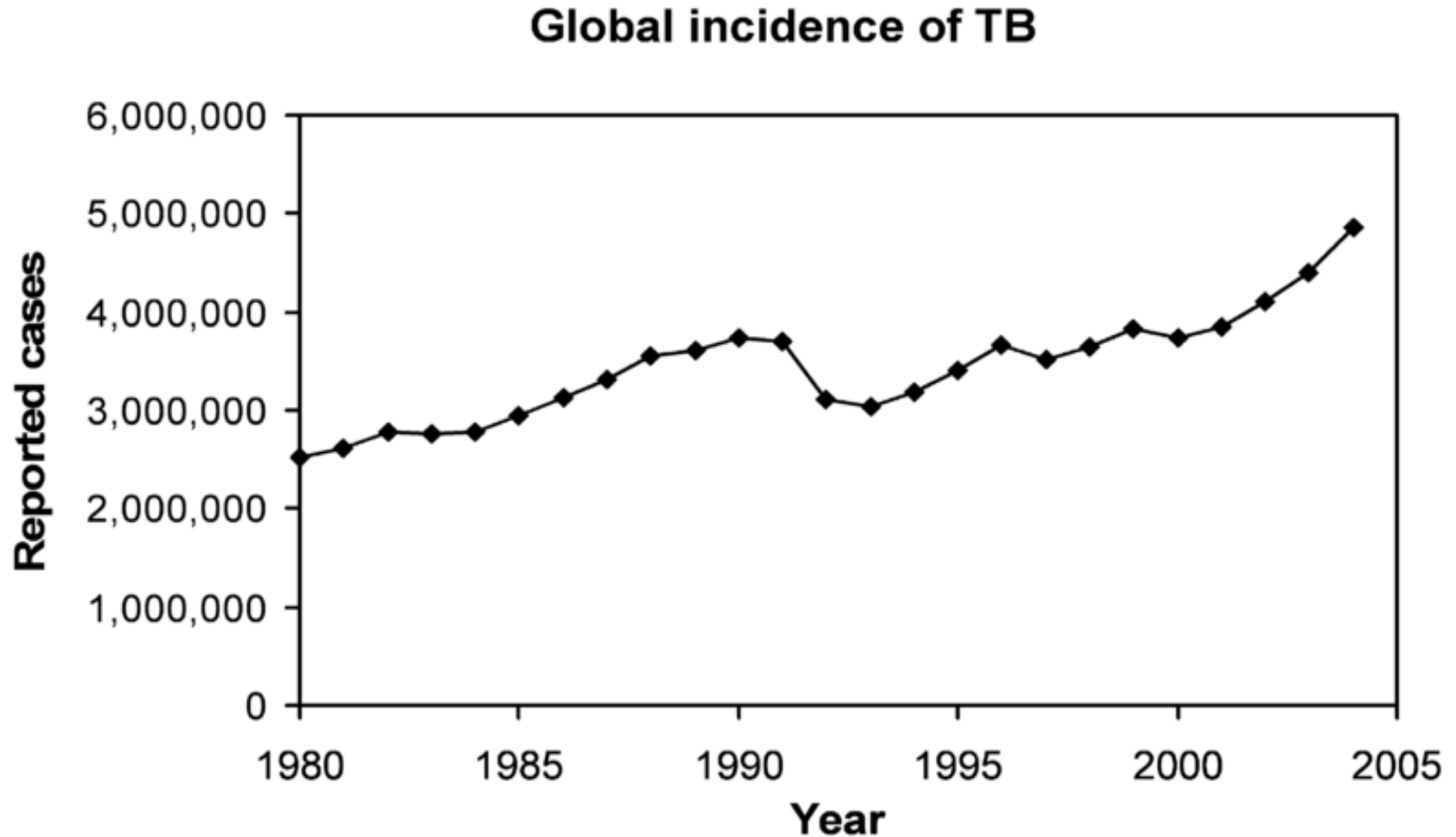
Viral hepatitis A in the world



Geographic distribution of Hepatitis B prevalence, 2005



