

SURVEILLANCE REPORT

Syphilis

Annual Epidemiological Report for 2021

Key facts

- In 2021, 25 270 confirmed syphilis cases were reported in 28 EU/EEA countries, with a crude notification rate of 7.0 cases per 100 000 population.
- Syphilis notification rates were nine times higher in men than in women and were highest in men aged 25–34 years (30 cases per 100 000 population).
- The majority (77%) of syphilis cases with information on transmission category were reported in men who have sex with men (MSM).
- The trend in syphilis notifications among men continuously increased between 2012 and 2019, mainly because of an increase in the number of cases among MSM. After a decrease in notifications in 2020, the overall EU/EEA rate increased again in 2021 to a level similar to 2019. Over the same period, there were very small fluctuations in syphilis notifications among the heterosexual population at the EU/EEA level.
- Between 2015 and 2021, the number of syphilis notifications in HIV-negative MSM increased by 87% (in the eight countries that reported consistently).

Introduction

Syphilis is a sexually transmitted infection (STI) caused by the bacterium *Treponema pallidum* [1]. Infection can be acquired during sexual activity by direct contact with treponema-rich, open lesions and contaminated secretions from an infected partner. It can also be transmitted from a mother to a baby during pregnancy (congenital syphilis).

After an average incubation period of three weeks (range: 10–90 days), a lesion (usually painless) called a 'chancre' occurs at the site of infection (primary syphilis). This is followed by a series of eruptions on mucous membranes and skin (secondary syphilis). Untreated infections can become latent. Although latent infections are non-infectious and cannot be transmitted sexually, they may still be passed on to a foetus. If an infection occurred within the last 12 months, it is defined as early latent syphilis. If an infection occurred more than 12 months ago, it is defined as late latent syphilis. Many years after the initial infection, latent syphilis can cause serious vascular and neurological damage (tertiary syphilis) if left untreated. Treatment regimens adapted to the stage of infection can effectively cure the infection [2]. Re-infection with syphilis following unprotected sexual contact is possible.

Methods

This report is based on data for 2021 retrieved from The European Surveillance System (TESSy) on 3 April 2023. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of the methods used to produce this report, refer to the Methods chapter of the 'ECDC Annual Epidemiological Report 2021' [3].

An overview of the national surveillance systems is available online [4].

A subset of the data used for this report is available through ECDC's online 'Surveillance Atlas of Infectious Diseases' [5].

For 2021, the majority of countries (20/28 countries) reported data using the standard EU case definitions [6]. Five countries reported using national case definitions and three countries did not state which case definition was used. Most countries (25 countries) had comprehensive surveillance systems. Three countries reported data derived from sentinel systems that only captured syphilis diagnoses from a selection of healthcare providers. Reporting of syphilis infection is compulsory in 25 countries and voluntary in the 3 countries with sentinel systems.

Data from sentinel systems were not included in the calculation of national or overall rates because population coverage was not always known and denominators were therefore not available. Data from sentinel systems are included in the descriptive analysis. Cases are analysed by date of diagnosis.

All reported syphilis cases were considered for the analysis regardless of the stage of infection, as some countries did not provide information on infection stage. Therefore, cases of late latent syphilis might be included for some countries even though they are not under EU/EEA surveillance.

The United Kingdom (UK) contributed surveillance data up to 2019. No data were reported by the UK for 2020 or 2021 due to its withdrawal from the EU on 31 January 2020. The UK data that were reported up to 2019 are presented in Table 1 but are not included in the analysis.

Epidemiology

Geographical distribution

In 2021, 25 270 confirmed syphilis cases were reported from 28 EU/EEA countries, giving a crude notification rate of 7.0 cases per 100 000 population (Table 1). The highest rate was observed in Malta (32.2 cases per 100 000 population), followed by Luxembourg (29.1), Ireland (14.3), Iceland (13.6) and Spain (11.1). Low rates of less than 3 cases per 100 000 population were observed in Croatia, Estonia, Latvia, Liechtenstein, Romania and Slovenia (Table 1, Figure 1).

