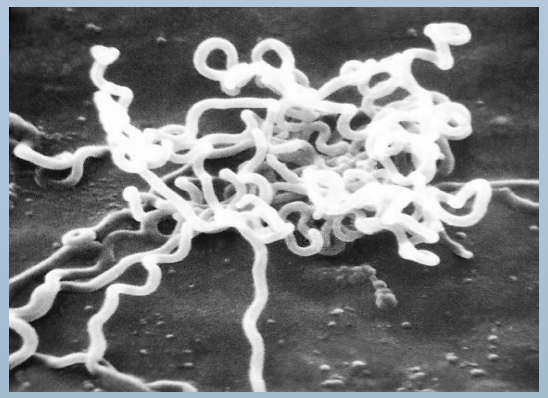
An Update on the Global and Local Epidemiology of Syphilis

Ildikó Valkai PhD, Kata Terecskei PhD

Public Health Service of Government Office for Csongrád-Csanád County
Laboratory Department
Laboratory of Virus Diagnostic and Serology
2022

Introductio
n



Syphilis

Treponema pallidum subsp. pallidum (Treponema, Spirochaetales, Spirochaetaceae)

• helical rods, thin helical cells, 10 x 0.15 µm, cannot be cultured *in vitro,*

• chronic, sexually transmitted infection (STI),

• transmitted by sexual contact; vertically and via blood transfusions,

• commonly invades the central nervous system at an early stage of infection and may or may not produce symptoms.

Introductio
n

Clinical Features and Stages of Syphilis:

Acquired syphilis (primarily by sexual contact) is divided into <u>early and late syphilis.</u>

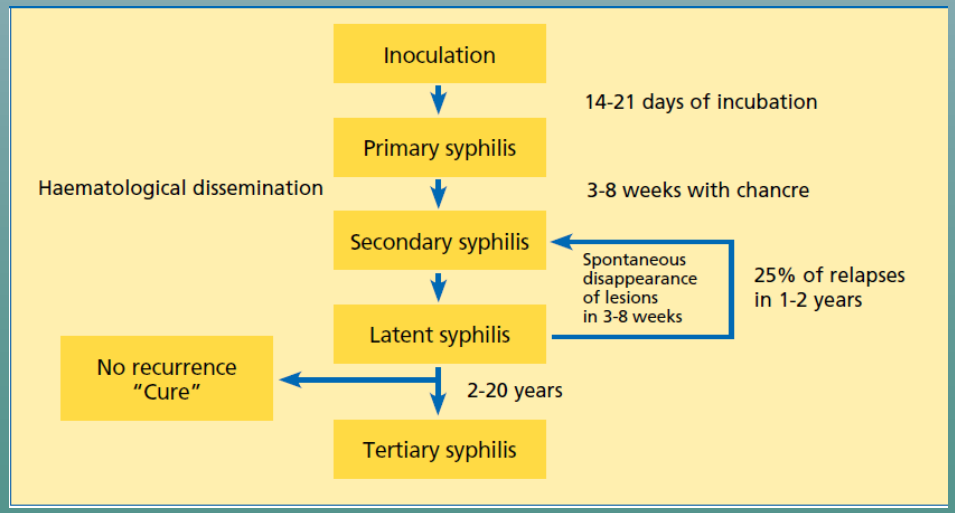
Primary syphilis— incubation period: 14 days to 3 months, - painless, 'punched- out' chancre on the genitalia, highly infectious and heal spontaneously after 1– 2 months.

Secondary syphilis— organisms disseminate from the chancre, causing symptoms 1– 6 months later: rush on trunk, limbs, palms, and soles. Mucosal ulcers may occur.

Latent syphilis— Asymptomatic, and infectivity is low,
the period lasts up to 2-4 years after primary infection (early and late phase).

