HIV / AIDS

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ACQUIRED IMMUNODEFICIENCY SYNDROME (AIDS) AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION - case definition

Clinical Criteria (AIDS)

- Any person who has any of the clinical conditions as defined in the European AIDS case definition for:
- — Adults and adolescents ≥ 15 years
- — Children < 15 years of age

Laboratory Criteria (HIV)

Adults, adolescents and children aged ≥ 18 months

At least one of the following three:

- — Positive result of a HIV screening antibody test or a combined screening test (HIV antibody and HIV p24 antigen) confirmed by a more specific antibody test (e.g. Western blot)
- — Positive result of 2 EIA antibody test confirmed by a positive result of a further EIA test
- — Positive results on two separate specimens from at least one of the following three:
- — Detection of HIV nucleic acid (HIV-RNA, HIV-DNA)
- — Demonstration of HIV by HIV p24 antigen test, including neutralisation assay
- Isolation of HIV

Children aged < 18 months

- Positive results on two separate specimens (excluding cord blood) from at least one of the following three:
- — Isolation of HIV
- — Detection of HIV nucleic acid (HIV-RNA, HIV-DNA)
- — Demonstration of HIV by HIV p24 antigen test, including neutralisation assay in a child ≥ 1 month of age

Epidemiological Criteria: NA

Case Classification

- A. **Possible case** NA
- B. **Probable case** NA
- C. **Confirmed case**
- — HIV infection
- Any person meeting the laboratory criteria for HIV infection
- — AIDS
- Any person meeting the clinical criteria for AIDS and the laboratory criteria for HIV infection

HIV disease continues to be a serious health issue for parts of the world.

Worldwide, there were about **2.1 million new cases** of HIV in 2015.

About **36.7 million people are living** with HIV around the world, and as of June 2016, 17 million people living with HIV were receiving medicines to treat HIV, called antiretroviral therapy (ART).

An estimated **1.1 million people died** from AIDS-related illnesses in 2015.

Sub-Saharan Africa, which bears the heaviest burden of HIV/AIDS worldwide, accounts for **65% of all new HIV** infections.

Other regions significantly affected by HIV/AIDS include Asia and the Pacific, Latin America and the Caribbean, and Eastern Europe and Central Asia.

Fosfolipid membrane

gp120 surface glykoprotein

gp 41 transmembrane glykoprotein

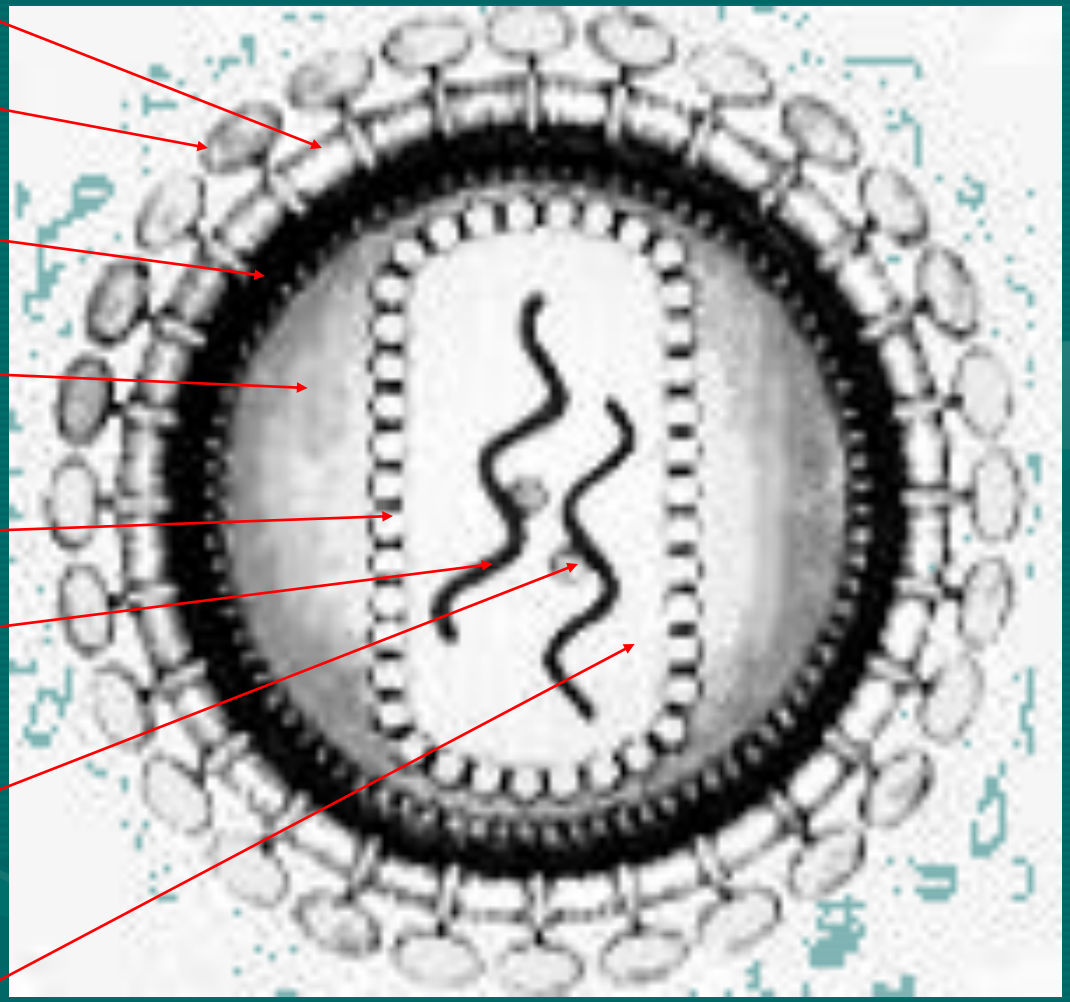
p 17M protein - matrix

p 24 protein – nucleocapsid core

RNA genome

reverzní transkriptáza

p 7, p 9 proteiny on the nucleic acide



HIV/AIDS

Etiology:

HIV - Human Immunodeficiency Virus is classed with the **Retroviridae family, Lentivirus genus**. HIV occurs in two types: HIV - 1 and HIV - 2. Both types have similar epidemiological features, but different serological response and geographic distribution. .

The source of infection

Only infected people are the sources of infection, in either the sick with manifestations of AIDS or a latent infection, (ARC - AIDS-Related Complex, PGL - Persistent Generalised Lymphadenopathy) or a symptomless carrier.

Route of transmission

Blood - borne By blood derivates and HIV- contaminated blood.

Use of **contaminated** needles and syringes in drug administration.

Sexually-transmitted, when injury of the mucosa and bleeding occur.

Sexually transmitted Through sperma, vaginal secrets in homo and heterosexual intercourse.

From mother to child (15 to 30 %) Vertical transmission - prenatally, perinatally or possibly through the mother´s milk.

Susceptibility

General.

Preventive measures:

Health education promoting a responsible approach to sex - use of condoms.

- To prevent contamination of blood tins and derivates.
- Supporting the programme of taking/giving needles and syringes from/to intravenous drug addicts.

Virus classification

Group: Group VI (ssRNART)

Family: *Retroviridae*

Genus: *Lentivirus*

Species:***Human immunodeficiency virus1***

Species:***Human immunodeficiency virus 2***

Diagram of HIV is different in structure from other retroviruses.

It is about 120 nm in diameter (120 billionths of a meter; around 60 times smaller than a red blood cell) and roughly spherical.

HIV primarily infects vital cells in the human immune system such as helper T cells (specifically CD4+ T cells), macrophages and dendritic cells.

HIV infection leads to low levels of CD4+ T cells through three main mechanisms:

- firstly, direct viral killing of infected cells;
- secondly, increased rates of apoptosis in infected cells;
- and thirdly, killing of infected CD4+ T cells by CD8 cytotoxic lymphocytes that recognize infected cells.

When CD4+ T cell numbers decline below a critical level, cell-mediated immunity is lost, and the body becomes progressively more susceptible to opportunistic infections.

The AIDS epidemic was discovered June 5, 1981, when the U.S. Centers for Disease Control and Prevention (CDC) reported a cluster of *Pneumocystis carinii* pneumonia (now classified as Pneumocystis jiroveci pneumonia) in five homosexual men in Los Angeles.

The disease was originally dubbed GRID, or Gay-Related Immune Deficiency, but health authorities soon realized that nearly half of the people identified with the syndrome were not homosexual men.

In 1982, the CDC introduced the term AIDS to describe the newly recognized syndrome, though it was still casually referred to as GRID.

In 1983, scientists led by Luc Montagnier at the Pasteur Institute in France first discovered the virus that causes AIDS. They called it lymphadenopathy-associated virus (LAV).

A year later a team led by Robert Gallo of the United States confirmed the discovery of the virus, but they renamed it human T lymphotropic virus type III (HTLV-III).

The dual discovery led to considerable scientific disagreement, and it was not until President Mitterrand of France and President Reagan of the USA met that the major issues were resolved.

In 1986, both the French and the U.S. names for the virus itself were dropped in favour of the new term, human immunodeficiency virus (HIV).

AIDS – Acquired ImmunoDeficiency Syndrome

SIDA – Syndrome d´ImmunoDeficience Acquise

SPID – Syndrom Priobretěnovo ImunoDeficita

HIV - Human Immunodeficiency Virus

- Three of the earliest known instances of HIV-1 infection are as follows:
- A plasma sample taken in 1959 from an adult male living in what is now the Democratic Republic of Congo.
- HIV found in tissue samples from a 15-year-old African-American teenager who died in St. Louis in 1969.
- HIV found in tissue samples from a Norwegian sailor who died around 1976.

- Although a variety of theories exist explaining the transfer of HIV to humans, no single hypothesis is unanimously accepted, and the topic remains controversial.
- The most widely accepted theory is so called 'Hunter' Theory according to which transference from chimp to human most likely occurred when a human was bitten by a chimp or was cut while butchering one, and the human became infected.

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Subtypes:

HIV 1 - group“M” (major) – subtypes A, B, C, D, E, F, G, H, I,… (expected other)

Subtypes:

A – West and Middle Africa

B – Europe, North and sud America, Thailand

C – Sud Africa, Indie

D – Middle Africa

E – Middle Africa, Thailand, Indie

F – Brazilie, Romania, Zair

G – Middle Africa

H – Gabun, Zair

I – Africa

Antiretroviral treatment reduces both the mortality and the morbidity of HIV infection, but routine access to antiretroviral medication is not available in all countries.

If untreated, eventually most HIV-infected individuals develop AIDS (Acquired Immunodeficiency Syndrome) and die; however about one in ten remain healthy for many years, with no noticeable symptoms.

- Since the beginning of the pandemic, three main transmission routes for HIV have been identified:

- Sexual route. The majority of HIV infections are acquired through unprotected sexual relations. Sexual transmission can occur when infected sexual secretions of one partner come into contact with the rectal, genital or oral mucous membranes of another.

Blood or blood product route. This transmission route can account for infections in intravenous drug users, hemophiliacs and recipients of blood transfusions (though most transfusions are checked for HIV in the developed world) and blood products. It is also of concern for persons receiving medical care in regions where there is prevalent substandard hygiene in the use of injection equipment, such as the reuse of needles in Third World countries. HIV can also be spread through the sharing of leaches.

Health care workers such as nurses, laboratory workers, and doctors, have also been infected, although this occurs more rarely.

People who give and receive tattoos, piercings and scarification procedures can also be at risk of infection.

Mother-to-child transmission (MTCT). The transmission of the virus from the mother to the child can occur in utero during the last weeks of pregnancy and at childbirth. In the absence of treatment, the transmission rate between the mother and child is 25%. However, where drug treatment and Cesarian section are available, this can be reduced to 1%. Breast feeding also presents a risk of infection for the baby.

- HIV-2 is transmitted much less frequently by the MTCT and sexual route than HIV-1.

HIV has been found at low concentrations in the:

saliva,

tears and

urine of infected individuals,

but there are no recorded cases of infection by these secretions and the potential risk of transmission is negligible.

The use of physical barriers such as the latex condom is widely advocated to reduce the sexual transmission of HIV.

Spermicide, when used alone or with vaginal contraceptives like a diaphragm, actually increases the male to female transmission rate due to inflammation of the vagina;

it should not be considered a barrier to infection.

HIV does not survive long outside the human body (such as on surfaces), and it cannot reproduce outside a human host.

It **is not** spread by:

- Mosquitoes, ticks, or other insects.
- Saliva, tears, or sweat that is not mixed with the blood of an HIV-positive person.
- Hugging, shaking hands, sharing toilets, sharing dishes, or closed-mouth or “social” kissing with someone who is HIV-positive.
- Other sexual activities that don’t involve the exchange of body fluids (for example, touching).