Table 1. Distribution of confirmed syphilis cases and rates per 100 000 population by country and year, EU/EEA, 2017–2021

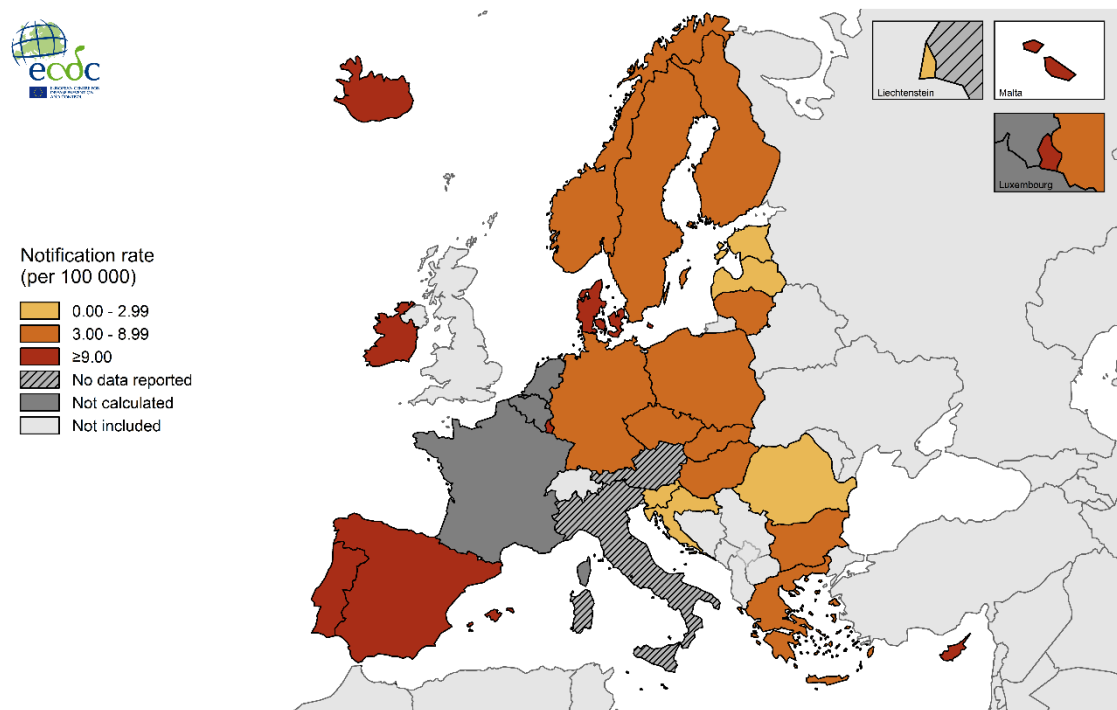
Country	2017		2018		2019		2020		2021	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate
Austria	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC
Belgium	1 493	NRC	1 901	NRC	1 670	NRC	1 407	NRC	2 070	NRC
Bulgaria	516	7.3	485	6.9	480	6.9	319	4.6	271	3.9
Croatia	29	0.7	35	0.9	28	0.7	22	0.5	35	0.9
Cyprus	21	2.5	44	5.1	31	3.5	43	4.8	92	10.3
Czechia	578	5.5	596	5.6	630	5.9	716	6.7	715	6.7
Denmark	325	5.7	322	5.6	361	6.2	445	7.6	638	10.9
Estonia	34	2.6	27	2.0	37	2.8	33	2.5	31	2.3
Finland	175	3.2	181	3.3	251	4.5	207	3.7	168	3.0
France	1 748	NRC	1 606	NRC	1 080	NRC	982	NRC	1 285	NRC
Germany	7 531	9.1	7 367	8.9	7 925	9.5	7 392	8.9	6 715	8.1
Greece	395	3.7	389	3.6	443	4.1	401	3.7	654	6.1
Hungary	728	7.4	675	6.9	788	8.1	774	7.9	764	7.9
Iceland	52	15.4	22	6.3	38	10.6	31	8.5	50	13.6
Ireland	403	8.4	485	10.0	745	15.2	579	11.7	717	14.3
Italy	1 631	2.7	1 526	2.5	1 826	3.1	843	1.4	NDR	NRC
Latvia	139	7.1	104	5.4	75	3.9	68	3.6	45	2.4
Liechtenstein	NDR	NRC	NDR	NRC	NDR	NRC	4	10.3	1	2.6
Lithuania	157	5.5	130	4.6	0	0.0	54	1.9	117	4.2
Luxembourg	31	5.2	104	17.3	50	8.1	199	31.8	185	29.1
Malta	62	13.5	85	17.9	95	19.2	85	16.5	166	32.2
Netherlands	1 519	NRC	1 355	NRC	1 474	NRC	1 526	NRC	1684	NRC
Norway	223	4.2	231	4.4	205	3.8	287	5.3	163	3.0
Poland	1 593	4.2	1 445	3.8	1 627	4.3	711	1.9	1 127	3.0
Portugal	105	1.0	255	2.5	479	4.7	868	8.4	1 080	10.5
Romania	823	4.2	638	3.3	539	2.8	296	1.5	318	1.7
Slovakia	379	7.0	433	8.0	278	5.1	160	2.9	282	5.2
Slovenia	48	2.3	52	2.5	54	2.6	31	1.5	37	1.8
Spain	4 941	10.6	4 826	10.3	4 880	10.4	4 531	9.6	5 277	11.1
Sweden	385	3.9	479	4.7	431	4.2	473	4.6	583	5.6
United Kingdom	7 798	11.8	8 328	12.6	8 738	13.1	NDR	NRC	NDR	NRC
EU/EEA	33 862	7.0	34 126	7.1	35 258	7.5	23 487	5.6	25 270	7.0

