The importance of reemerging infectious diseases and migration

The Changing Patterns of Global Migration and the Impact on Infectious Diseases

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General considerations

- Human migration has always been associated with disease translocation.
- Over the last century the speed and volume of international travel and migration has reached unprecedented levels bringing the impact of globalization into every sector of society- economic, environmental, political, socio-cultural, and health.

General consideration

- As a consequence, the threat of geographic expansion from emerging and traditional infectious diseases has increased.
- UNESCO defines an international migrant as a person living outside their birth country for >= 12 months.

General consideration

- The global patterns of human migration have changed substantially in the last half century:
  - increased # countries sending and receiving migrants,
  - accelerated rates of migration,
  - bi-directional migration and migration transitions,
  - diversification of migrant types, and
  - changes in gender patterns of migrants.

General consideration

- Along with these profound changes in demography, volume, speed, and purpose of migration come unique challenges in detection, diagnosis, response and management of infectious diseases.
- Even in the 21st century infectious diseases account for ~25% of the global mortality burden as well as substantial morbidity.
- Increasingly these diseases are blind to geopolitical borders

General consideration

- Cyclical pandemics like influenza traverse the globe more rapidly than ever; newly emerged pathogens like SARS represent a constant challenge to public health preparedness and response.
- Even old diseases like tuberculosis emerge in more lethal drug resistant forms e.g. XDR-TB.
- These challenges demand new paradigms to global disease control in governance, surveillance and response.

Characteristics of migration-related diseases

- „Traditional” infections: hepatitis-B, syphilis, tuberculosis, pertussis, measles, etc.
- Imported tropical diseases: leishmaniasis, leprosy, Katayama fever (schistosomiasis), Oroya-fever, Chagas disease, African trypanosomiasis
- Tropical diseases with the tendency of being reestablished in non-endemic areas: malaria, dengue fever, chicungunya fever
- Potentially lethal diseases from focal infections: SARS, avian (pig) influenza, haemorrhagic fevers, monkey pox
- AIDS

Tuberculosis

- In European countries more than half of all tuberculosis cases still occur among foreign-born individuals.
- Amid unprecedentedly high levels of global migration these numbers could rise.
- Migrants are disproportionately affected by tuberculosis and HIV because they reflect the high rates of infection in their country of origin—where health systems may be underfunded or have broken down.
- Migrants are also frequently confined to situations of poverty and social exclusion in their new host country, where tuberculosis may circulate and conditions favor reactivation of latent disease.

The incidence of latents TB (Spanish survey)

Table 1 Ten most common countries of origin.

Country	Frequency	%
Equatorial Guinea	411	16.7
Nigeria	237	9.6
Pakistan	201	8.2
Ecuador	168	6.8
Sierra Leone	141	5.7
Cameroon	124	5.0
Ghana	109	4.4
India	103	4.2
Senegal	101	4.1
Morocco	86	3.5