- **The chance that an HIV-negative person will get HIV from oral sex with an HIV-positive partner is extremely low.**
- Oral sex involves putting the mouth on the penis (fellatio), vagina (cunnilingus), or anus (anilingus). In general, there's little to no risk of getting or transmitting HIV through oral sex.
- Factors that may increase the risk of transmitting HIV through oral sex are ejaculation in the mouth with oral ulcers, bleeding gums, genital sores, and the presence of other sexually transmitted diseases (STDs), which may or may not be visible.
- You can get other STDs from oral sex. And, if you get feces in your mouth during anilingus, you can get hepatitis A and B, parasites like *Giardia*, and bacteria like *Shigella*, *Salmonella*, *Campylobacter*, and *E. coli*.

The risk of health care workers being exposed to HIV on the job (occupational exposure) is very low, especially if they use protective practices and personal protective equipment to prevent HIV and other blood-borne infections. For health care workers on the job, the main risk of HIV transmission is from being stuck with an HIV-contaminated needle or other sharp object. However, even this risk is small. Scientists estimate that the risk of HIV infection from being stuck with a needle used on an HIV-infected person is less than 1%.

Kaposi's sarcoma in a 20-year old man who had AIDS.

- Postexpoziční profylaxe (PEP) HIV po pohlavním styku není v ČR hrazena z veřejných zdrojů. Preexpoziční profylaxe (PrEP) není v ČR zatím součástí doporučeného postupu vůbec. Přitom mezinárodní organizace a asociace obě modality jednoznačně doporučují jako součást preventivních strategií zejména mezi MSM. PrEP prokázala vysokou účinnost v prevenci HIV sérokonverze u MSM, je dobře tolerována, vznik rezistence je nízký a (kompenzační) nárůst rizikového sexuálního se nekoná [Spinner a kol., 2016]. Jako standardní metoda byla PrEP v roce 2016 zavedena ve Francii, Norsku a prakticky ve Velké Británii, v 17 dalších evropských zemích proběhly, probíhají nebo se chystají tzv. PrEP demonstrační projekty; ČR však mezi nimi chybí [European Centre for Disease Prevention and Control, 2016, out.com, 2016, NHS England, 2016]. I když je PrEP aktuálně dávána do souvislosti se zvýšeným rizikem dalších STI vlivem nárůstu podílu sexuálních styků bez kondomu a zvýšení počtu sexuálních partnerů, je pravděpodobné, že se na něm podílí rovněž zvýšená protestovanost nebo selekční bias, protože ve studiích PrEP se pravidelně vyšetřují i další STI a jsou do nich cíleně zařazovány právě osoby s vysokou mírou rizikového chování již při vstupu do studie. V souvislosti s jinými STI je PrEP vnímána jako příležitost ke zlepšení jejich včasné diagnostiky a léčby mezi MSM s nejvyšší mírou rizikového chování [Kojima a kol., 2016, Scott a Klausner, 2016].

New“ strategy under N. Ramjee, 2006

A, B, C, D, E, F, G, H, (I)

A – abstinence
B – be faithful – být si vzájemně věrný, buď věrný
C – kondom (mužský kondom)
C = také femidom neboli kondom
D – diafragma (poševní) with spermicid
D – dental dam – dentální rouška
E – exposure prophylaxis
F – female initiated microbicides
G – **genital tract infections** – therapy
H – **HSV 2 suppression** Herpes simplex 2
I – „imunity induced by vaccine“ ?????

Pre-exposure prophylaxis or PrEP

is the use of an antiretroviral medication to prevent the acquisition of HIV infection by uninfected persons.

PrEP may either be taken orally, using an antiretroviral drug available for treatment of HIV infection (tenofovir plus emtricitabine), or topically as a vaginal gel containing tenofovir.

The efficacy of oral PrEP has been shown in four randomized control trials and is high when the drug is used as directed.

The efficacy of gel has been shown in one trial and is moderate.

As of September 2015, WHO recommends that people at substantial risk of HIV infection should be offered PrEP as an additional prevention choice, as part of comprehensive prevention.

Conclusions (1)

- HIV infection is of major public health importance in Europe, with evidence of continuing transmission in specific populations with no clear signs of overall decrease.

- Half of the HIV infections were diagnosed as late presenters with CD4 cell counts less than 350/mm^3 blood.

- Heterogeneity exists in HIV epidemics in the EU/EEA:
  - Men who have sex with men accounted for majority of cases;
  - One third of heterosexual cases have direct links to sub-Saharan Africa (areas with a generalised epidemic);
  - Despite low levels of HIV reported in IDU, increases continue in Greece and Romania.

Conclusions (2)

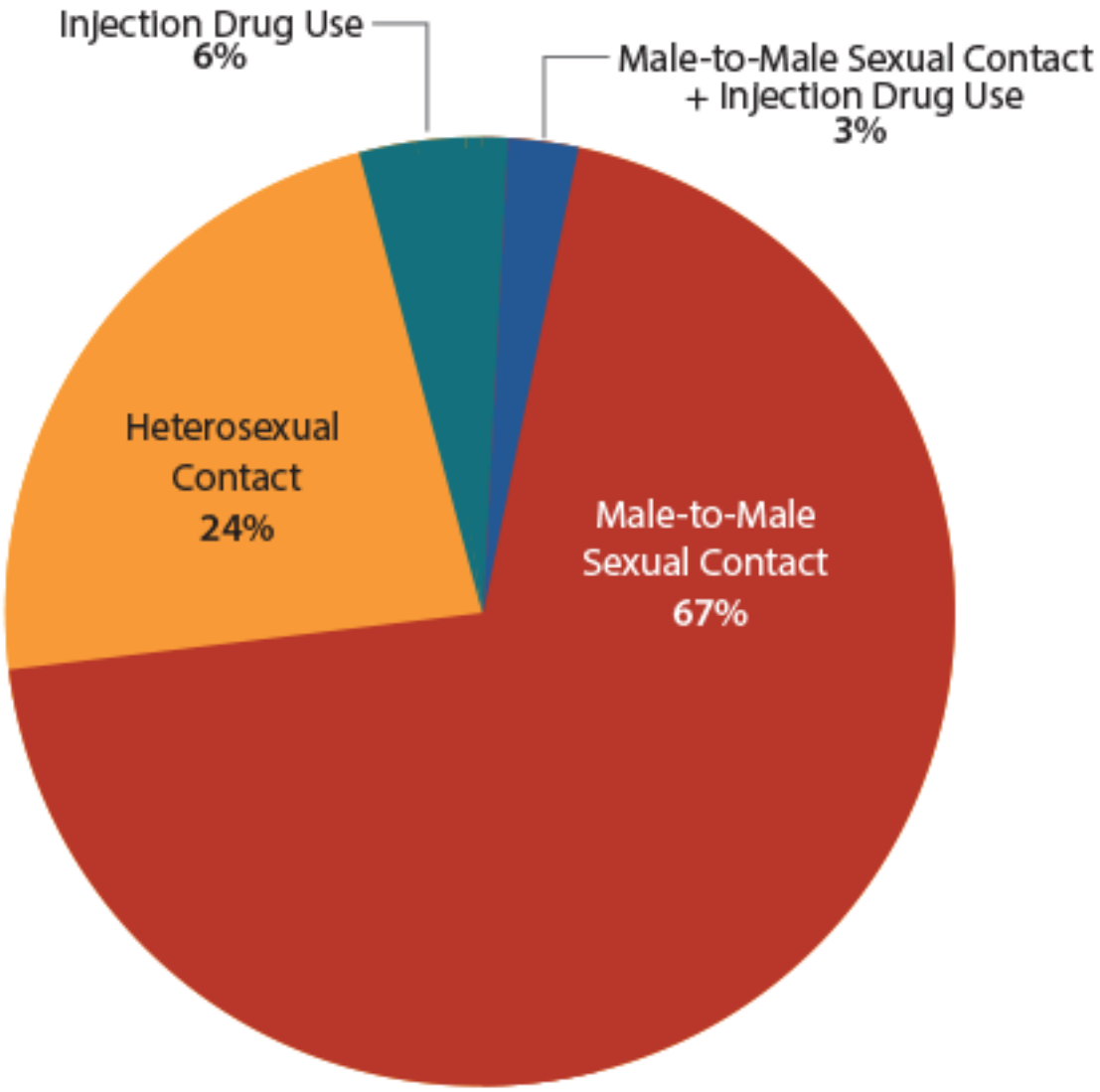
- Interventions should be based on evidence and tailored to the local epidemiological situation and vulnerable populations such as MSM, IDU and migrant populations.

- Wider access and uptake of HIV counselling and testing is needed to ensure earlier diagnosis and access to treatment – both to improve the longer term treatment outcomes for the individuals but also to prevent or reduce further transmission in the community.

Global summary of the AIDS epidemic | 2015

Number of people living with HIV in 2015	**Total**	36.7 million [34.0 million – 39.8 million]
	Adults	34.9 million [32.4 million – 37.9 million]
	Women (15+)	17.8 million [16.4 million – 19.4 million]
	Children (<15 years)	1.8 million [1.5 million – 2.0 million]
People newly infected with HIV in 2015	**Total**	2.1 million [1.8 million – 2.4 million]
	Adults	1.9 million [1.7 million – 2.2 million]
	Children (<15 years)	150 000 [110 000 – 190 000]
AIDS deaths in 2015	**Total**	1.1 million [940 000 – 1.3 million]
	Adults	1.0 million [840 000 – 1.2 million]
	Children (<15 years)	110 000 [84 000 – 130 000]

New HIV Diagnoses by Transmission Category (2015, n=39,513)



Vertical transmission -CDC

HIV and AIDS Diagnoses

Approximately 8,500 women living with HIV give birth annually.

Most (73%) of the estimated 174 children in the United States who were diagnosed with HIV in 2014 got HIV through perinatal transmission.

Most (88%) of the estimated 104 children in the United States diagnosed with AIDS in 2014 got HIV through perinatal transmission.

Living With HIV

Of the estimated 1,999 children living with perinatal HIV at the end of 2013, 1,298 (65%) were black/African American, 312 (16%) were Hispanic/Latino,[b] and 212 (11%) were white.

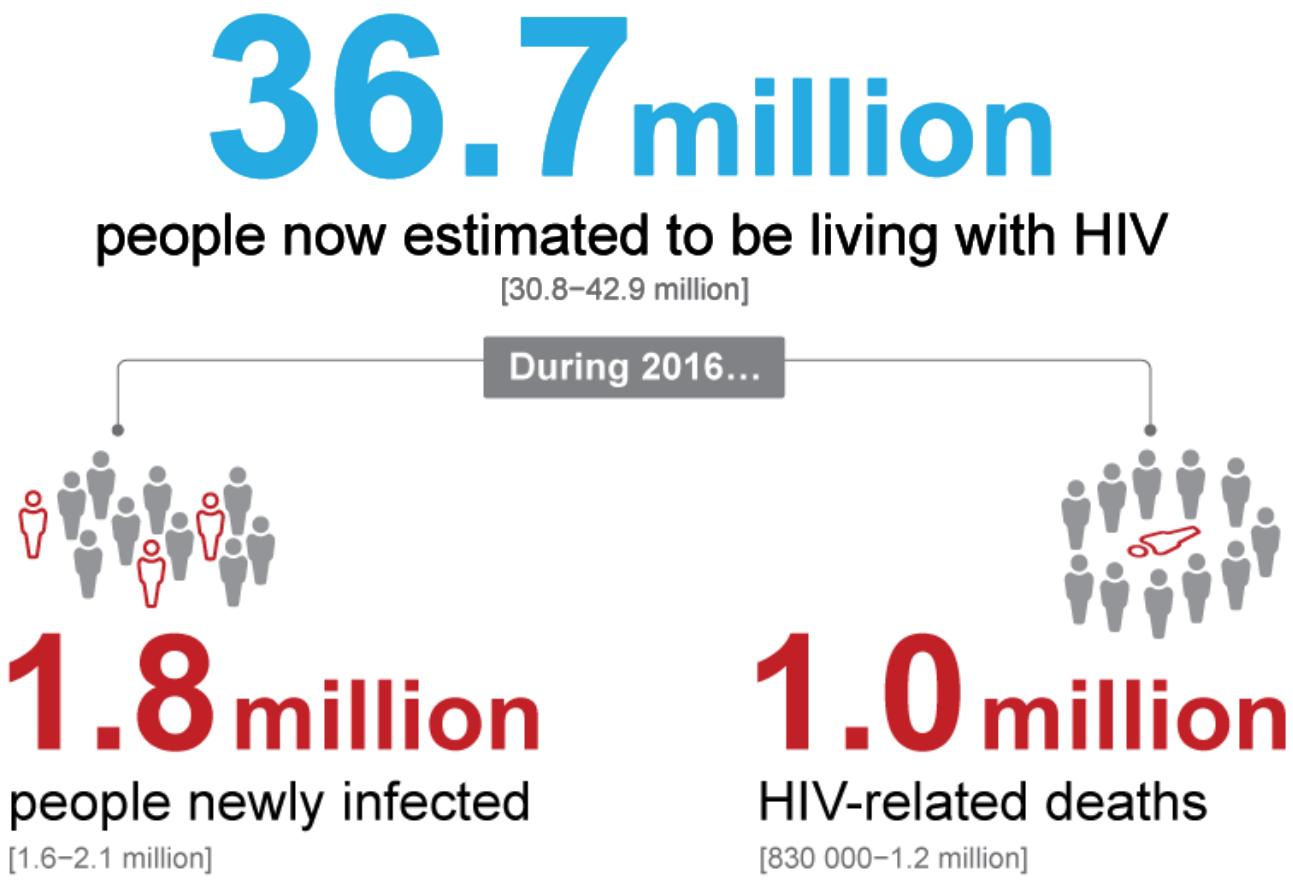
At the end of 2013, an estimated 9,131 adults and adolescents (aged 13 and older) were living with HIV acquired through perinatal transmission. Of these, 60% (5,495) were black/African American, 23% (2,093) were Hispanic/Latino, and 12% (1,118) were white.