Source: country reports

NDR: no data reported

NRC: no rate calculated

Rates for Belgium, France and the Netherlands were not calculated, as the reported data were from sentinel systems where population denominators were not known. A total of 171 cases with unknown classification and zero confirmed cases were reported by Lithuania for 2019. Cases with unknown classification are not presented in the table or included in the analysis. There were changes in surveillance system configuration and coverage in France between 2019 and 2020. The United Kingdom did not report data for 2020 or 2021 due to its withdrawal from the EU on 31 January 2020.

Figure 1. Distribution of confirmed syphilis cases per 100 000 population by country, EU/EEA, 2021

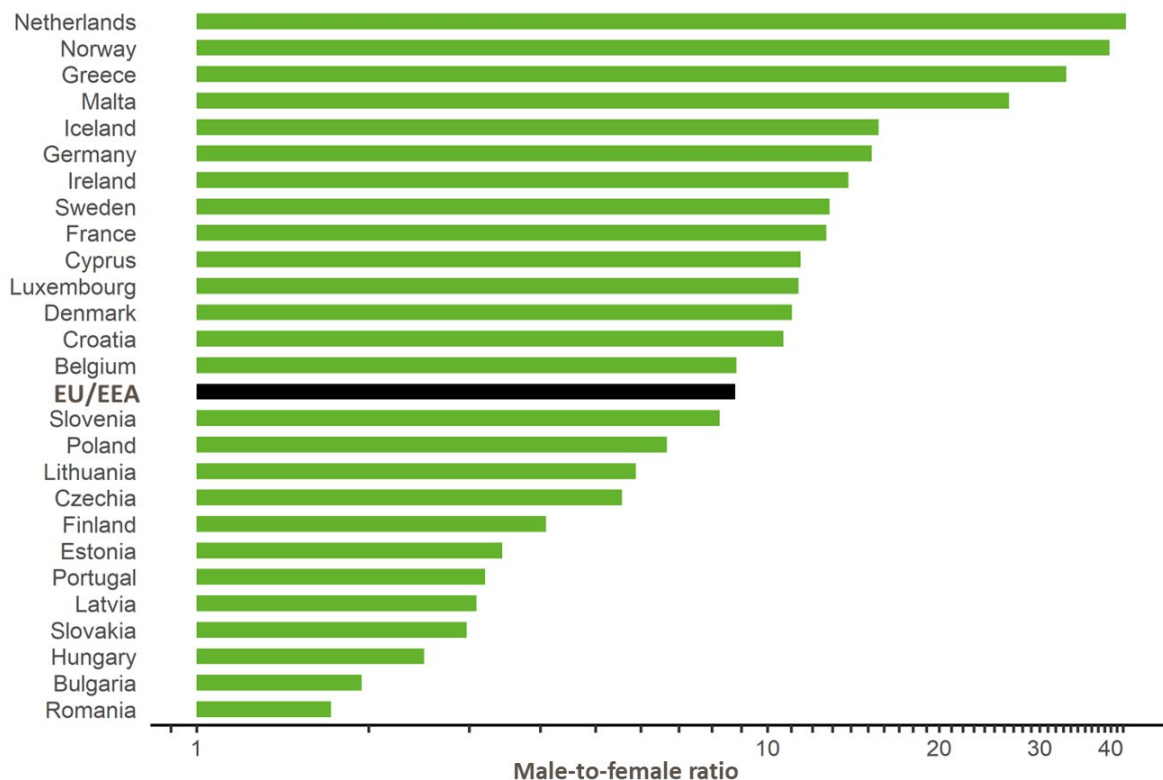
Gender