TB in an infant

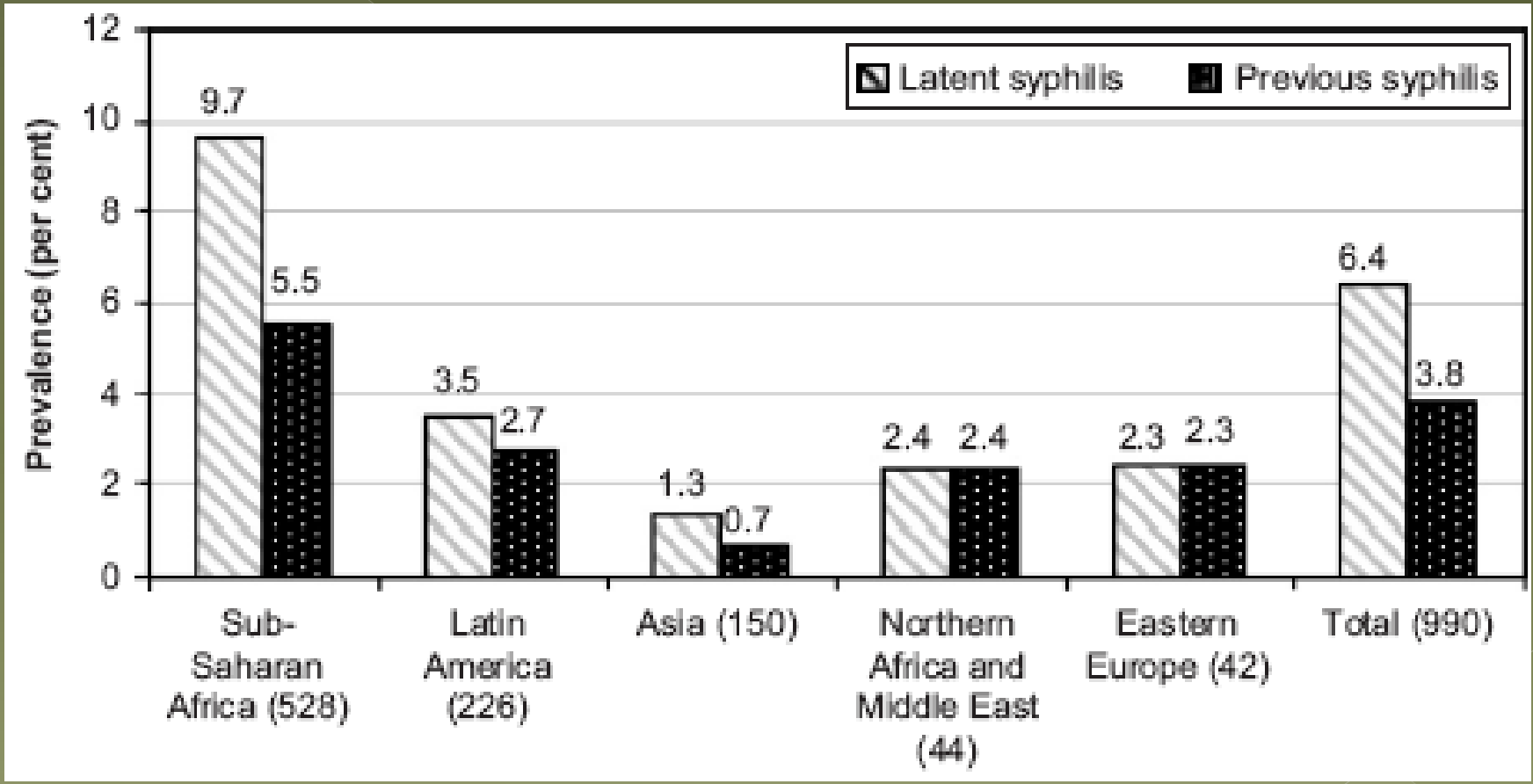
Tuberculosis

- Screening can no longer be viewed as a one-stop shop on arrival.
- Required are additional community-based approaches and more inclusive policies that encourage greater participation in health services by hard-to reach migrant groups, incorporating tuberculosis screening into a more general health assessment that explores vaccination status, key infectious diseases (HIV, hepatitis), and other unmet health needs.

Syphilis (Spanish survey)

- A reaginic (RPR) and a treponemic (TPHA) test were carried out in 990 patients (Immigrants).
- The prevalence of latent syphilis, as defined above, was 6.4% (63/990); a previous syphilis was detected in 38 patients (3.8%) and a false-positive result in seven (0.3%).
- No sex differences were found in prevalence of latent or previous syphilis.
- Nineteen cases of latent syphilis were detected in women of childbearing age (N ¼ 229, prevalence in this class 6.4%).
- People with latent or previous syphilis was significantly older than people with a negative result (mean age 35.6 vs. 29.3 years, po0.001).

Geographic distribution



Hepatitis B (Spanish survey)

	HBsAg carriers	Previous HBV infection	Negative HBV serology	Total
Sub-Saharan Africa	134 (12.0%)	606 (54.1%)	380 (33.9%)	1120
Latin America	2 (0.6%)	32 (9.3%)	309 (90.1%)	343
Asia	5 (1.9%)	41 (15.3%)	222 (82.8%)	268
Northern Africa and ME	3 (3%)	14 (14%)	83 (83%)	100
Eastern Europe	2 (2.7%)	14 (18.9%)	58 (78.4%)	74
Total	146 (7.7%)	707 (37.1%)	1052 (55.2%)	1905

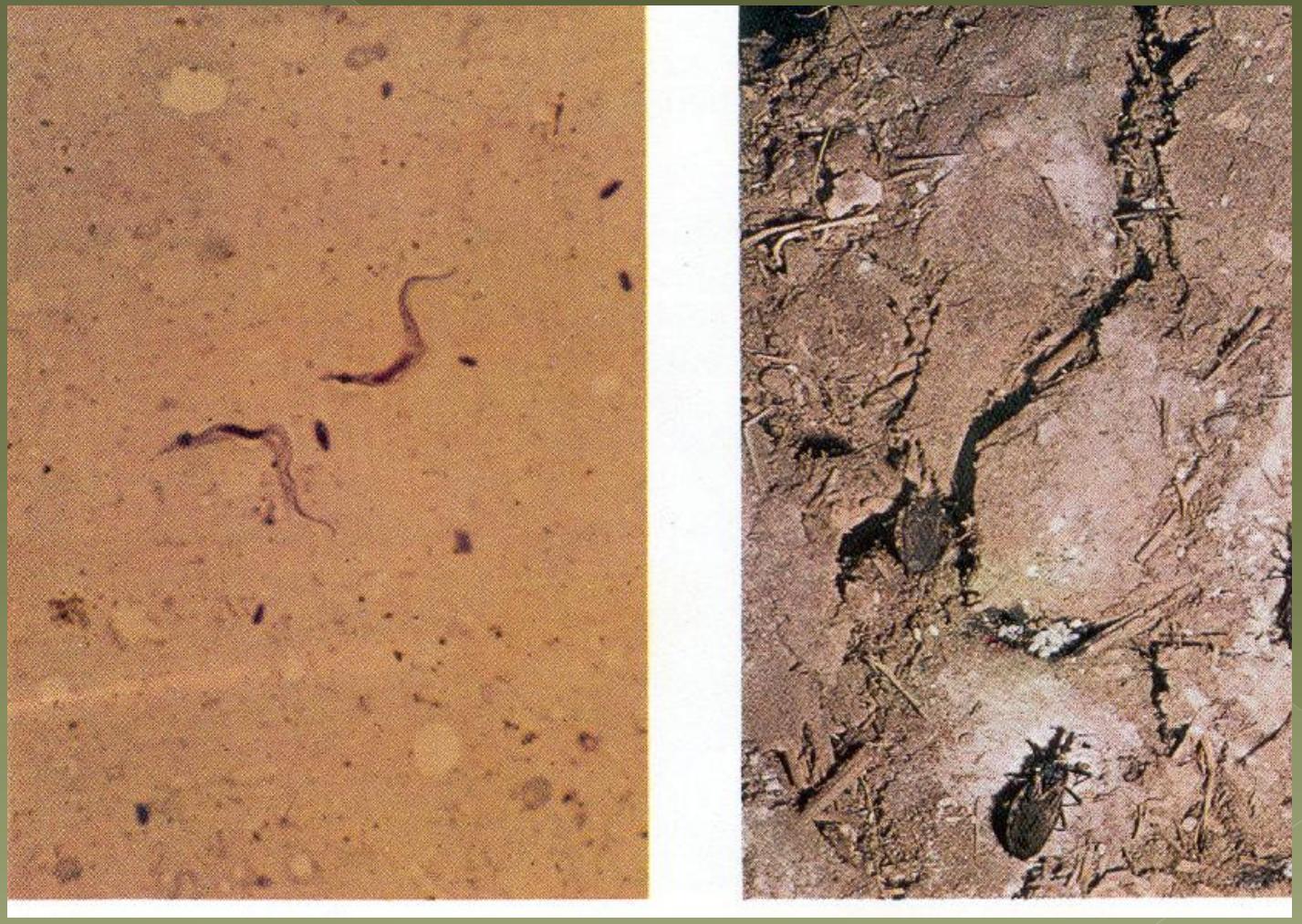
HBsAg, surface antigen of hepatitis B virus; HBV, hepatitis B virus; ME, Middle East.