Deaths

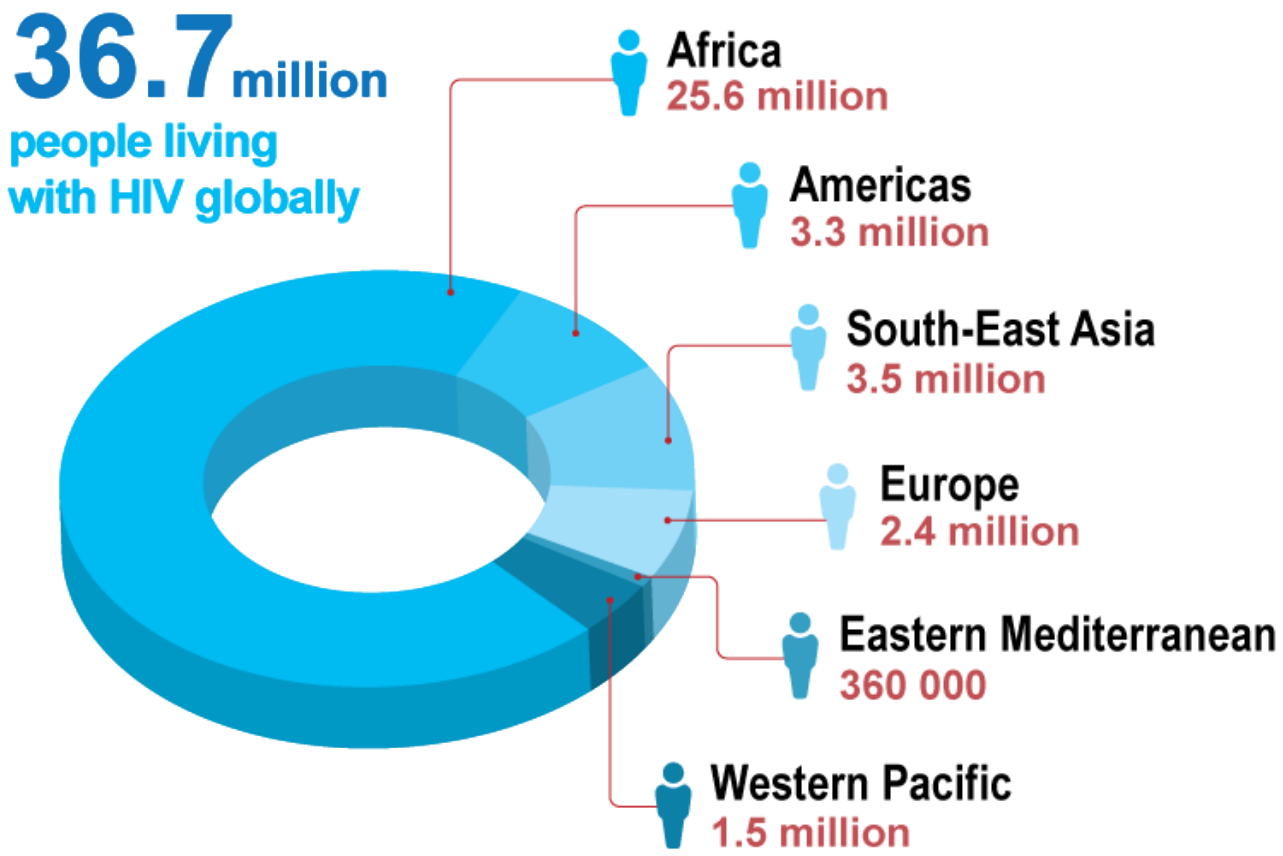
An estimated 4,998 children ever diagnosed with AIDS have died since the beginning of the epidemic through the end of 2013 (includes only those under age 13 at time of death).[c]

Almost all of them (91%) got HIV through perinatal transmission.

Summary of global HIV epidemic (2016)



People living with HIV by WHO region (2016)

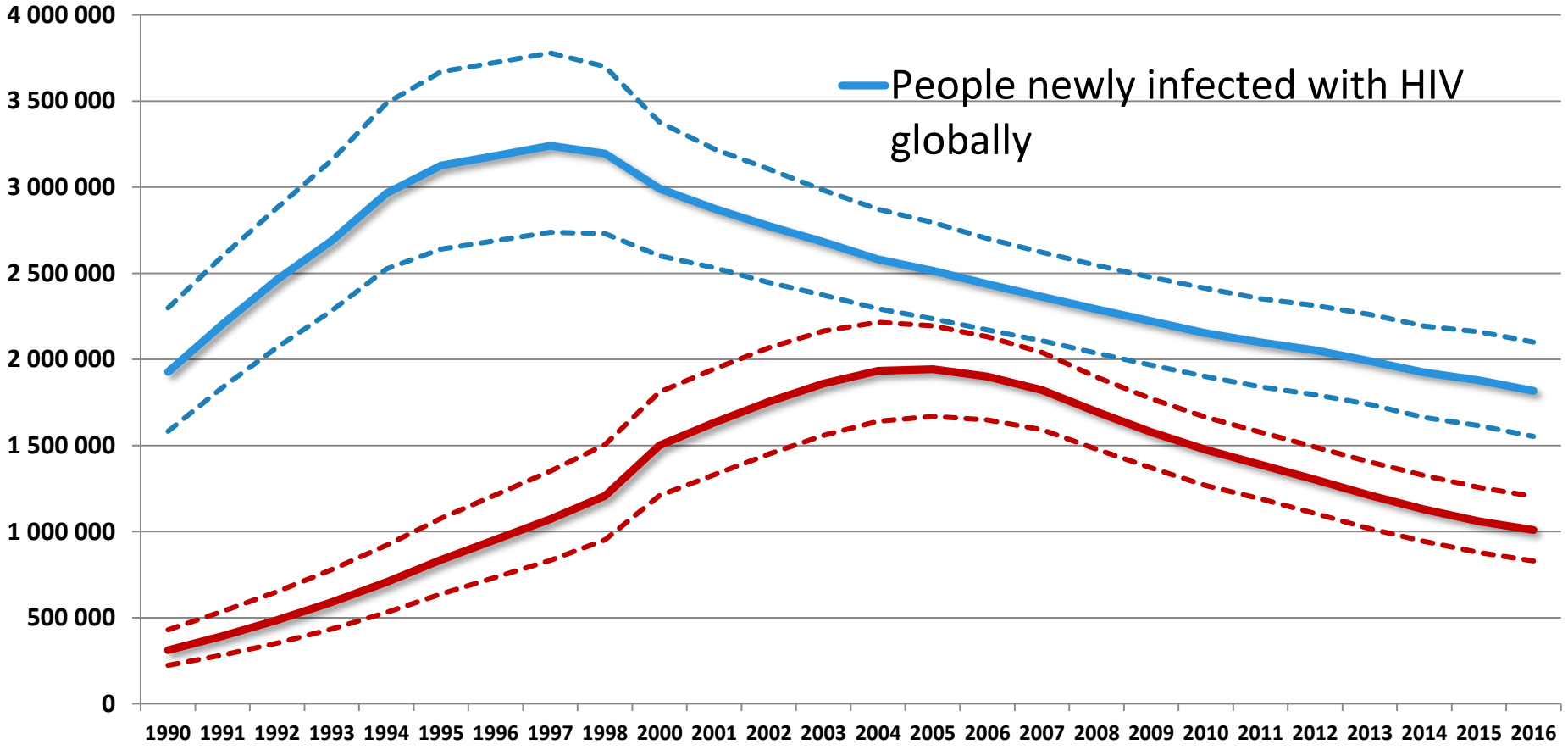


Summary of global HIV epidemic (2016)

Number of people living with HIV in 2016	Total	36.7 million [30.8 million – 42.9 million]
	Adults	34.5 million [28.8 million – 40.2 million]
	Women	17.8 million [15.4 million – 20.3 million]
	Men	16.7 million [14.0 million – 19.5 million]
	Children (<15 years)	2.1 million [1.7 million – 2.6 million]
People newly infected with HIV in 2016	Total	1.8 million [1.6 million – 2.1 million]
	Adults	1.7 million [1.4 million – 1.9 million]
	Children (<15 years)	160 000 [100 000 – 220 000]
AIDS deaths in 2016	Total	1.0 million [830 000 – 1.2 million]
	Adults	890 000 [740 000 – 1.1 million]
	Children (<15 years)	120 000 [79 000 – 160 000]

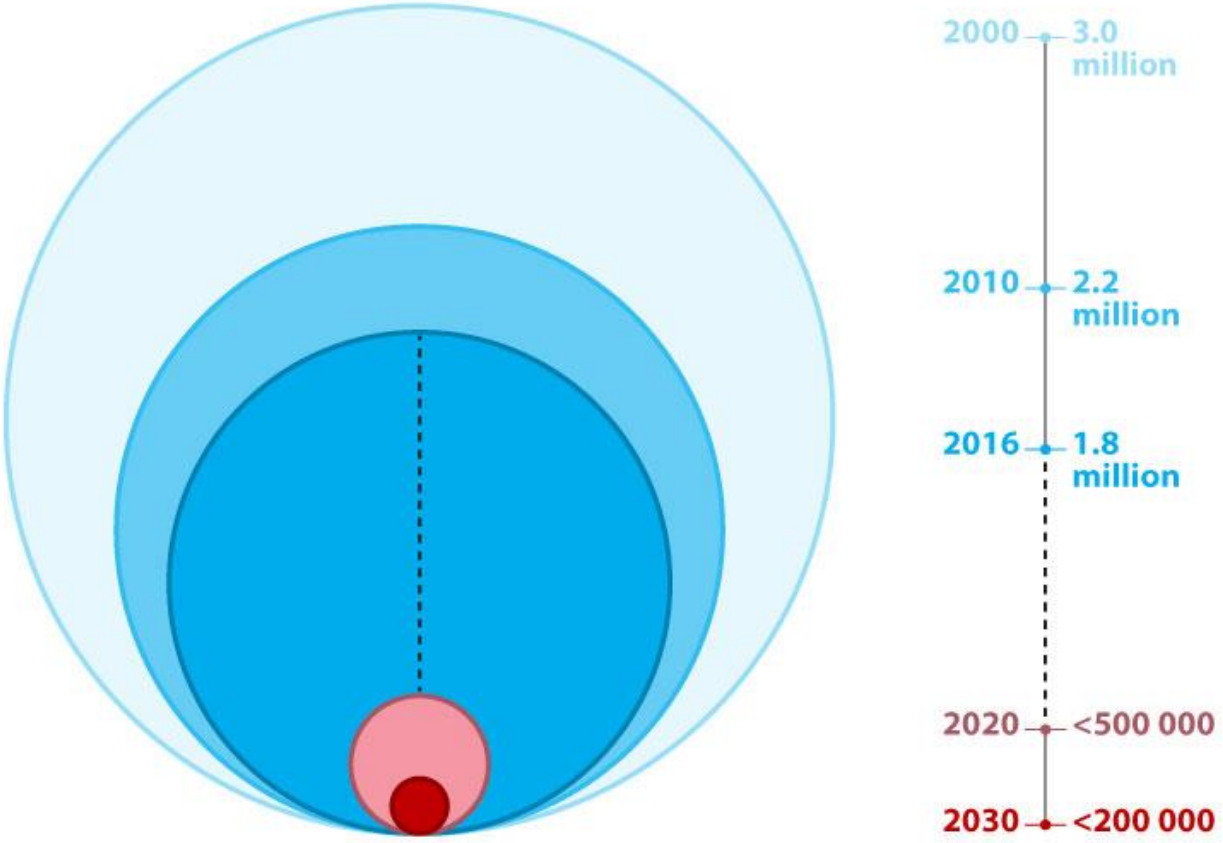
Source: UNAIDS/WHO estimates.