The overall male-to-female ratio of syphilis cases in the EU/EEA in 2021 was 8.8:1, with rates of 11.2 cases per 100 000 population in men (17 845 cases) and 1.4 cases per 100 000 population in women (2 033 cases).

In 2021, the highest rates among men (more than 15 cases per 100 000 population) were observed in Cyprus, Denmark, Germany, Iceland, Ireland, Luxembourg, Malta and Portugal. Rates among women were highest (more than 3 cases per 100 000 population) in Hungary, Luxembourg and Portugal.

There were marked differences in the male-to-female ratios across countries. Ratios of 15:1 or higher were reported by Germany, Greece, Iceland, Malta, the Netherlands and Norway, while two countries reported male-to-female ratios less than 2:1 (Bulgaria and Romania) (Figure 2).

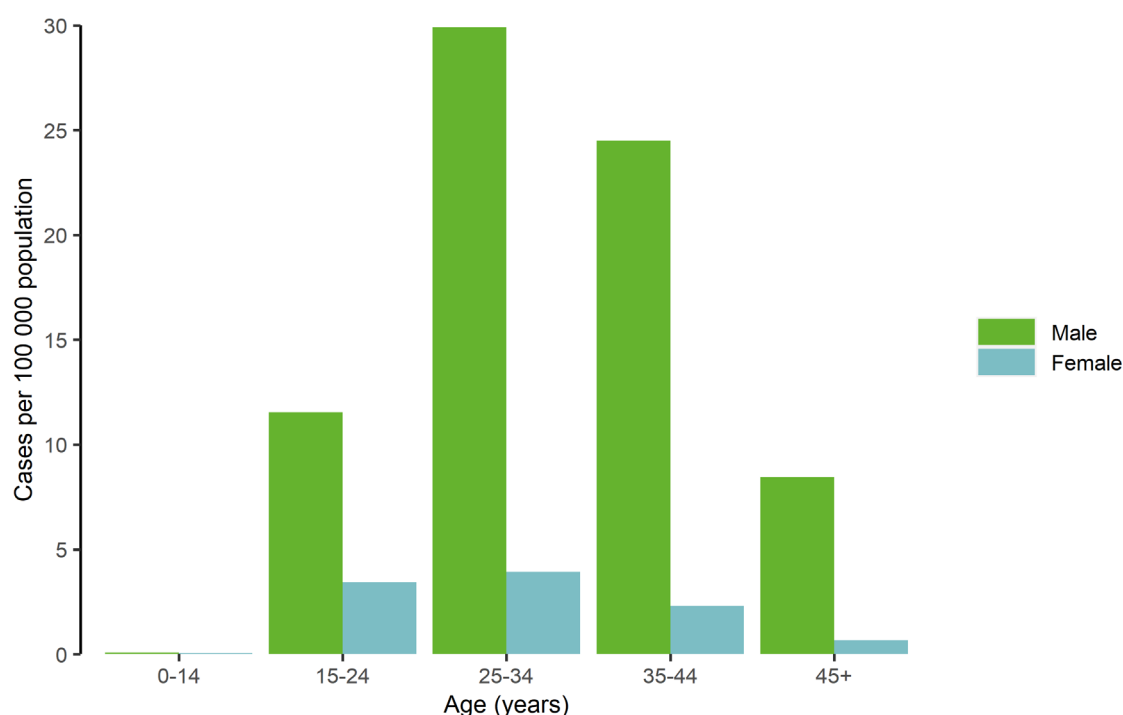
Figure 2. Male-to-female ratios of syphilis cases by country, EU/EEA, 2021