Chagas disease

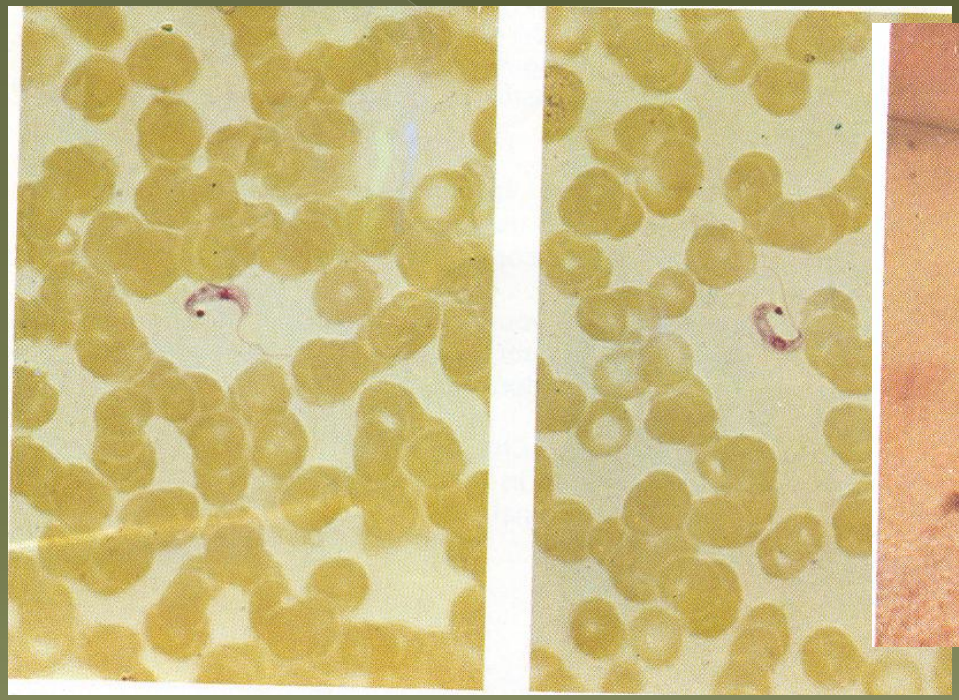
- Political repression and/or economic stagnation stimulated the flow of migration from the 17 Latin American countries endemic for Chagas disease to developed countries.
- Because of this migration, Chagas disease, an autochthonous disease of the Continental Western Hemisphere is becoming a global health problem.
- In 2006, 3.8% of the 80,522 immigrants from those 17 countries to Australia were likely infected with Trypanosoma cruzi.
- In Canada in 2006, 3.5% of the 156,960 immigrants from Latin America whose country of origin was identified were estimated to have been infected.
- In Japan in 2007, there were 80,912 immigrants from Brazil, 15,281 from Peru, and 19,413 from other South American countries whose country of origin was not identified, a portion of whom may have been also infected.