Decline in HIV incidence and mortality over time



Source: UNAIDS/WHO estimates.

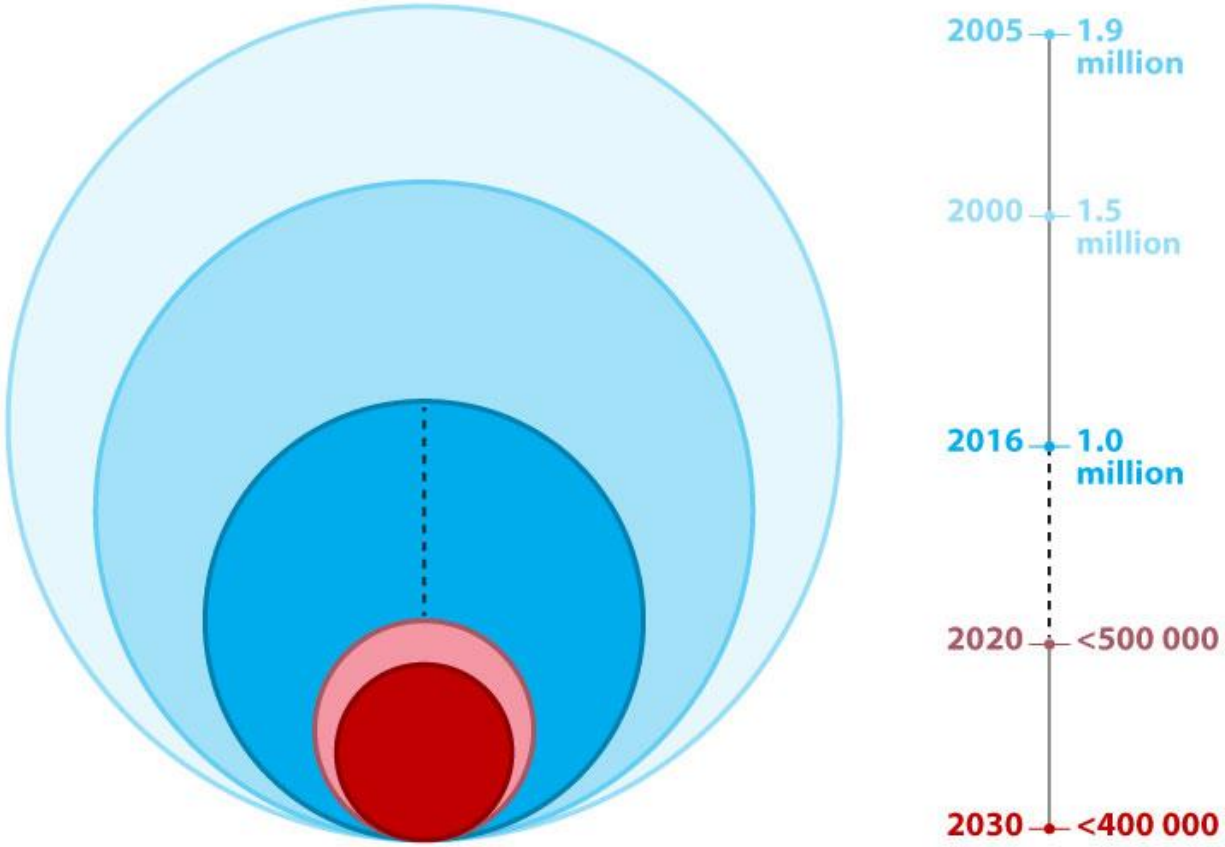
Number of people newly infected with HIV



Future targets

UNAIDS/WHO estimates

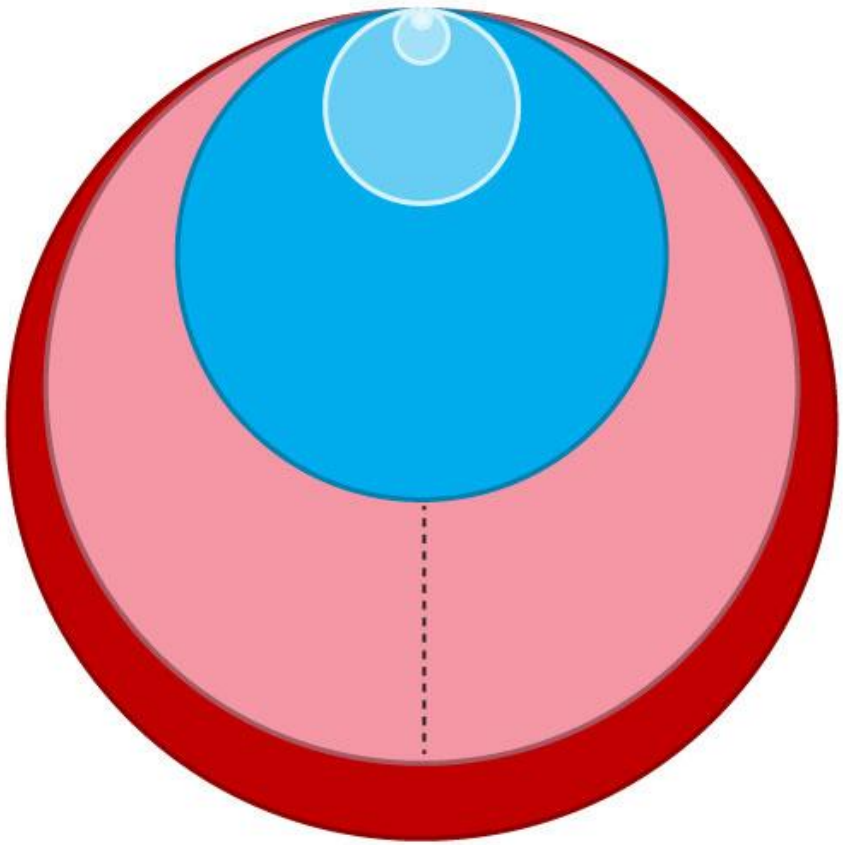
Number of people dying from HIV

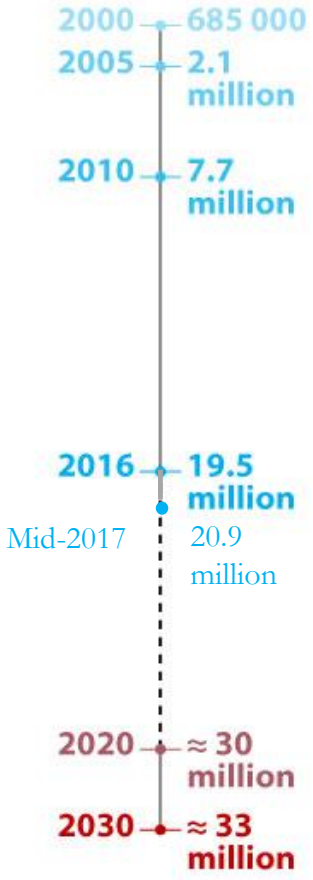


Future targets

UNAIDS/WHO estimates

Number of people receiving antiretroviral treatment

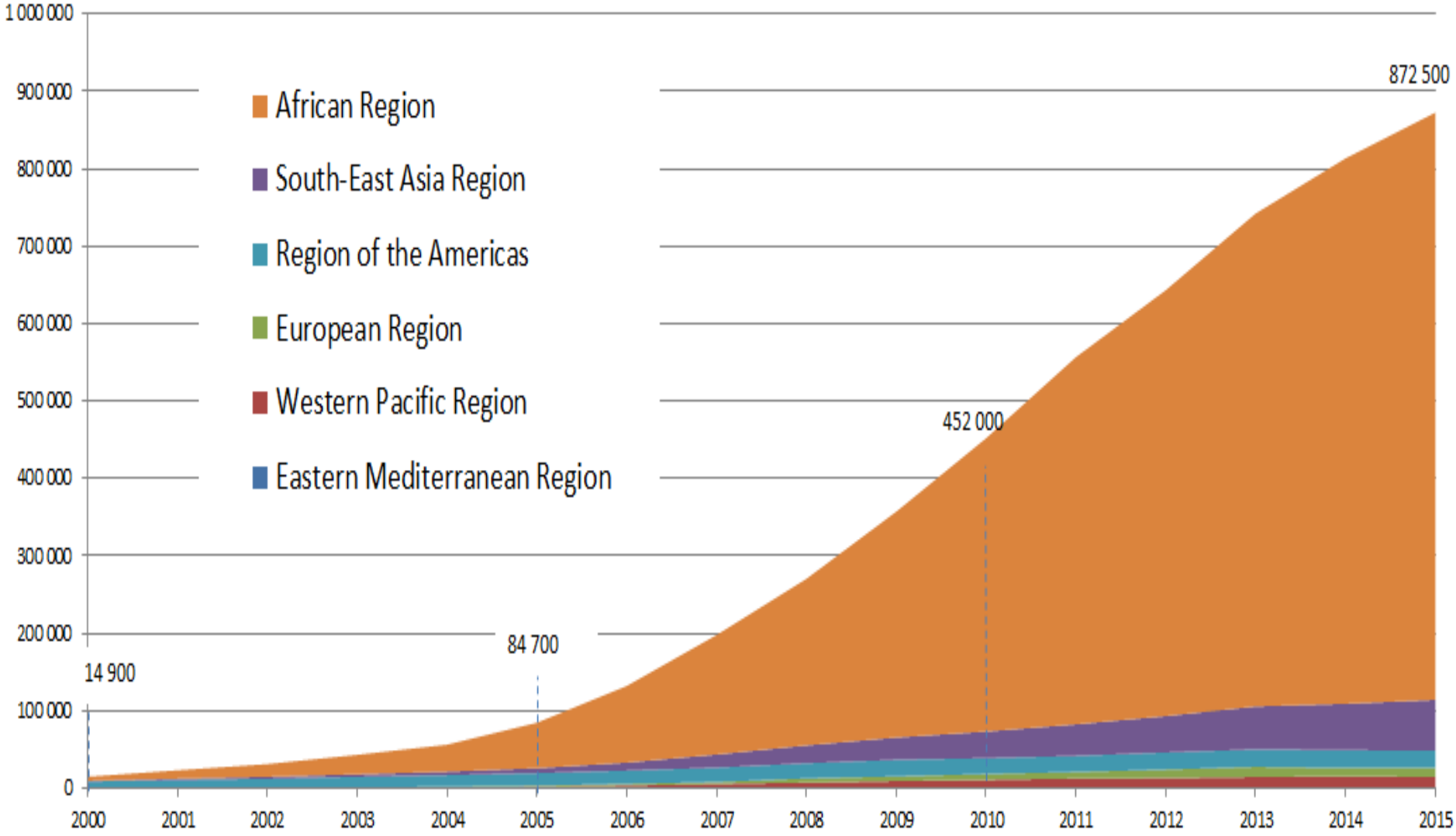




Future targets

UNAIDS/WHO estimates

Number of children (<15 years) receiving ART globally, and by WHO region, 2000-2015