Age

Information on age was available for cases reported from 24 countries in 2021. It was not available or was reported in a format not suitable for analysis for Belgium, Bulgaria, Poland and Spain, which accounted for 35% of all cases. In 2021, the largest proportion of cases was reported in two age groups: 25–34 years and 45 years or above. These two groups accounted for 32% and 30% of all cases, respectively. Adults aged 35–44 years accounted for 26% of all reported cases, and young people aged 15–24 years accounted for 12% of all reported cases.

Age-specific rates were higher among men than women across all age groups (Figure 3). Rates were highest among men aged 25–34 years (30 cases per 100 000 population), followed by men aged 35–44 years (25 cases per 100 000 population) and 15–24 years (12 cases per 100 000 population). Women aged 25–34 years had the highest age-specific rate (4 cases per 100 000 population), followed by women aged 15–24 years (3 cases per 100 000 population).

Figure 3. Distribution of confirmed syphilis cases per 100 000 population, by age and gender, EU/EEA, 2021

Transmission, HIV status and syphilis stage

For 2021, 16 countries reported information on transmission category for more than 60% of their cases. These cases accounted for 58% (n = 14 564) of all reported syphilis cases. Among these cases, transmission category was indicated as MSM (66%), heterosexual (19%; males: 12% and females: 7%) and unknown (15%). If cases with unknown transmission category were excluded, 77% of syphilis cases were among MSM. The percentage of cases diagnosed in MSM ranged from 31% or fewer (Latvia, Romania and Slovakia) to more than 75% (Denmark, France, Germany, Greece, Malta, the Netherlands, Norway and Sweden).

For 2021, information on HIV co-infection status was reported by 17 countries, accounting for 35% (n = 8 861) of all reported syphilis cases. Of these, 15% were HIV positive (either known or newly diagnosed), 54% were HIV negative and 31% had an unknown HIV status. Of the MSM cases with known HIV status, 32% were HIV positive. Between 2015 and 2021, the number of syphilis notifications in MSM with HIV negative status increased by 87% (in the eight countries that consistently reported information on HIV status and sexual orientation).

Details on the clinical stage of syphilis infection were provided by 15 countries, accounting for 27% (n = 6 720) of all reported cases in 2021. The majority of these cases were reported as primary (29%), secondary (24%) or early latent (35%) infections. Fewer cases were reported as latent (7%) or late latent (5%) infections. Distribution across countries varied. In France, Greece, Norway, Portugal and Slovenia, more than half of reported cases had primary or secondary syphilis. In Cyprus, Estonia, Luxembourg and Portugal, more early latent syphilis cases were reported than primary and secondary syphilis cases.