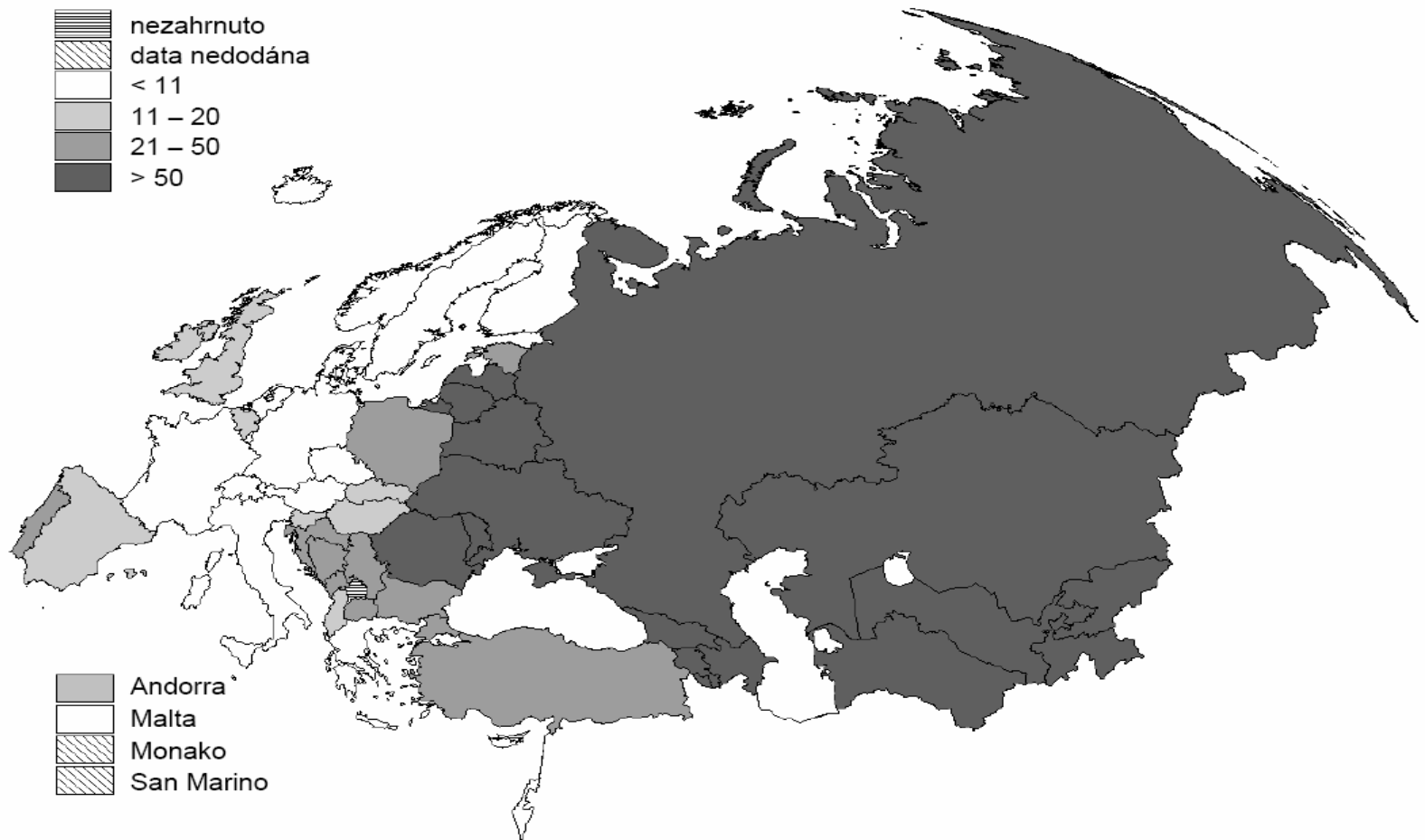
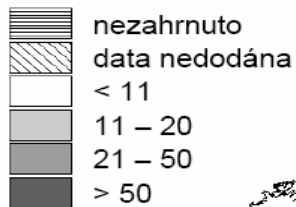
Tuberculosis in the world