2015

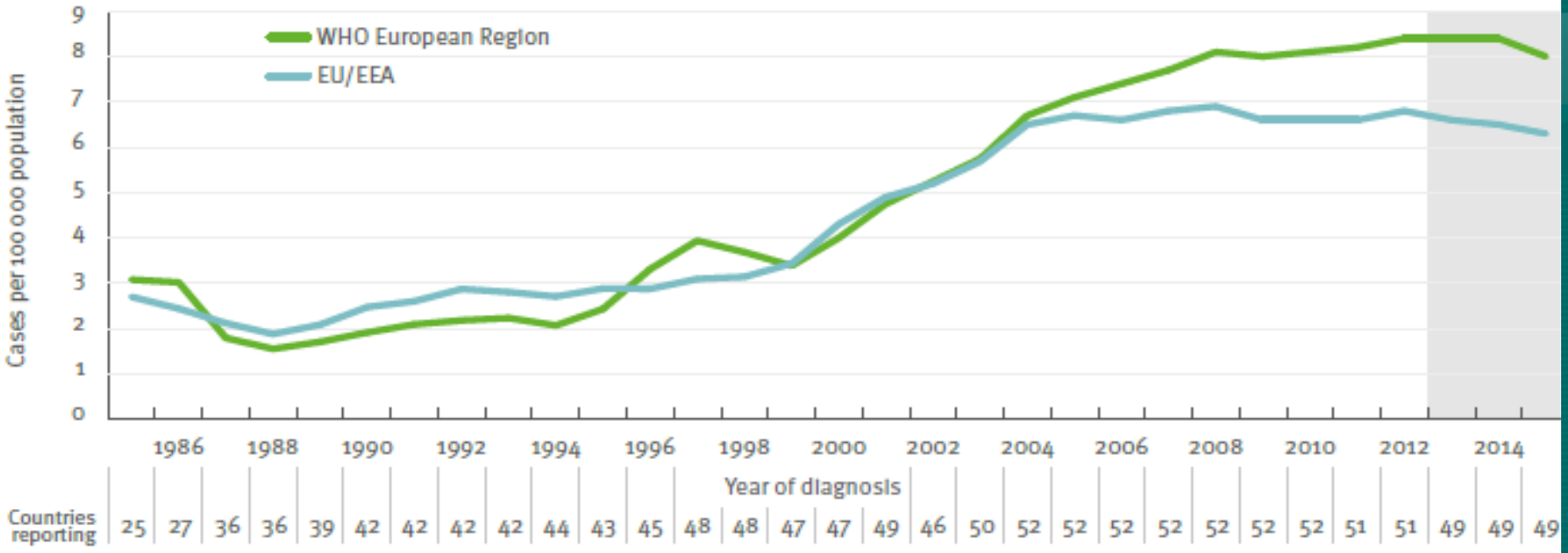
HIV/AIDS surveillance in Europe

Among the 49 reporting countries3 the rate was

7.6 per 100 000 population

and 6.3 per 100 000 for the EU/EEA

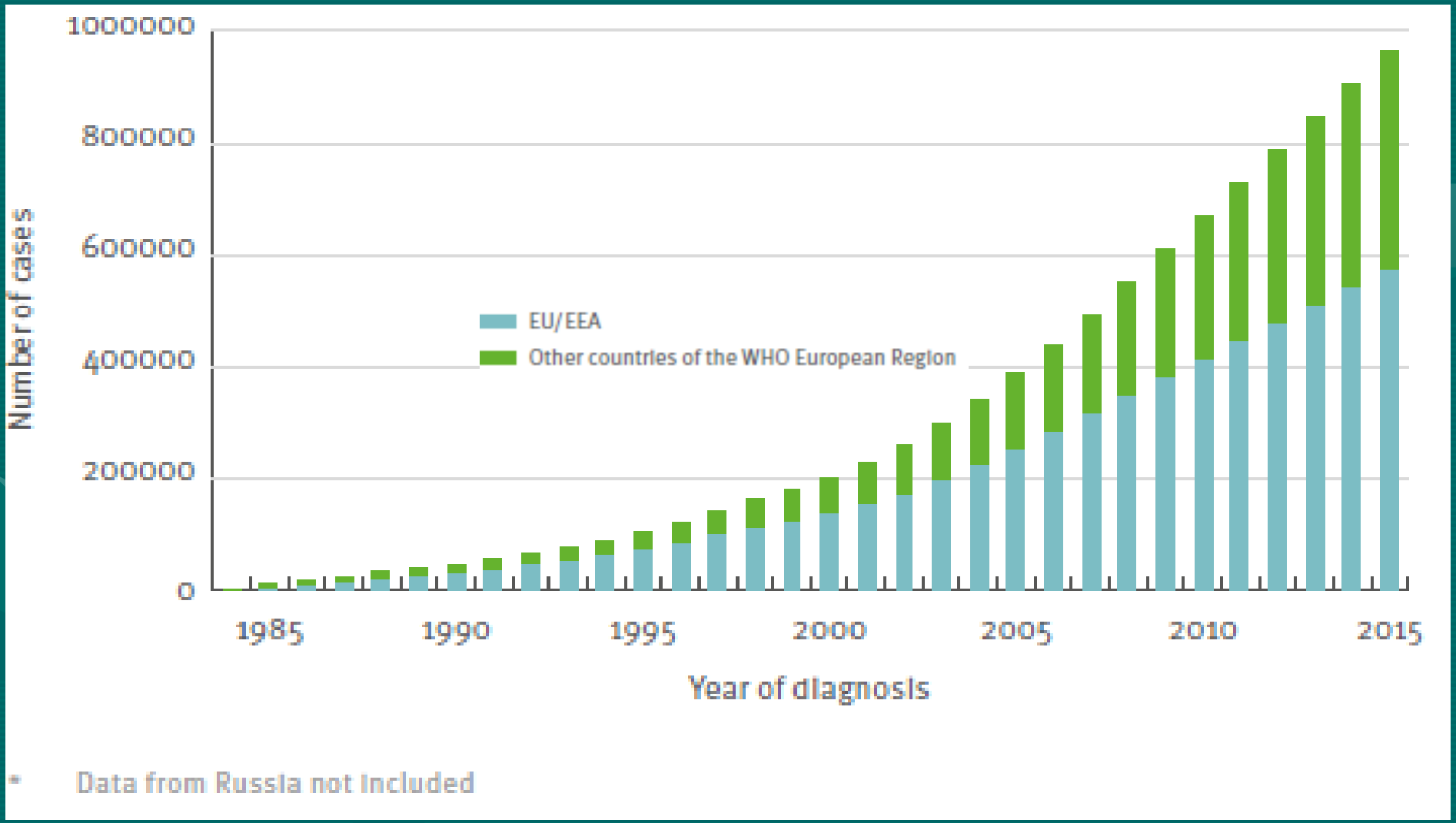
Figure A: Rate of new HIV diagnoses per 100 000 population, by year of diagnosis and adjusted for reporting delay, in the EU/EEA and the WHO European Region*, 1985–2015



Rates may increase in the coming years due to reporting delays

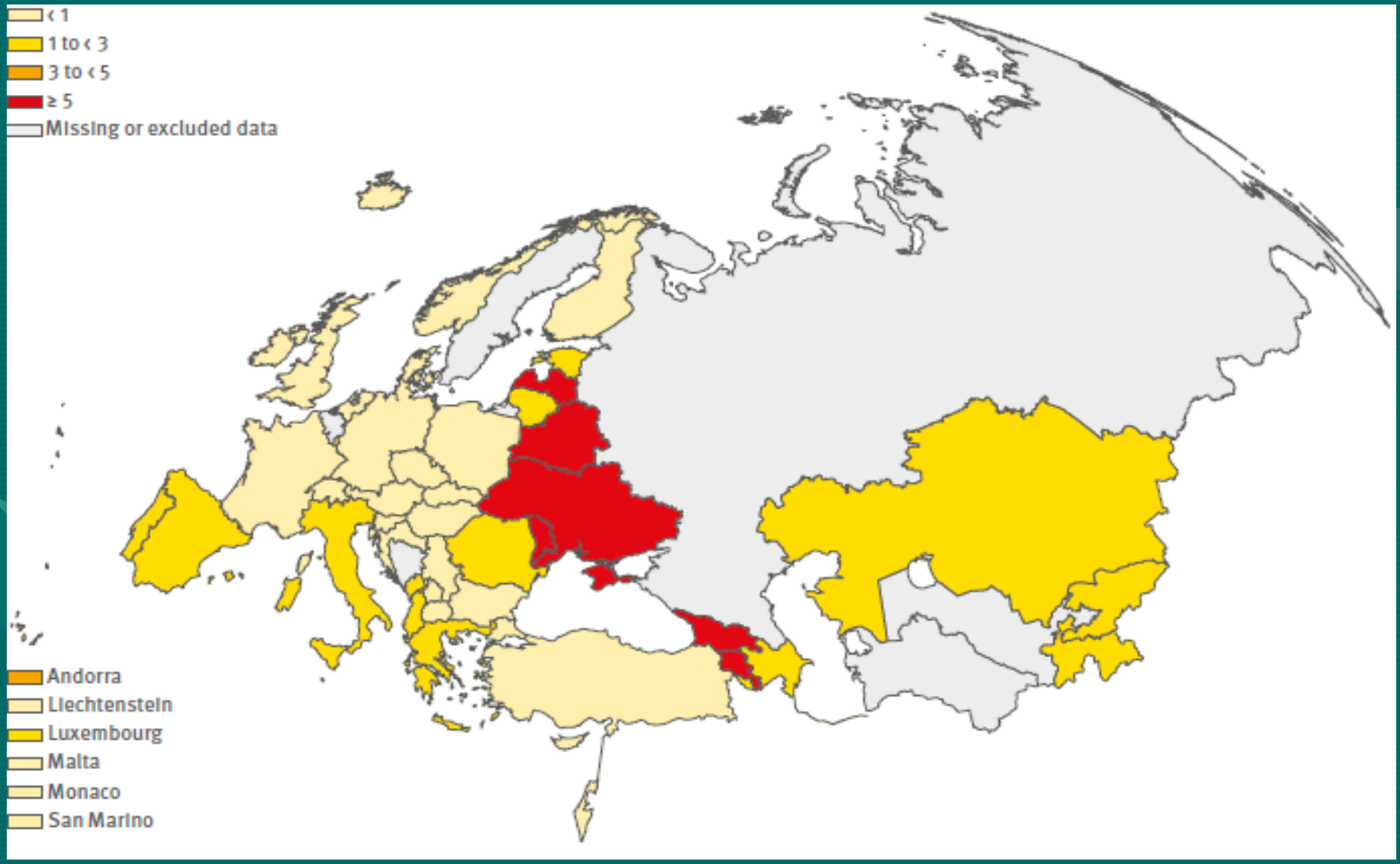
* Data from Russia are not included

Cumulative number of new diagnosis in the EU/EEA and other countries of the WHO European Region