Trends, 2012–2021

Between 2012 and 2021, 230 922 cases of syphilis were reported in 30 EU/EEA countries. During this period, 27 countries consistently reported data. In addition, Austria reported data for 2012 to 2013 and Italy reported data for 2012 to 2020. Liechtenstein reported data for 2020 and 2021.

When considering cases from countries with comprehensive surveillance that reported consistently between 2012 and 2021, notification rates of syphilis infections per 100 000 population increased continuously until 2019, when they reached an all-time-high. After a decrease in 2020, the overall EU/EEA notification rate increased again in 2021 (Figure 4). Between 2012 and 2021, trends relating to gender have been divergent, with a marked increase among men and a slow decrease among women. The decrease in syphilis notifications in 2020 was more evident among men.

Between 2019 and 2021, data were reported consistently from 25 countries. In 2020, compared with 2019, decreases in syphilis notifications were reported by the majority (17/25 countries) of countries. Decreases of more than 25% were observed in Bulgaria, Poland, Romania, Slovakia and Slovenia. Eight countries reported more cases

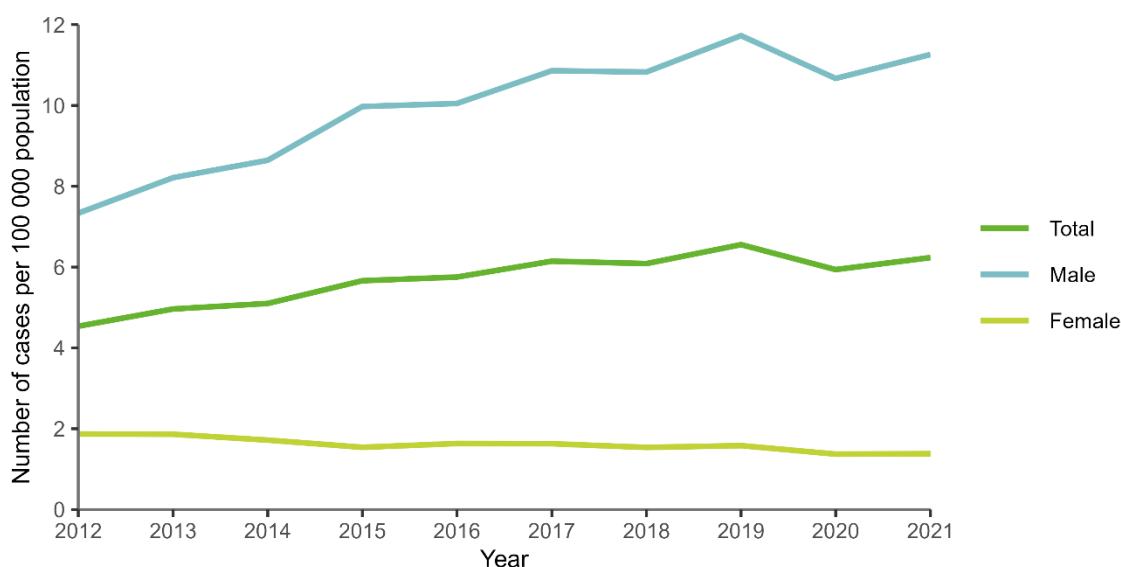
in 2020 than in 2019 (Cyprus, Czechia, Denmark, Luxembourg, Netherlands, Norway, Portugal and Sweden), with increases of more than 25% in Cyprus, Luxembourg, Norway and Portugal.