Tuberculosis in Europe

Hlášená TB onemocnění na 100 tis. obyvatel,
Evropský region WHO, 2006

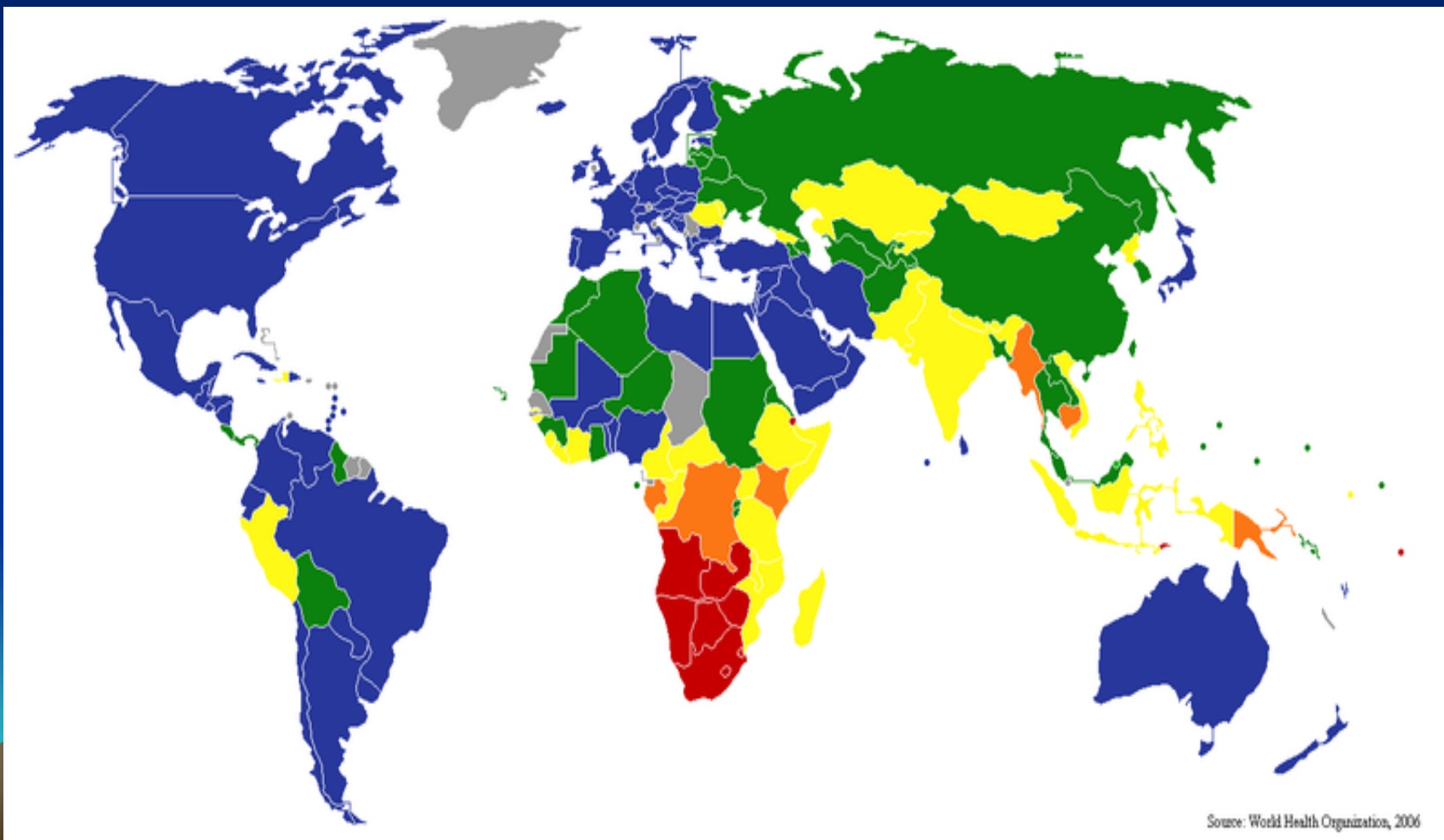
míra hlášenosti




Tuberculosis in the world

Incidence:

červená = >300, oranžová = 200-300; žlutá = 100-200;
zelená 50-100; modrá = <50



Recommendation

- VHB immunisation and meningococcus immunisation are useful for travellers to endemic areas, particularly if long residence is planned.
 - Vaccine for rabies and for Japanese encephalitis B may be needed for persons with animal contact in endemic areas.
 - Other general protective measures include insect repellents where insect vector may transmit disease (malaria, yellow fever, dengue, filariasis, leishmaniasis, trypanosomiasis and hemorrhagic fevers).
- 

Recommendation

- Use of light colored and protective clothing, mosquito netting, and avoidance of scented cosmetics may be helpful.
- The traveler should take care not to eat or drink contaminated food or water and should avoid uncooked foods.
- Commonly encountered travel-related diseases include traveler's diarrhea, hepatitis A, yellow fever, typhoid fever, cholera, malaria.



Thank You for Attention