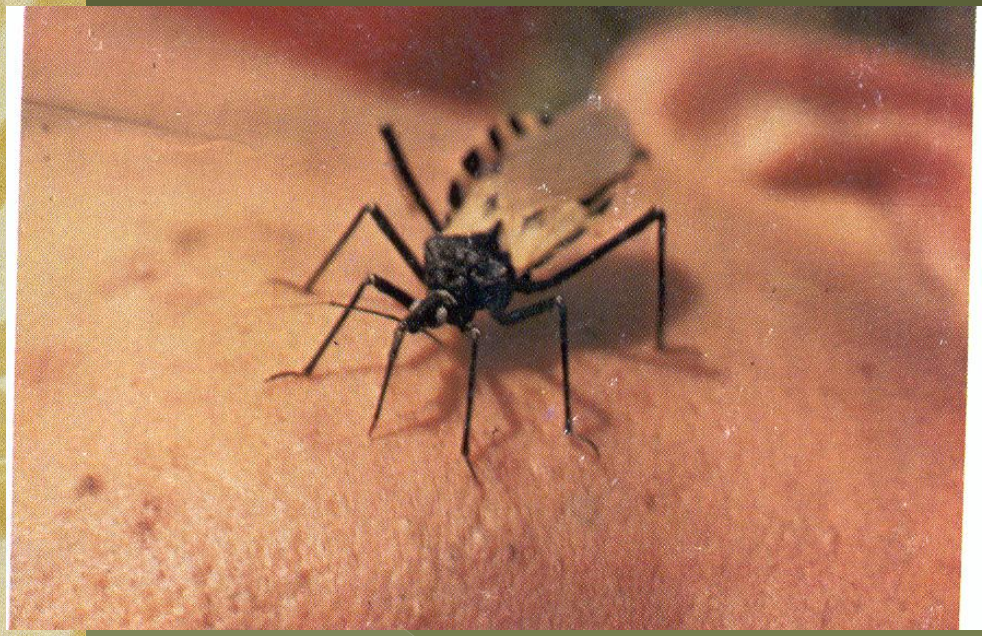
The distribution of Chagas disease

Trypanosoma cruzii in the feces of bugs, the natural shelter of bugs

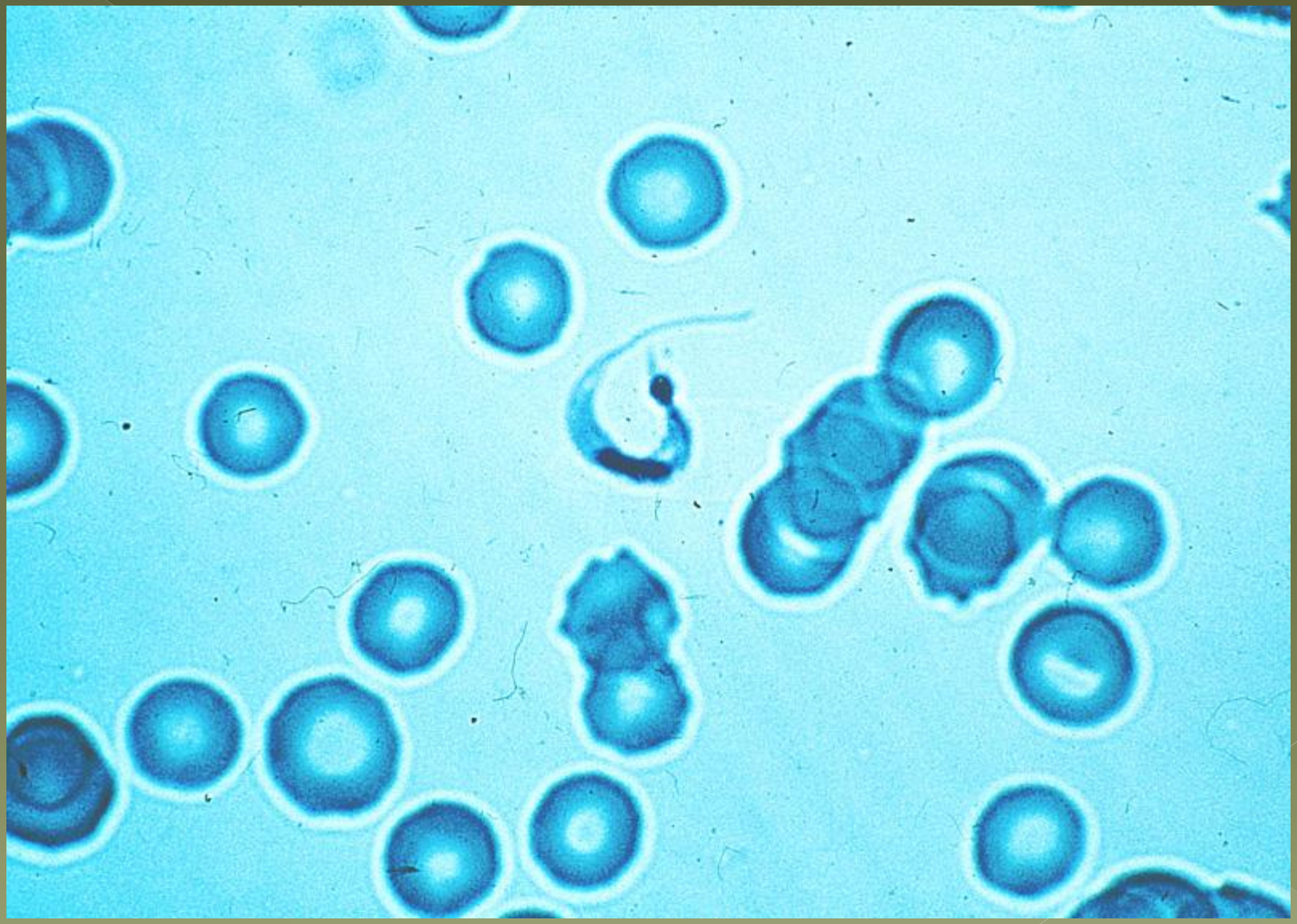