Late/ tertiary syphilis— rare, follows a latent period of 2– 20 years; chronic inflammation:

• gummatous syphilis/late neurosyphilis/ cardiovascular syphilis



Antonio Fuertes Ortiz de Urbina: Syphylis 2014;
UK Standards for Microbiology Investigations-Syphilis serology 2016;

Introductio

nDiagnosis of Syphilis

- Polymerase chain reaction (PCR) testing of primary lesions
- Dark field microscopy
- Serologic testing:

1. **Non-treponemal tests** (e.g. Venereal Diseases Research Laboratory test (VDRL))
   - -high sensitivity in the secondary and early latent stages,
   - -become positive 10–15 days after the appearance of the primary chancre,
   - -in the absence of treatment, reach a peak after 1–2 years,
   - -remain positive at low titres in late stage disease,
   - -lower sensitivity for late syphilis,
   - -become negative after successful treatment,
   - -used to monitor effectiveness of treatment

2. **Treponemal tests** (e.g. T. pallidum haemagglutination test (TPHA), T. pallidum passive particle agglutination test (TPPA), ELISA, ELFA, WB, LIA)
   - -become positive 1–2 weeks after appearance of the chancre,
   - -high sensitivity in secondary, early latent and late latent stages,
   - -remain positive for life,
   - -not useful for monitoring effectiveness of treatment or disease activity,

Diagnosis is usually through the use of different combinations of treponemal and non-treponemal tests as screening and confirmatory tests.

European syphilis guideline

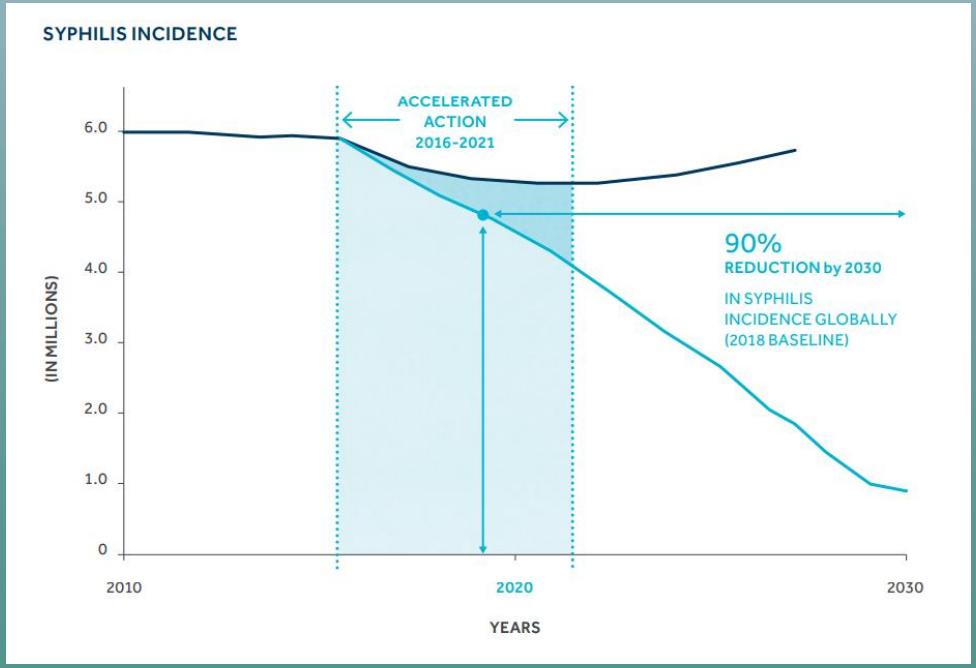
ECDC TECHNICAL REPORT: Syphilis and congenital syphilis in Europe

Global View of Syphilis

The incidence of syphilis dropped significantly-its lowest levels in the 1990s.
More than 1 million STIs are acquired every day worldwide, the majority of which are asymptomatic.
An increase in the disease was reported towards the end of the 20th century mostly in young people and MSM
In northern America the elevation of cases 75% of new cases were Afro-American MSM
Most of the cases are associated with HIV infection-50-70% of coinfection

WHO Global Health Strategy in 2016:

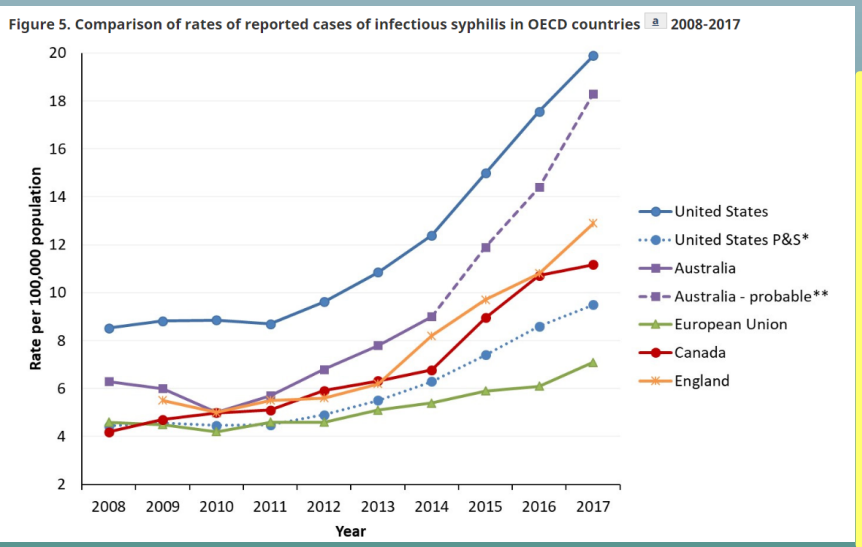
90% reduction of T. pallidum incidence globally (2018 global baseline).
-National sexually transmitted infection survillance and monitoring
-Countries should conduct routine syphilis prevalence monitoring of pregnant women, specific populations (MSM, and sex workers, drug addicts)

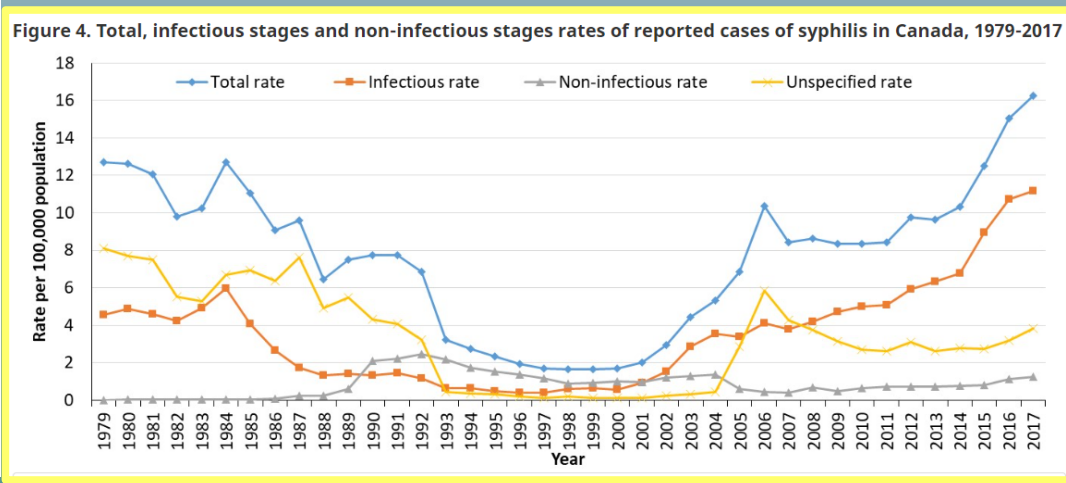


WHO GLOBAL HEALTH SECTOR STRATEGY ON SEXUALLY TRANSMITTED INFECTIONS, 2016–2021

Global View of Syphilis

2022: United States and Canada have reported an increase in at least 3 STIs: syphilis, gonorrhea and chlamydia.
Since 1 January 2022, cases of monkeypox have increased exponentially in countries that are not endemic of the disease.
Key shifts are required to end STIs as a public health concern by 2030.
The epidemiology of syphilis has **changed markedly in high-income countries**.
Rates began to increase in the 2000s, mainly among MSM.
2015: Rates have increased significantly in other populations, (women and heterosexual men) although MSM remain the most affected population.