* Data from Russia not included

AIDS diagnoses reported per 100 000 population 2015

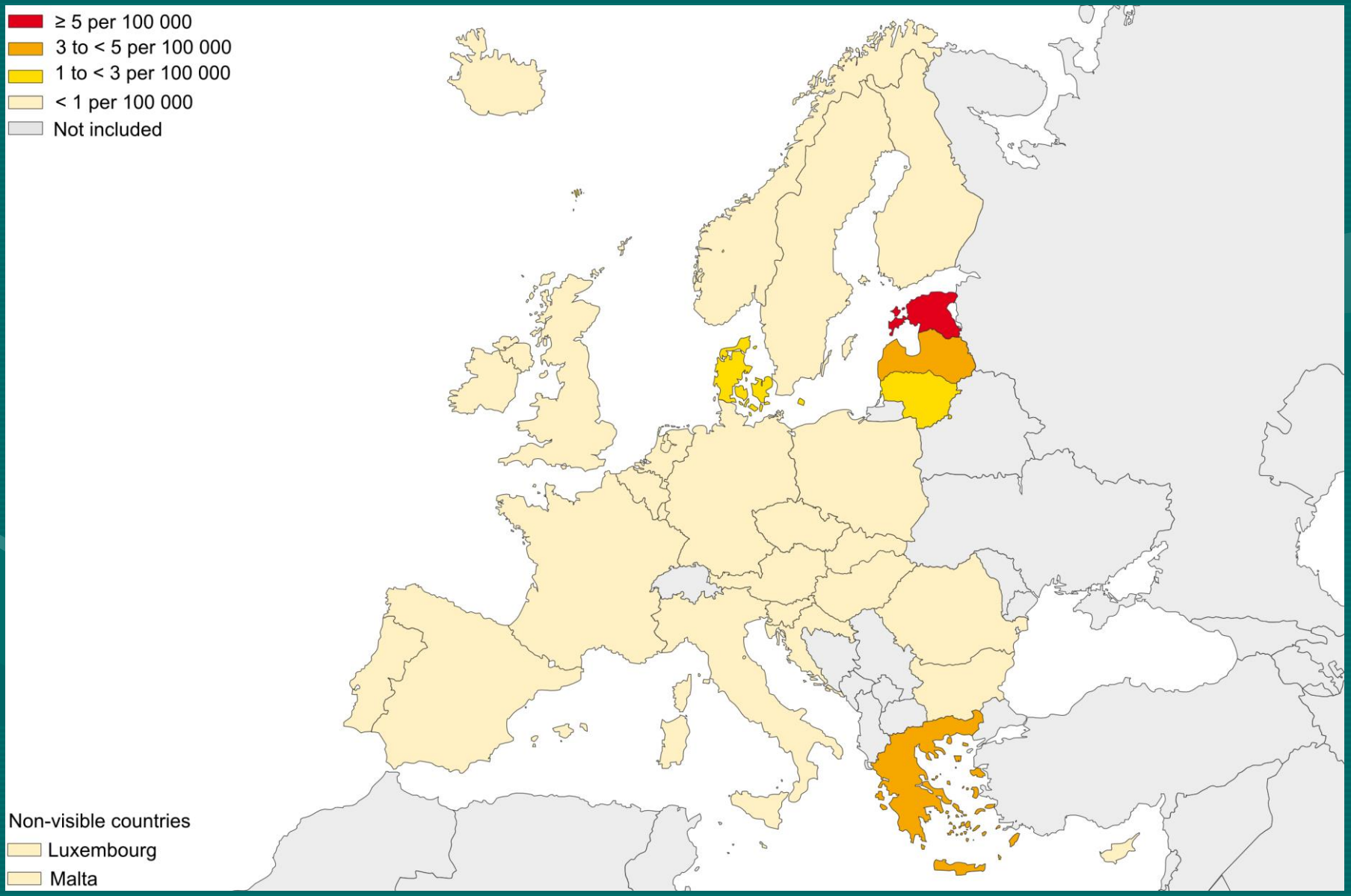


HIV infections diagnosed, 2012

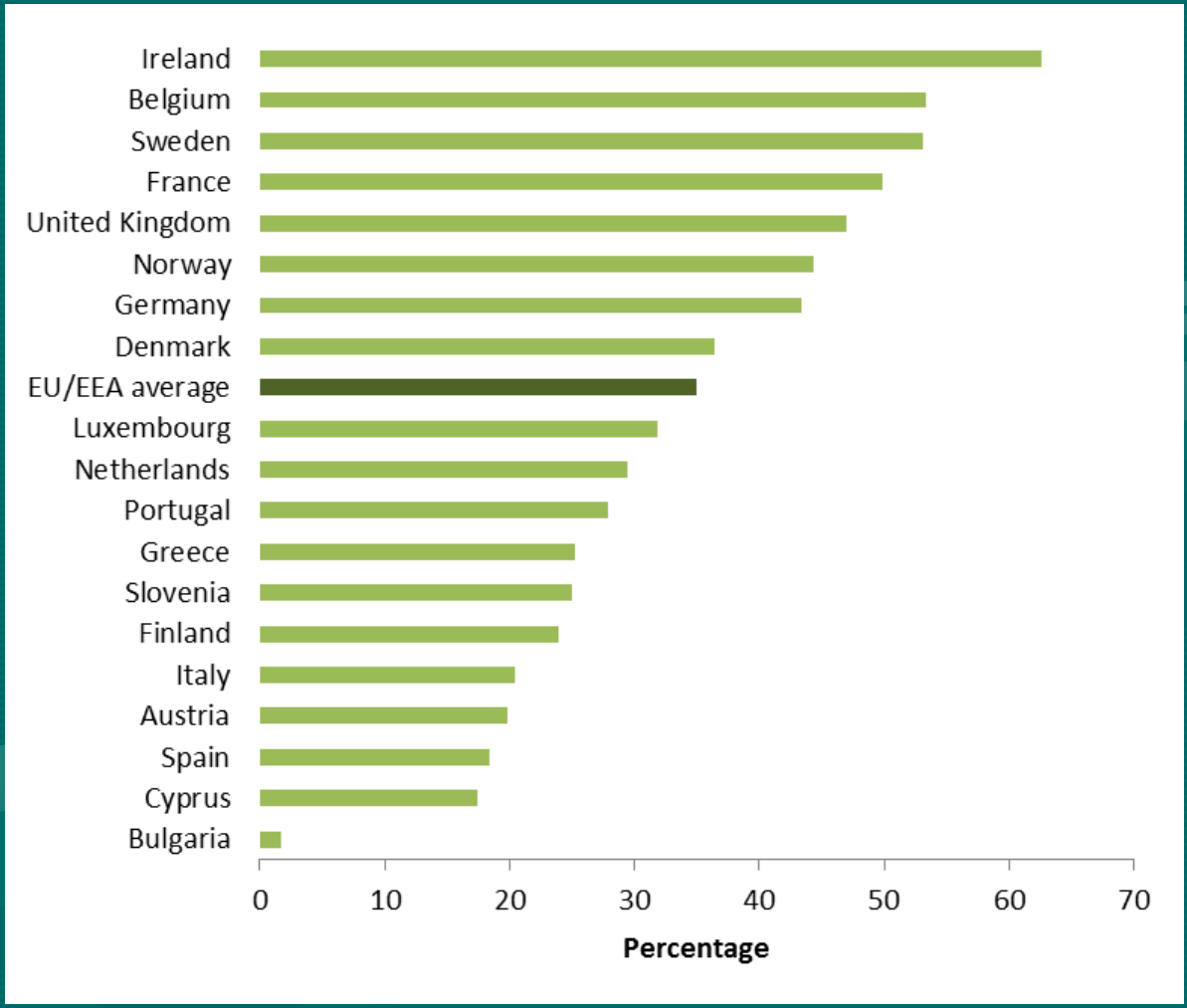
Characteristics of reported cases	EU/EEA
Number of HIV diagnoses	29 381
Diagnoses per 100 000 population	5.8
Percentage aged 15–24 years	10.6%
Male-to-female ratio	3.2
Transmission mode (percentage)	
Heterosexual	33.8%*
Men who have sex with men	40.4%
Injecting drug use	6.1%
Unknown	18.7%

HIV infections diagnosed and reported, 2012

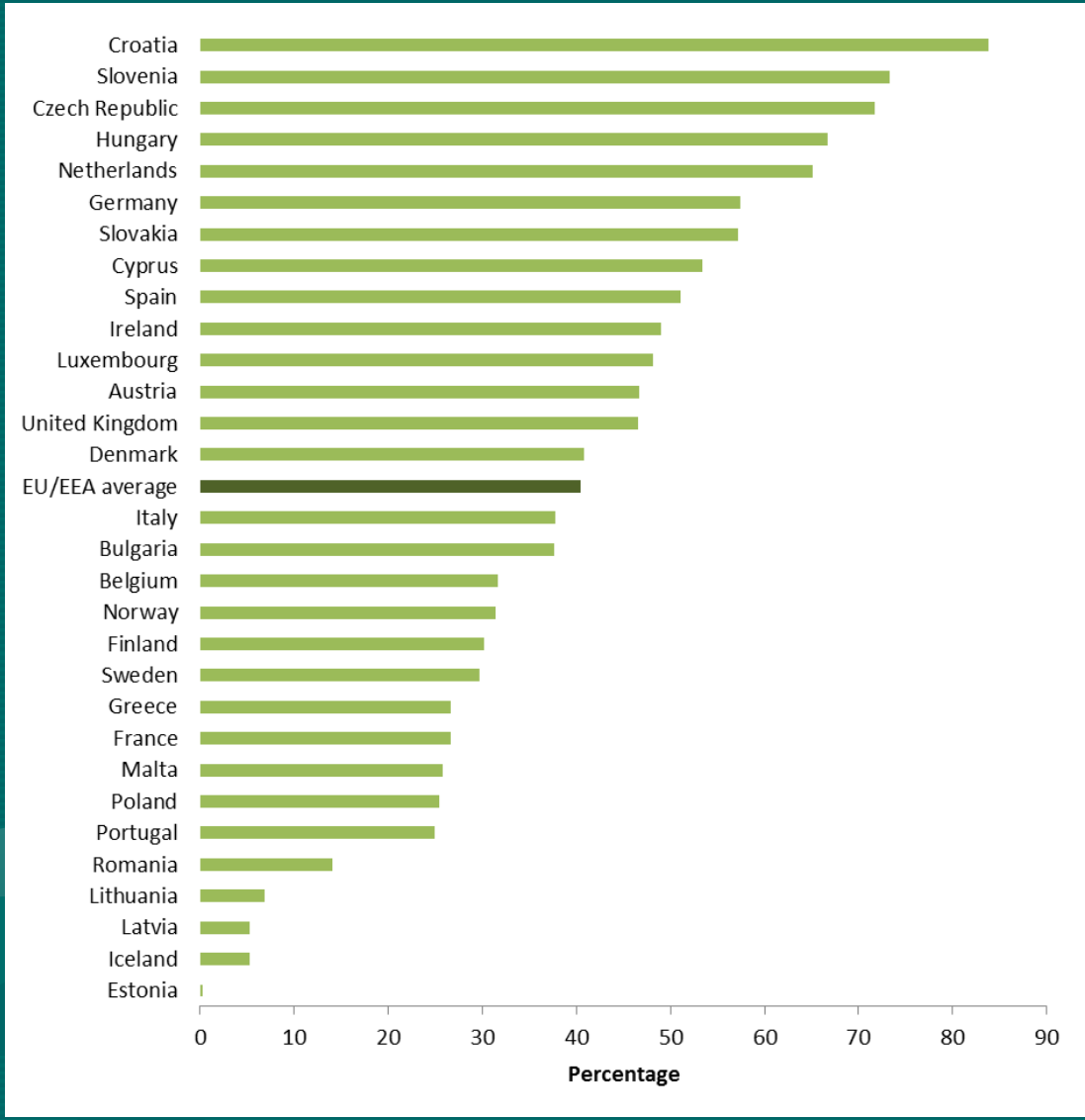
Injecting drug use, EU/EEA



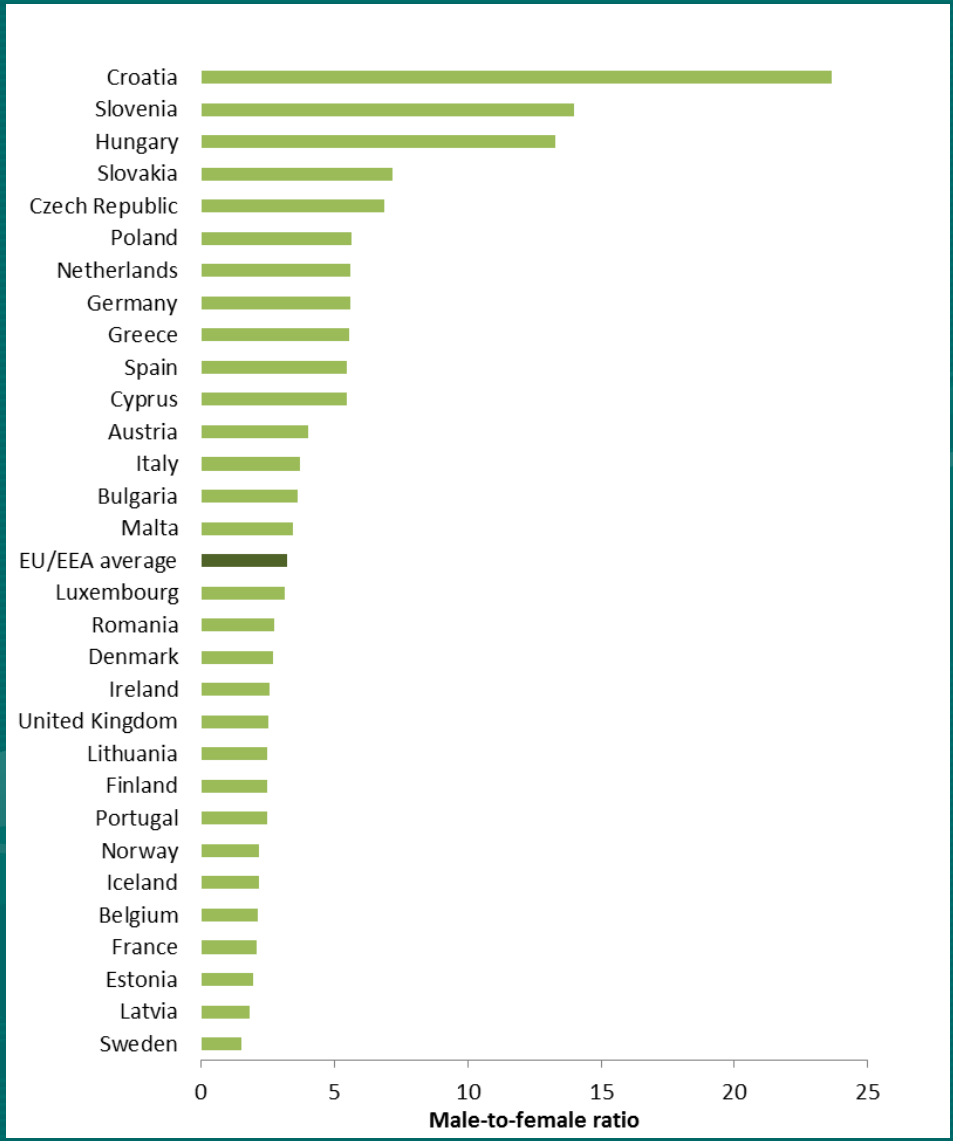
HIV diagnoses in persons originating from countries with a generalised epidemic among all the heterosexually acquired infections, 2012 (n=9 944)