Trypansoma cruzi in peripheral blood, feeding bug





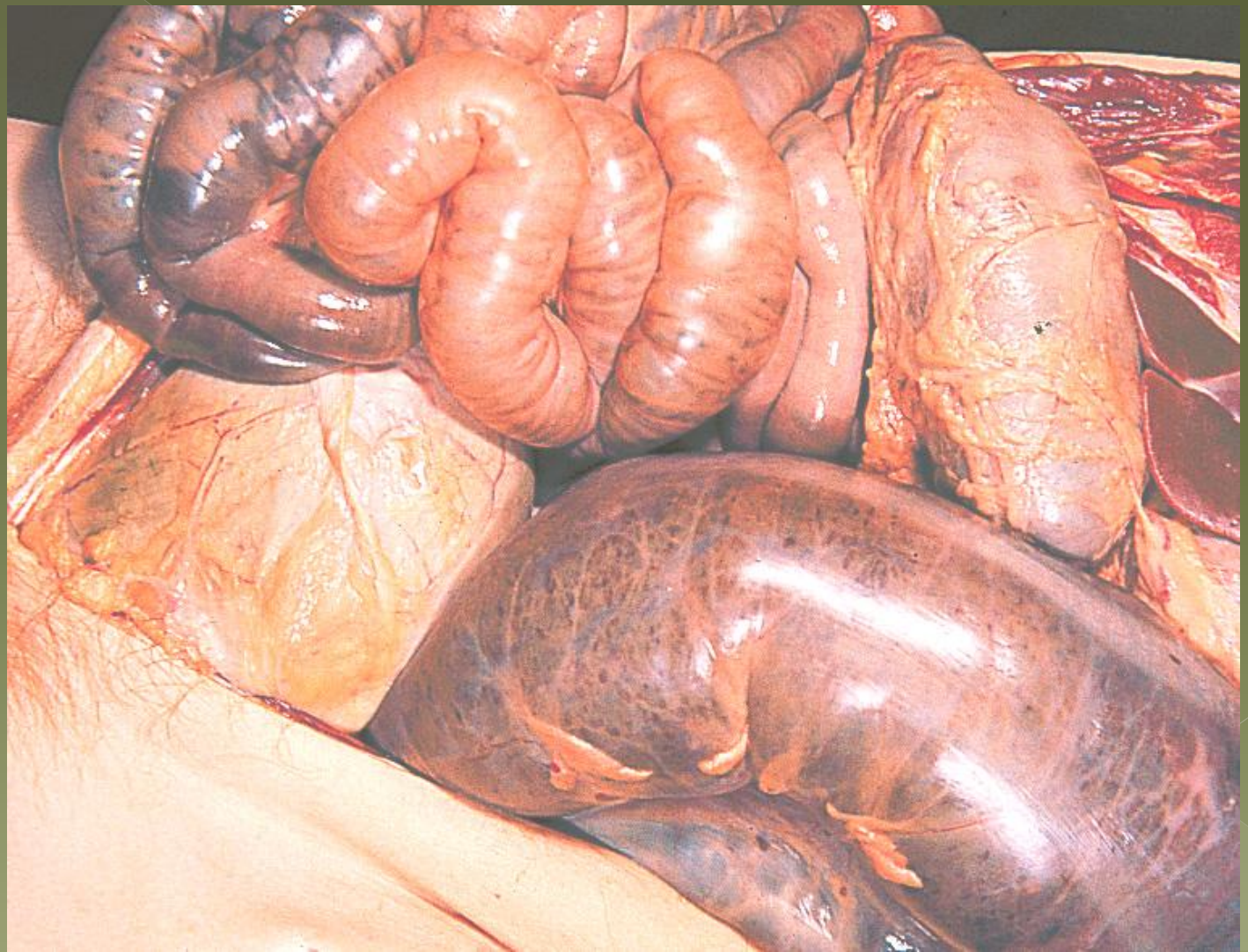
Trypanosoma cruzi in Giemsa-stained thin blood film