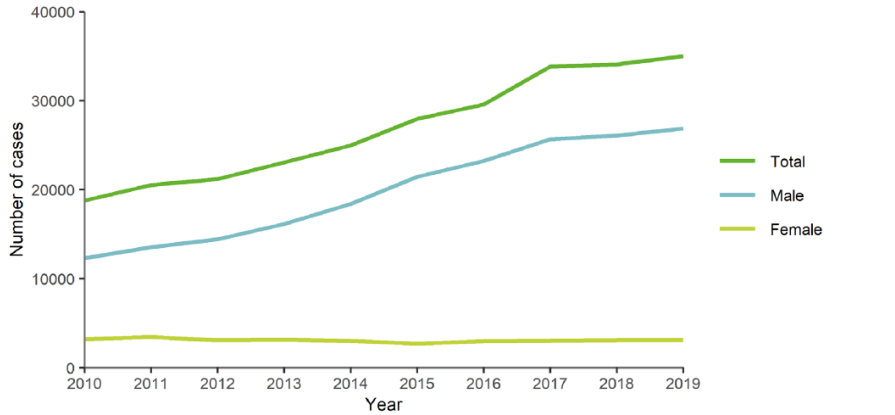
https://www.who.int/news/item/02-09-2022-stis-in-2022-emerging-and-re-emerging-outbreaks
https://www.canada.ca/en/services/health/publications/diseases-conditions/syphilis-epidemiological-report.html

Syphilis in the European Region

Over the last decade - **increasing of new syphilis cases**.
Lower case numbers in heterosexual men and women populations.
MSM are the most affected population in the EU/EEA.
Increases in congenital syphilis infections.

Several syphilis outbreaks (n=25) and clusters of cases (n=4) with a range of between 5 and more than 1000 cases were reported in high income countries. **Countries with highest rates** of new cases: UK (13.1 in 2019), Ireland (15.1 in 2019), Malta (19.2 in 2019).
Countries with lowest rates of new cases: Croatia (0.7 in 2019), Slovenia (2.6 in 2019), Estonia (2.8 in 2019).

Figure 4. Number of confirmed syphilis cases by gender and year in EU/EEA countries reporting consistently, 2010–2019



Source: Country reports from Belgium, Bulgaria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom.

	Confirmed new syphilis cases	Cases per 100 000 population
2016	29 944	6.1
2017	33 189	7.1
2018	33 927	7.0
2019	35 039	7.4

ECDC TECHNICAL REPORT: Syphilis and congenital syphilis in Europe

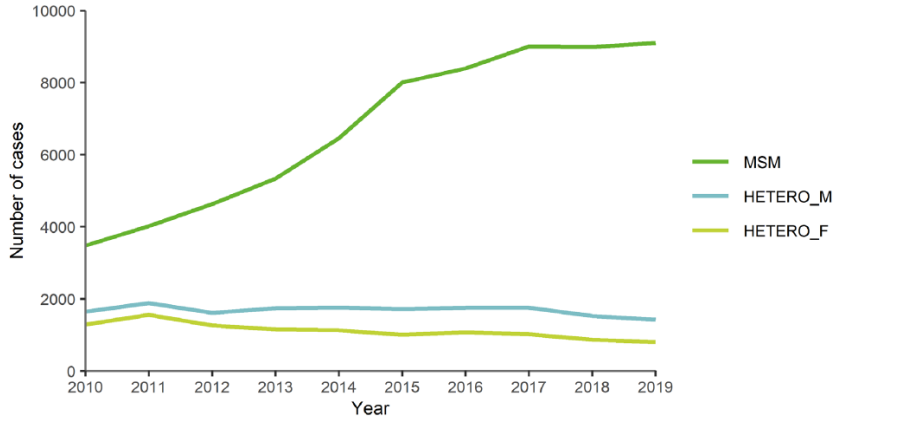
Syphilis in the European Region

More than two-thirds (69%) of syphilis cases, with information on transmission category, were reported in MSM in 2019.

The trend in syphilis rates has been on the rise since 2011 and up to 2017, particularly among men and mainly among MSM.
The use of social networking sites, mobile device applications to find sex partners are the determining factors of outbreaks among MSM. Most of these cases in an urban environment and predominantly MSM.

Reported syphilis rates were nine times higher in men than in women and showed a peak for men aged 25-34 years (29 cases per 100,000 of the population).