HIV diagnoses in MSM among all reported HIV cases, by country, EU/EEA, 2012 (n=29 381)



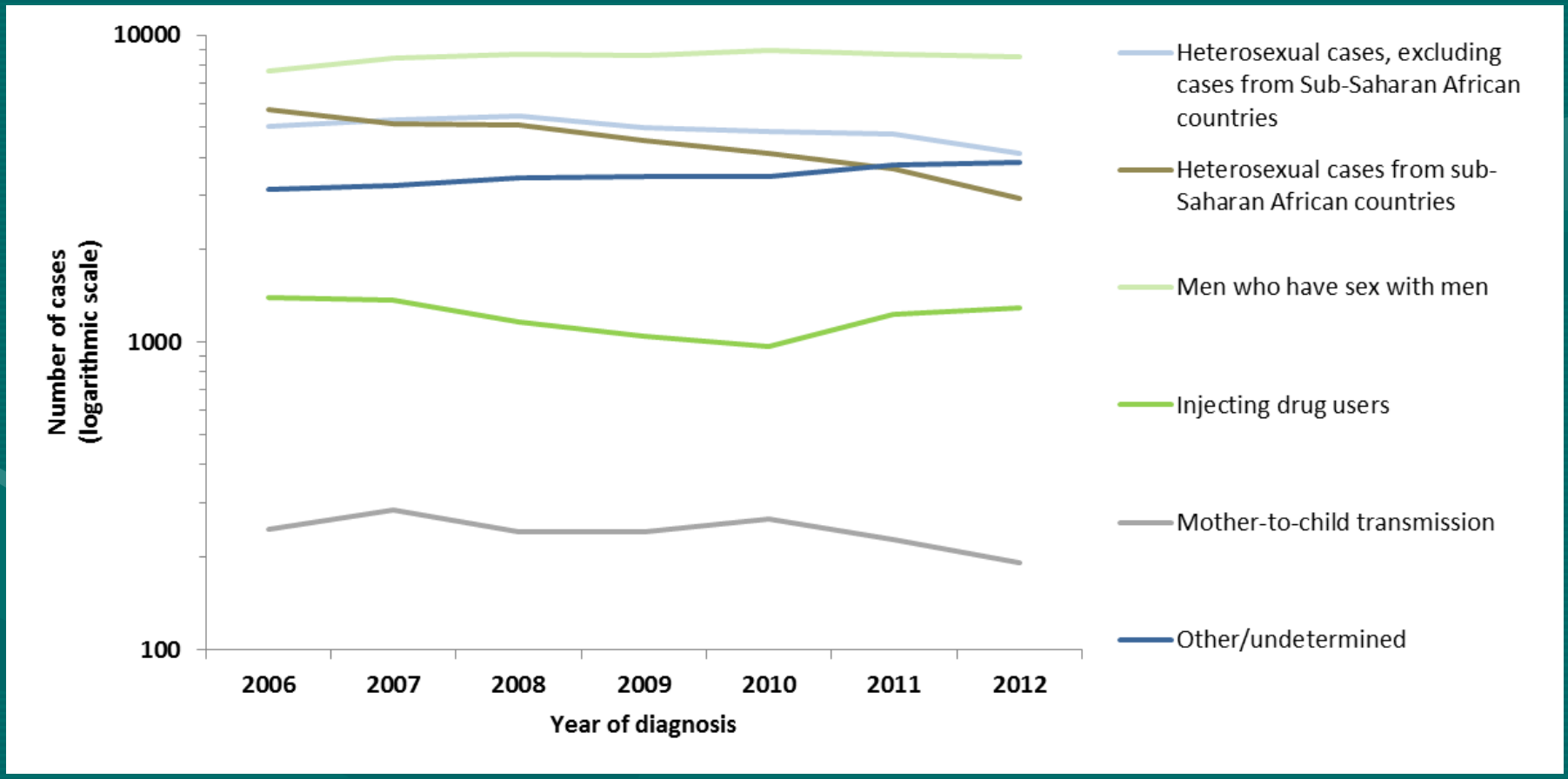
Male-to-female ratio of HIV infections, by country, EU/EEA, 2012 (n=29 327)



Rate of reported HIV diagnoses, by year of diagnosis, in the EU/EEA, 1984–2012

HIV infections reported, 2006-2012

Transmission mode and origin, adjusted for reporting delay



Predominant transmission mode: men who have sex with men

Data were not included or not available from Estonia, Poland, Spain, Italy.

Celkový stav vyšetřování HIV protilátek v ČR

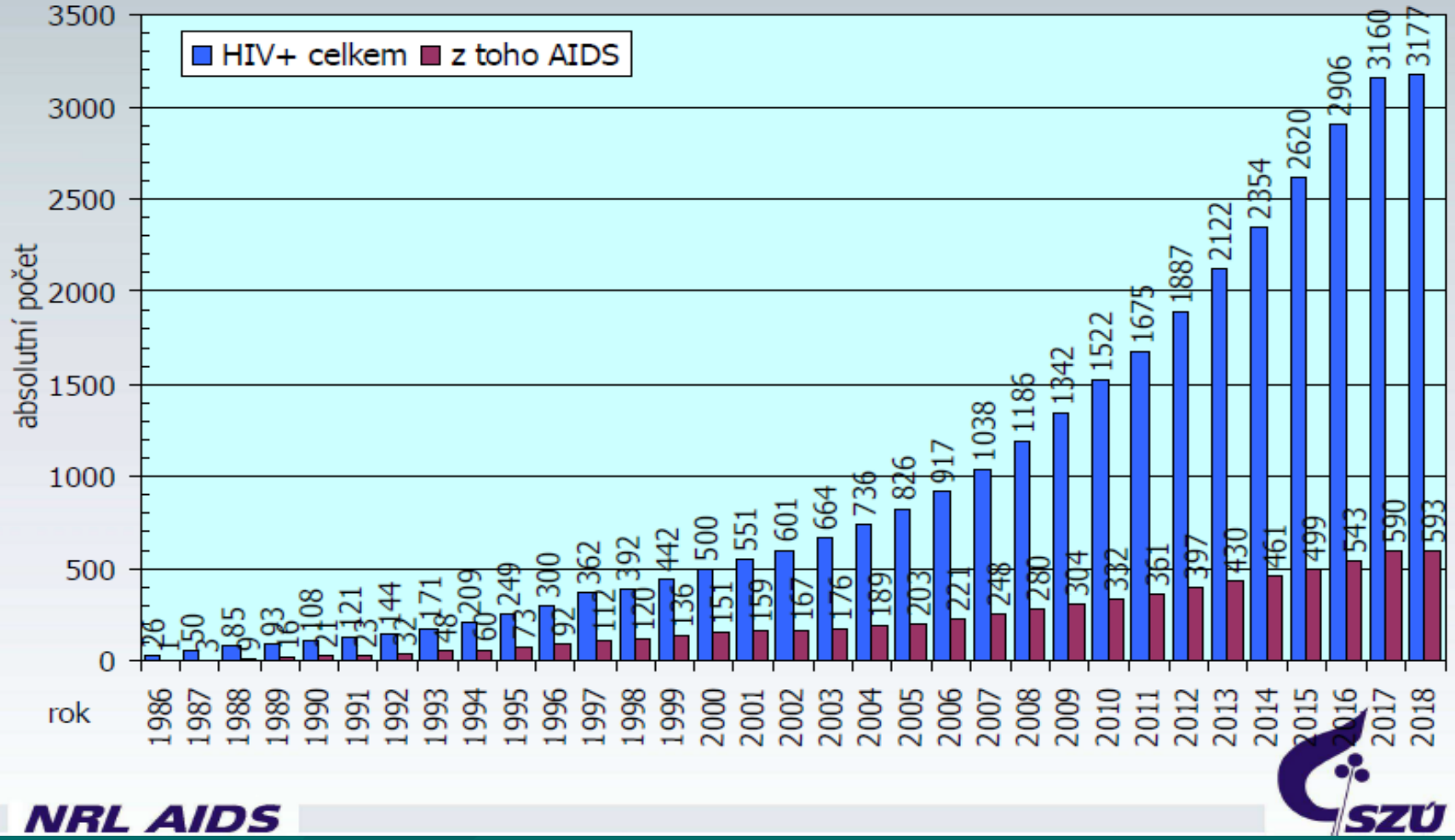
Kumulativní údaje k 31.1.2018

HIV / AIDS V ČESKÉ REPUBLICE

(občané ČR a cizinci s trvalým pobytem)

Kumulativní údaje za období

1.1.1986 - 31.1.2018



NRL AIDS

SZÚ

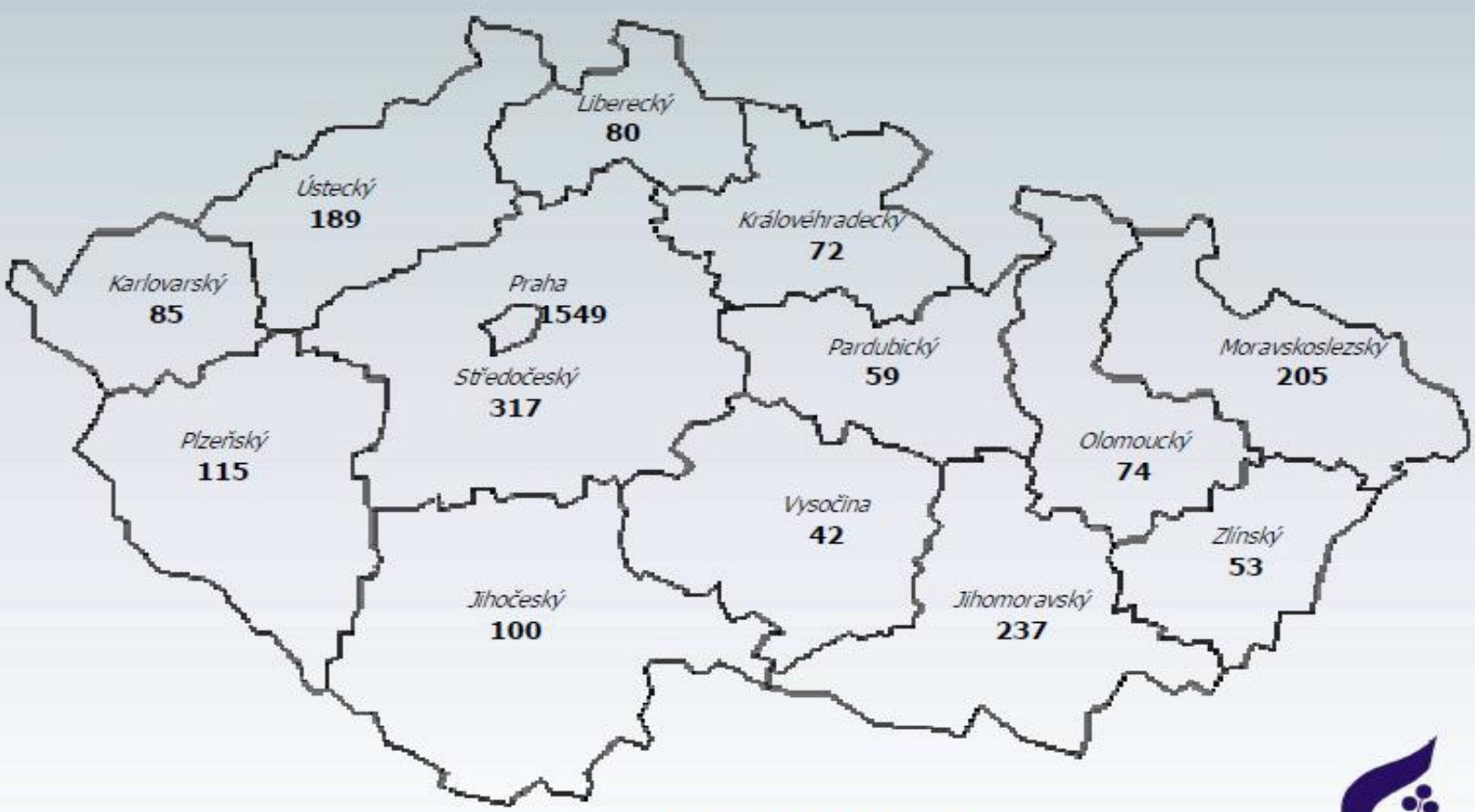
HIV INFEKCE V ČESKÉ REPUBLICE

PODLE KRAJE BYDLIŠTĚ V DOBĚ PRVNÍ DIAGNÓZY HIV

(občané ČR a cizinci s trvalým pobytem)