In 2021, compared with 2020, the number of syphilis cases increased in 16 and decreased in 9 of the 25 countries with available data. Increases of 25% or more were reported in Belgium, Croatia, Cyprus, Denmark, Greece, Iceland, Poland and Slovakia. Together, these countries accounted for 20% of all syphilis cases notified in 2021. Decreases of more than 25% were reported in Latvia and Norway, two countries that accounted for only 1% of syphilis cases notified that year. Changes between -25% and +25% were reported in Bulgaria, Czechia, Estonia, Finland, Germany, Hungary, Ireland, Luxembourg, the Netherlands, Portugal, Romania, Slovenia, Spain and Sweden. Together, these countries accounted for 78% of all syphilis cases notified in 2021.

In the past 10 years, age-specific rates of syphilis cases have consistently been highest in those aged 25–44 years. Between 2012 and 2021, the number of cases increased by 66% in the 25–34 years age group and by 60% in the 35–44 years age group. A decrease in the number of cases in 2020 (as compared with 2019), followed by a rebound in 2021, has been observed across all age groups over 15 years old.

Trends by transmission group (Figure 5) in the 11 countries that provided sufficient transmission category data for 2012 to 2021 show a steep increase in reported cases among MSM up to 2019 and a decrease in 2020 and 2021. There were very small fluctuations in the number of cases among the heterosexual population, with a decreasing tendency in recent years. The small upsurge in the number of male heterosexual cases observed in 2021 is not clearly replicated among women.

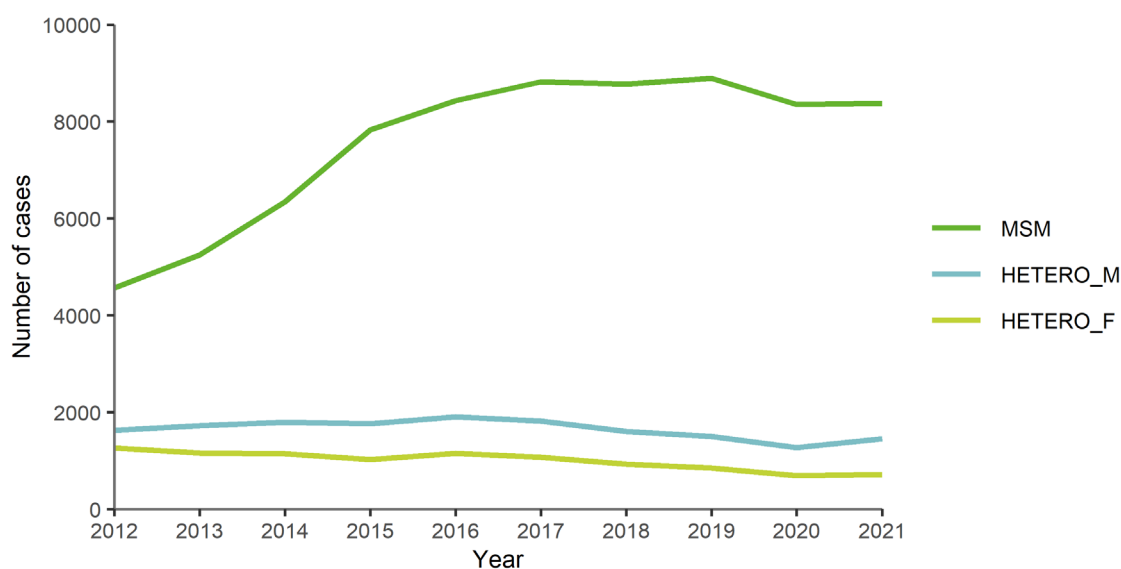
Figure 4. Rate of confirmed syphilis cases per 100 000 population, total and by gender for cases with available data, EU/EEA countries reporting consistently, 2012–2021



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

The Total category includes all reported cases regardless of whether data on gender were available. No data from Lithuania and Spain are included in the Male and Female categories, as data on gender were not consistently reported during the study period. Cases reported from Belgium, France and the Netherlands are not included, as the reported data were from sentinel systems where population denominators were not known.