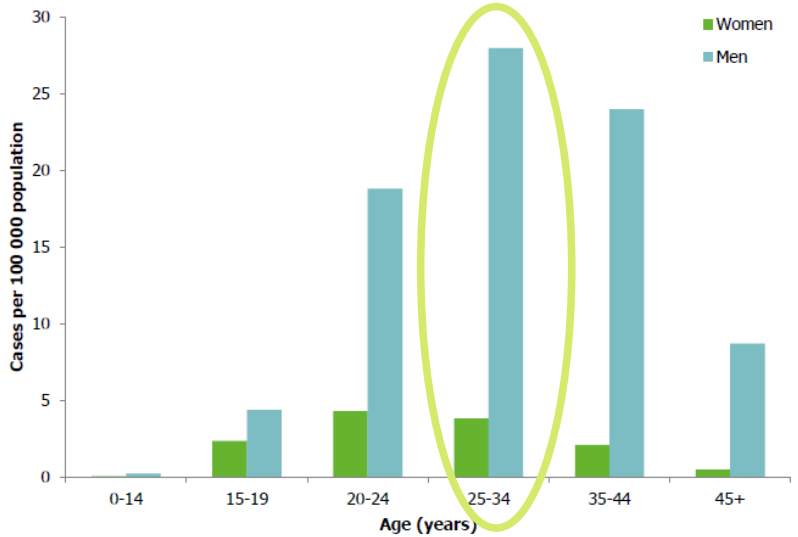
Figure 5. Number of confirmed syphilis cases by gender, transmission category and year in EU/EEA countries reporting consistently, 2010–2019



Note: HETERO_M: heterosexual male; HETERO_F: heterosexual female

Source: Country reports from Czechia, France, Germany, Greece, Ireland, Latvia, the Netherlands, Norway, Romania, Slovenia, Sweden.

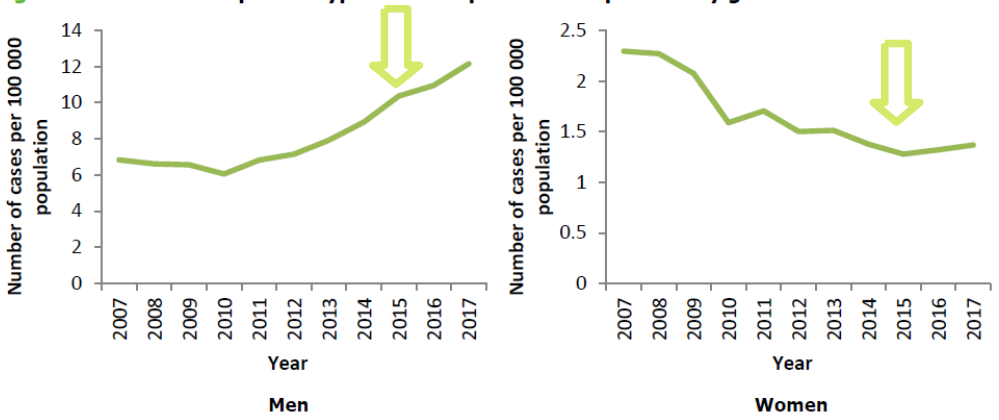
Figure 3. Distribution of confirmed syphilis cases per 100 000 population by age and gender, EU/EEA, 2017



ECDC TECHNICAL REPORT: Syphilis and congenital syphilis in Europe

Syphilis in the European Region

Figure 3. Number of reported syphilis cases per 100 000 persons by gender



Source: Country reports from Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Germany, Ireland, Italy, Latvia, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden and the United Kingdom

Figure 3. Distribution of confirmed syphilis cases per 100 000 population, by age and gender, EU/EEA, 2019