Natural host: armadillo

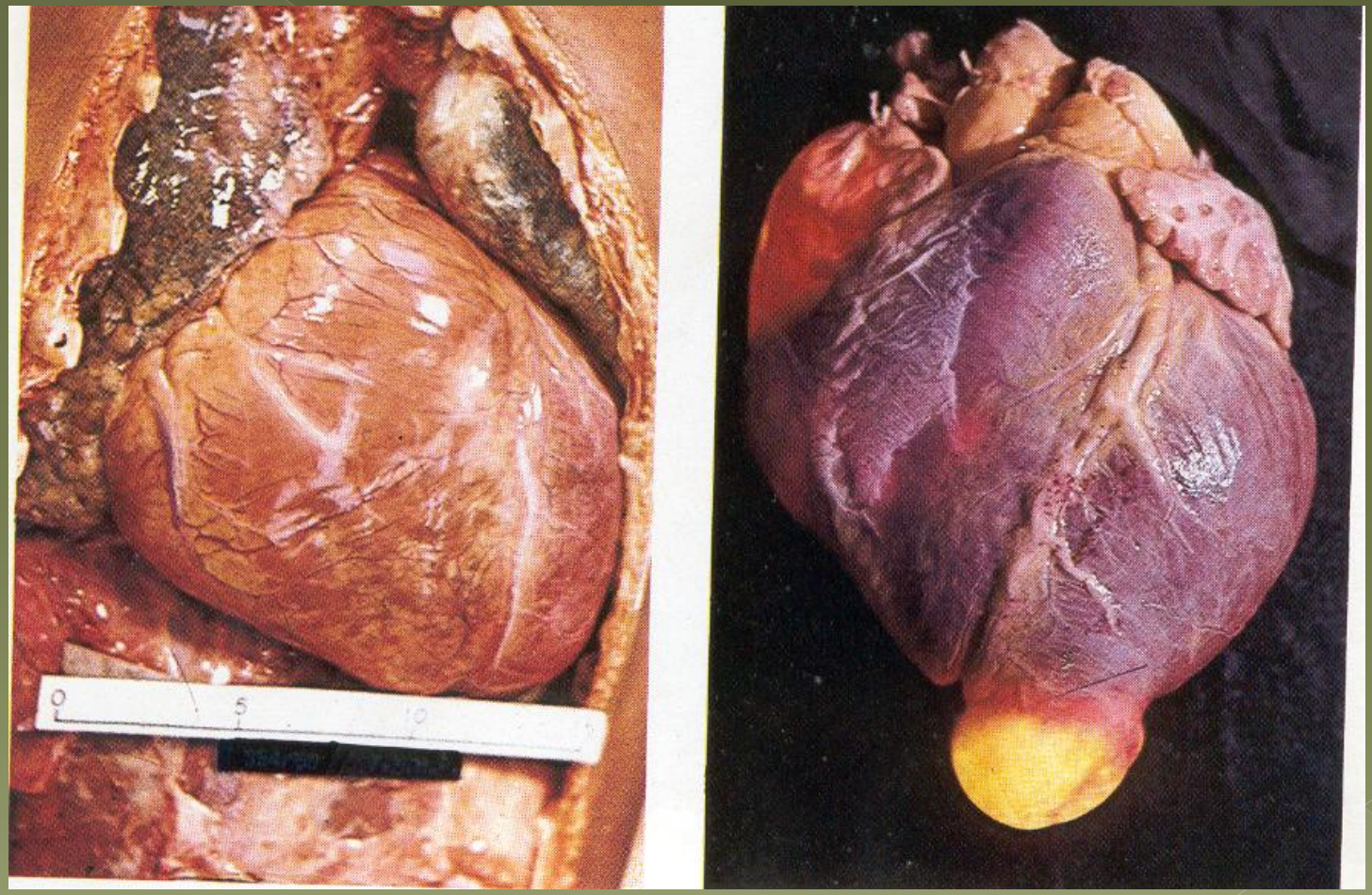
Romaňa - sign

Megacolon



Megaoesophagus on radiograph

Cardiomegaly and apical aneurism in Chagas disease



Chagas' disease

- In 15 countries of Europe in 2005, excluding Spain, 2.9% of the 483,074 legal Latin American immigrants were estimated to be infected with T. cruzi.
- By 2008, Spain had received 1,678,711 immigrants from Latin American endemic countries; of these, 5.2% were potentially infected with T. cruzi and 17,390 may develop Chagas disease.
- Further, it was estimated that 24–92 newborns delivered by South American T. cruzi infected mothers in Spain may have been congenitally infected with T. cruzi in 2007.
- In the USA we estimated that 1.9% of approximately 13 million Latin American immigrants in 2000, and 2% of 17 million in 2007, were potentially infected with T. cruzi.
- Of these, 49,157 and 65,133 in 2000 and 2007 respectively, may have or may develop symptoms and signs of chronic Chagas disease.

Chikungunya fever

- Chikungunya is an arboviral disease transmitted by aedes mosquitoes. The virus was first isolated in 1953 in Tanzania.
- Chikungunya virus is a member of the genus Alphavirus and the family Togaviridae.
- The disease typically consists of an acute illness characterized by fever, rash, and incapacitating arthralgia.
- The word chikungunya, used for both the virus and the disease, means “to walk bent over” in some east African languages, and refers to the effect of the joint pains that characterize this dengue-like infection.

Chikungunya fever

- Chikungunya virus has been imported to Europe and the USA by infected travellers returning from areas with high incidence rates, and *A albopictus has been* introduced into several European countries (Belgium, Bosnia, Croatia, France, Greece, the Netherlands, Serbia, Spain, and Switzerland) and also to Central America, Brazil, and the USA.

Chikungunya fever

- *A albopictus has been* imported through the trade in used tyres and in ornamental plants.
- Some authors have suggested that if viraemic patients were to arrive in southern Europe during the summer they could cause a European outbreak.