Kumulativní údaje za období

1.10.1985 - 31.1.2018



HIV + CELKEM 3177

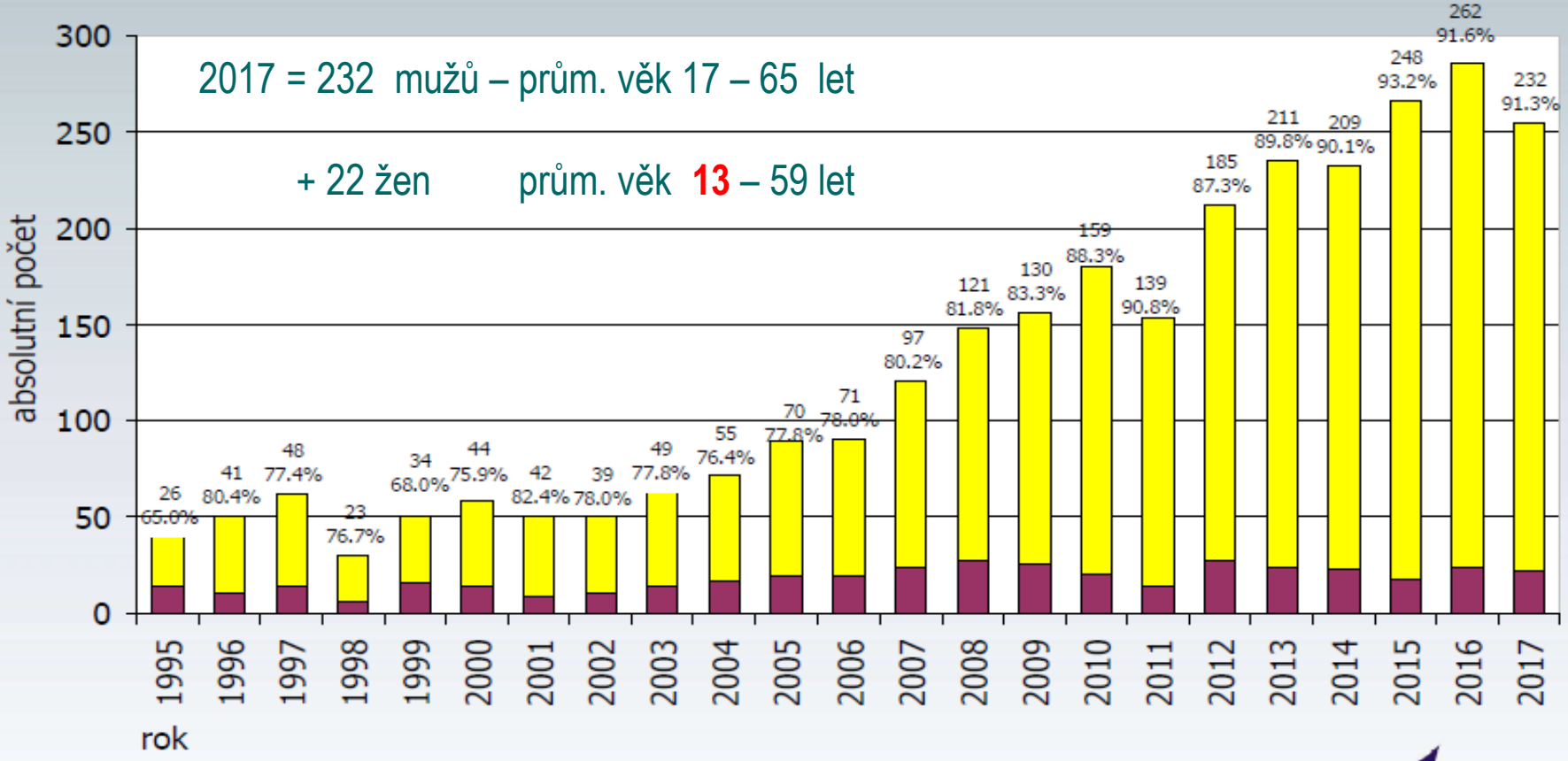
NRL AIDS

SZÚ

HIV+ V ČR PODLE POHLAVÍ A LET - ZASTOUPENÍ HIV+ MUŽŮ

(občané ČR a cizinci s dlouhodobým pobytem)

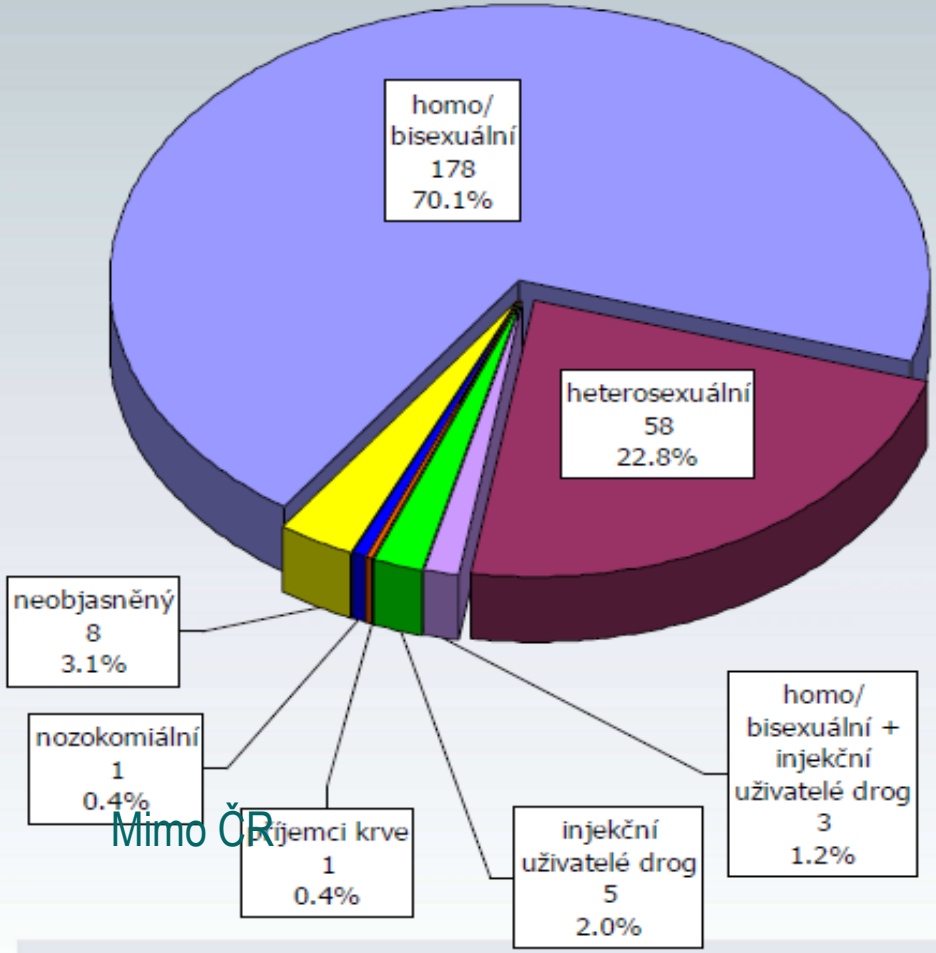
Údaje za období
1.1.1995 - 31.12.2017



ROZDĚLENÍ HIV POZITIVNÍCH PŘÍPADŮ V ČR PODLE ZPŮSOBU PŘENOSU

(občané ČR a cizinci s dlouhodobým pobytem)

Údaje za rok 2017



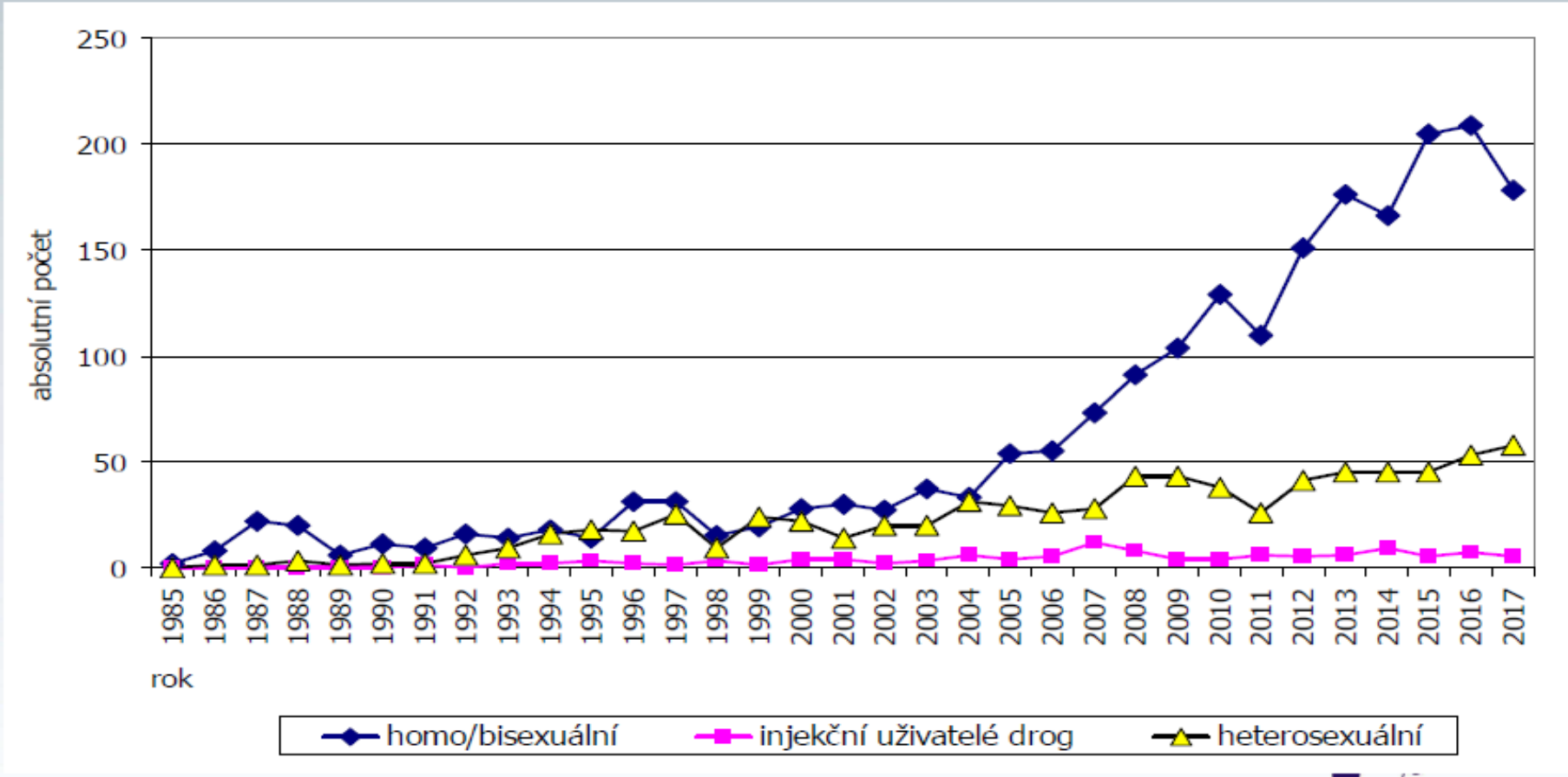
VYBRANÉ KATEGORIE PŘENOSU HIV V ČESKÉ REPUBLICE

podle roku diagnózy

(občané ČR a cizinci s dlouhodobým pobytem)

Absolutní údaje ke dni

31.12.2017



RUTINNÍ TESTOVÁNÍ HIV U GRAVIDNÍCH ŽEN

V JEDNOTLIVÝCH LETECH

(občané ČR a cizinci s dlouhodobým pobytem)

Absolutní údaje ke dni

31.12.2017

Z toho 5 rezidentky.

Celkem narozeno 13 dětí od HIV + matek (8 věděly + 5 zjištěno při skríningu