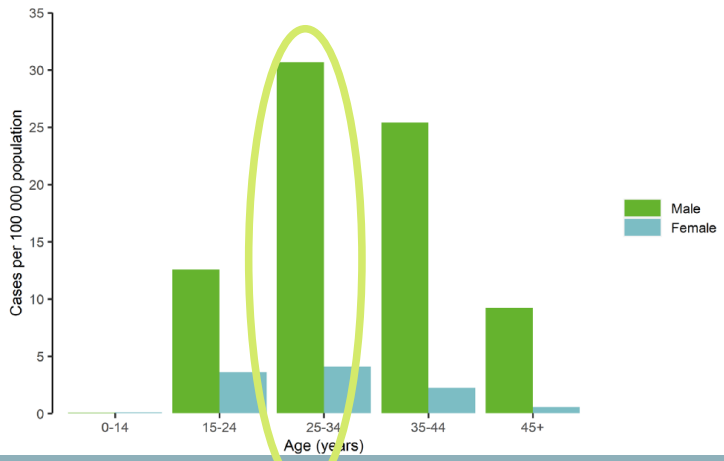
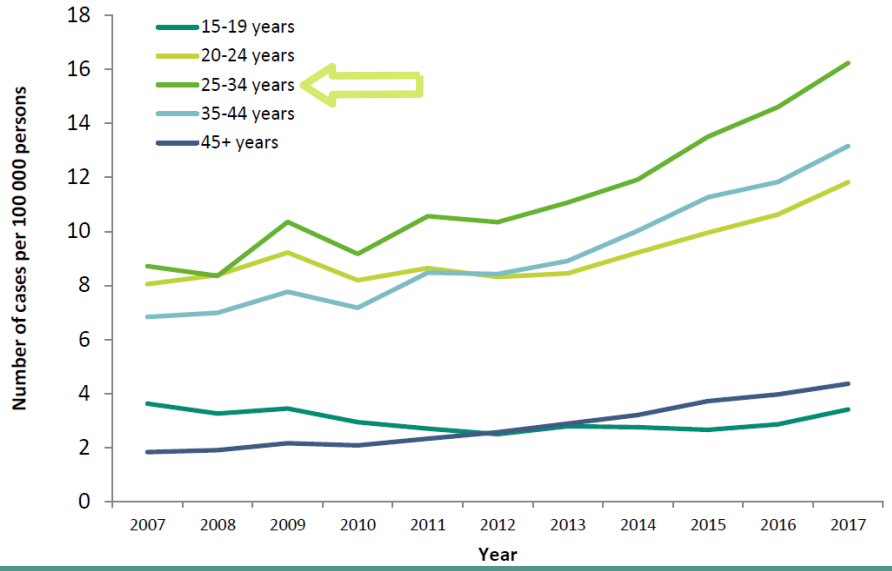


Figure 4. Number of reported confirmed syphilis cases per 100 000 population by age group, EU/EEA countries, 2007–2017



Syphilis in Hungary

Confirmed new syphilis cases in Hungary 2012-2021

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
621	629	623	617	714	731	680	791	777	776

Cases per 100 000 population in Hungary 2012-2021

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
6.2	6.3	6.3	6.3	7.3	7.5	7.0	8.1	8.0	8.0

Confirmed syphilis cases by gender in Hungary:

2016		2021	
male	female	male	female
516	198	553	223
72.3%	27.3 %	71.3%	28.7%

- 91% of new syphilis infections were diagnosed at early contaginous phase.
- The highest incidence were between 25-29 year old male and 20-24 year old female population.

Syphilis in the East-Southern Region of Hungary

County	Budapest	Csongrád-Csanád	Bács-Kiskun	Békés
Confirmed new syphilis cases per 100 000 population in 2021	26.0	4.0	3.4	2.8

Data from Bács-Kiskun, Békés, Csongrád, Jász-Nagykun-Szolnok counties:

	Nr of investigations	Pregnant screens	Positive cases	Rate	Non pregnant	Positive cases	Rate
2016	13367	11187	24	0,21%	2180	13	0,6%
2017	12208	10745	16	0,15%	1463	18	1,23%
2018	11686	10482	15	0,14%	1204	14	1,16%
2019	11540	9815	7	0,07%	1725	7	0,4%
2020	10883	9093	0	0%	1790	8	0,45%
2021	12644	10365	0	0%	2279	8	0,35%

Source: Public Health Service of Government Office for Csongrád-Csanád County, Laboratory of Virus Diagnostic and Serology

Introductio
n

Congenital Syphilis

The infection can also affect the foetus, it can cause miscarriages, premature births, stillbirths, or death of newborn babies.