Chikungunya fever

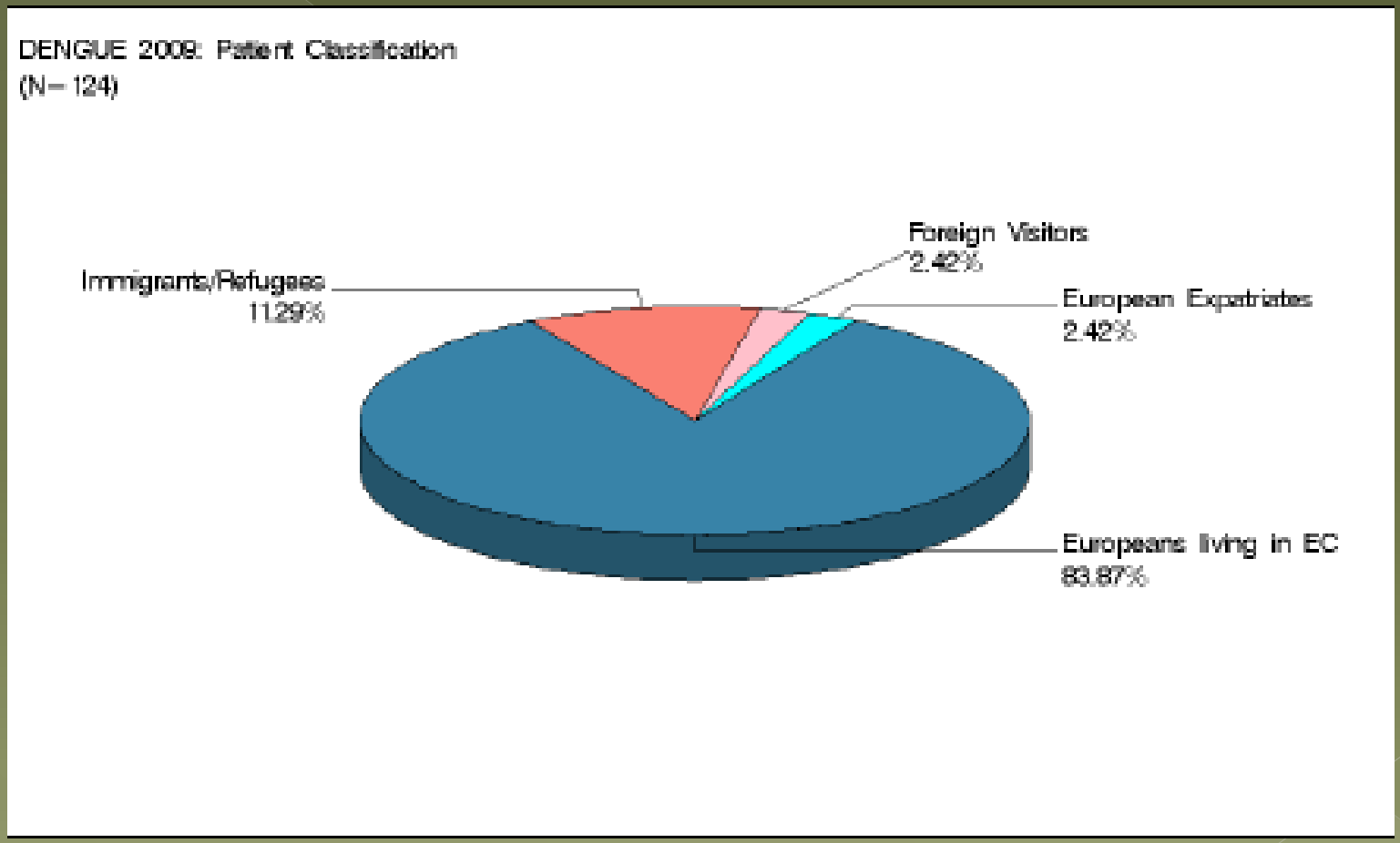
Dengue fever

- Dengue is endemic to tropical and subtropical countries and is the arboviral disease that has spread most rapidly among the tropical and subtropical regions of the planet.
- It also behaves in an epidemic fashion when appropriate conditions exist.
- The occurrence of conditions that favour endemicity and epidemicity, namely the presence of large territories with Aedes mosquito infestation, sizeable susceptible human groups and the continuous introduction and/or circulation of one or more serotypes are factors responsible for endemic and epidemic DF and DHF.

Dengue fever

- In Europe, imported DF is the most common cause of fever in returning travellers.
- Data from the European Network on Imported Infectious Disease Surveillance (TropNetEurop), which assesses approximately 12% of European patients with imported infectious diseases, suggest that the number of imported dengue cases in Europe increased from 64 in 1999 to a maximum of 224 in 2002 and has since remained at 100–170. In 2008, 116 cases were reported, mostly in European travellers; 43% had travelled to Europe from South East Asia, 14% from Latin America, 12% from the Indian subcontinent, 11% from the Caribbean and 4% from Africa, reflecting worldwide dengue activity and travel preferences.