80% the chance of a mother passing onto her unborn baby if left untreated.

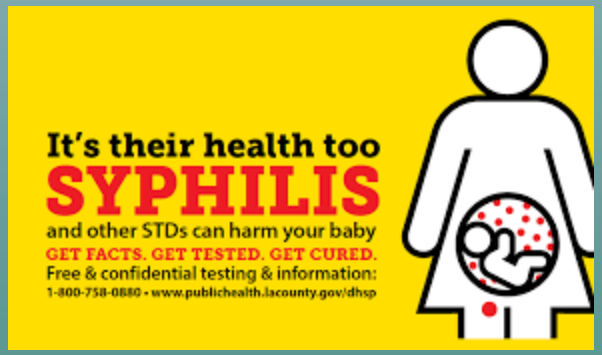
Leads to over 300 000 fetal and neonatal deaths/year, and places an additional 215 000 infants at increased risk of early death, worldwide (WHO).

- Early congenital syphilis

Occurs within 2 years of birth: rash, condylomata lata, vesiculobullous lesions, snuffles, haemorrhagic rhinitis, osteochondritis, periostitis, neurological or ocular involvement, haemolysis and thrombocytopenia, generalized lymphadenopathy, etc.

- Late congenital syphilis

Presents after 2 years with interstitial keratitis, Clutton's joints, Hutchinson's incisors, mulberry molars, high palatal arch, Rhagades, deafness, frontal bossing, short maxilla, saddle nose deformity, neurological or gummatous involvement, etc.



Congenital Syphilis

70% of countries have at least 95% of pregnant women **screened for HIV and/or syphilis.**
WHO GLOBAL HEALTH SECTOR STRATEGY ON SEXUALLY TRANSMITTED INFECTIONS, 2016–2021

The **crude rate of reported congenital syphilis infection** in the **EU/EEA**:

Congenital syphilis levels in the EU/EEA have been **consistently low**.
3.1 per 100 000 live births in 2007
1.1 cases per 100 000 live births in 2017-The highest rates were observed in Bulgaria and in Portugal.

Figure 1. Number of confirmed congenital syphilis cases by year in EU/EEA countries reporting consistently, 2010-2019

Source: Country reports from Bulgaria, Cyprus, Czechia, Denmark, Estonia, Germany, Hungary, Iceland, Ireland, Latvia, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

ECDC TECHNICAL REPORT: Syphilis and congenital syphilis in Europe

Congenital Syphilis

Hungary-compulsory sreening for syphilis and HBV in the first trimester of pregnancy.

Data from Bács-Kiskun, Békés, Csongrád, Jász-Nagykun-Szolnok counties:							
	Nr of investigations	Pregnant screens	Positive cases	Rate	Non pregnant	Positive cases	Rate
2016	13367	11187	24	0,21%	2180	13	0,6%
2017	12208	10745	16	0,15%	1463	18	1,23%
2018	11686	10482	15	0,14%	1204	14	1,16%
2019	11540	9815	7	0,07%	1725	7	0,4%
2020	10883	9093	0	0%	1790	8	0,45%
2021	12644	10365	0	0%	2279	8	0,35%

Source: Public Health Service of Government Office for Csongrád-Csanád County, Laboratory of Virus Diagnostic and Serology

For congenital syphilis, an interim 2025 target of ≤10 cases per 10 000 live births and a 2030 target of ≤1 cases per 10 000 live births are proposed (WHO/ECDC).

Future Perspectives:

Preserve our recent, regional STI situation!

1.Prevention
2.Testing,
3.Initiation of care and treatment
4.Ongoing care and support

} Develope the targets, norms and standards

Support the estimation and economic burden of STIs and strengthening of STI surveillance.

HBV vaccination ⇨ the pregnant screening guidelines should change

Prevention for congenital syphilis:

- Requires more comprehensive congenital syphilis surveillance data.
- Necessary to uniform the laboratory methods used to diagnose cases.
- Public education campaigns, healthcare provider education/training.

Global health sector strategy on HIV, Hepatitis and Sexually Transmitted Infections, 2022–2030