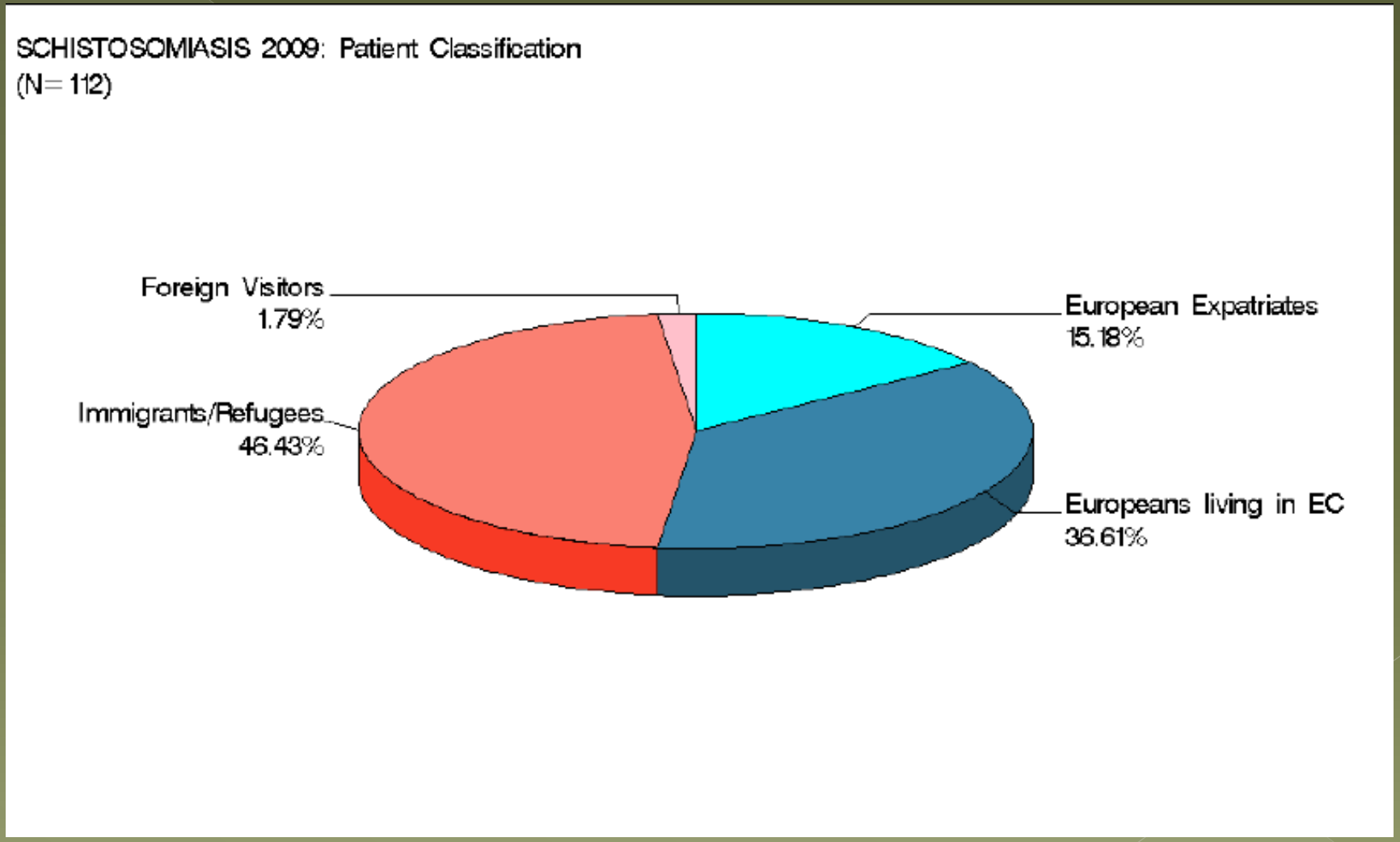
Deangue 2009 (TropNetEuro)



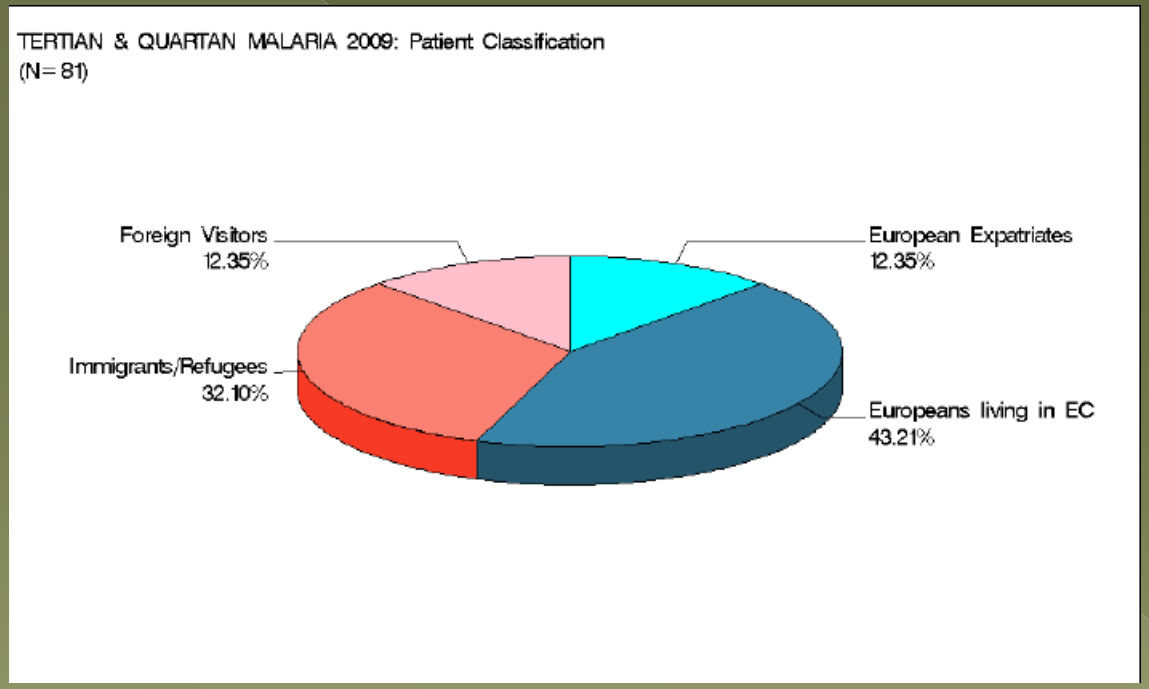
TropNetEurop 2009

	N	%
Member Sites	61	100.0
Sites reporting electronically	35	57.4
Reported Patients	13606	100.0
Patients reported electronically	5052	37.1
Reported Diagnoses	13624	100.0
Malaria	10244	75.2
Dengue	1564	11.5
Schistosomiasis	1562	11.5
Leishmaniosis	254	1.9

Schistosomiasis 2009



Tertian and quartan malaria in EU 2009



Falciparum malaria in EU 2009