Figure 5. Number of confirmed syphilis cases by gender, transmission category and year in EU/EEA countries reporting consistently, 2012–2021



Source: Country reports from Czechia, France, Germany, Greece, Latvia, the Netherlands, Norway, Romania, Slovakia, Slovenia and Sweden
 HETERO_F: heterosexual female; HETERO_M: heterosexual male; MSM: men who have sex with men.

Outbreaks and other threats

In addition to reporting data to TESSy, EU/EEA countries can report events and significant threats to public health in the EU/EEA in real time through the ECDC platform EpiPulse [7]. There were no alerts or events related to syphilis reported in 2020 or 2021.

Discussion

Between 2012 and 2021, more than 230 000 syphilis cases were reported in the EU/EEA. The number of annual notifications from EU/EEA countries with available data increased continuously between 2012 and 2019, and decreased in 2020 for the first time in the last decade. According to an ECDC survey of the STI Network, the decrease in 2020 was most likely due to the COVID-19 pandemic's impact on high-risk populations, as well as the availability of and access to STI care services, such as reduced testing opportunities and a decrease in STI surveillance capacity due to the diverting of resources to the COVID-19 response (internal ECDC report, data not published).

The increase in syphilis cases between 2012 and 2019 has been mainly among men. In particular, men who have sex with men (MSM) have been disproportionately affected by the epidemic during this period.

Several factors have been associated with the intensified transmission of syphilis among MSM between 2012 and 2019. These include increases in high-risk sexual behaviour (e.g. more anonymous sex contacts, condomless anal sex, group sex, or drug-use before or during sex); serosorting (i.e. selection of sexual partners based on HIV status) among HIV-positive MSM, which may lead to less perception of risk and more high-risk sexual behaviour; numbers of sexual partners among HIV-negative MSM and, more recently, risk compensation behaviour (i.e. being less careful because they feel more protected) among HIV-negative MSM after pre-exposure prophylaxis (PrEP) enrolment [8]. The use of social networking sites or mobile device applications to find sex partners has also been linked to syphilis outbreaks among MSM [8].

More than one-third (32%) of MSM cases in 2021 were HIV positive. More high-risk sexual behaviour was associated with the high frequency of syphilis in this group [9-11]. The number of syphilis cases among MSM with HIV-negative status continued to increase in 2021. Increased incidence of syphilis and other STIs has been observed among HIV-negative MSM after PrEP enrolment, which is likely explained by risk compensation behaviour and more frequent STI screening in this group [12,13].

In 2021, syphilis notifications among the heterosexual population in the EU/EEA remained at a low level. In European settings, factors associated with heterosexual transmission are: high-risk sexual behaviour, sex work, substance use (drugs or alcohol) and social vulnerabilities such as poverty, homelessness or identifying as an ethnic minority, migrant or refugee [8].

Rates of syphilis infections among women remained low in 2021. Considering the potentially extreme consequences of syphilis during pregnancy, it is important to monitor syphilis trends among women. Antenatal screening programmes must be implemented effectively and retesting for syphilis during the third trimester (weeks 28–32 of pregnancy) should be offered to women at higher risk of infection [8].

In 2021, syphilis cases were diagnosed at different stages of infection, possibly reflecting varying levels of access to diagnostic services across Europe and/or awareness of syphilis among healthcare providers, the general population and populations at risk.

In 2020, the European guideline for the management of syphilis was updated to include recommendations for which patient groups should be prioritised for testing and for clinical and laboratory diagnosis [2]. Further details on treatment regimens were also given.

Any data comparisons across countries should be made with caution due to differences in testing, reporting and surveillance systems.

Public health implications

Following the increasing syphilis trends in the EU/EEA in 2019, and upon the request of EU Member States, ECDC formulated options for public health response, which remain valid [8].

In general, syphilis response activities should consider a combination of case management (diagnosis and treatment), case finding (enhanced screening of populations at risk, expanded testing in outreach venues, partner notification and surveillance activities) and education (directed at the general population, populations at risk and healthcare providers). More specifically, enhanced screening of populations at risk of syphilis includes offering syphilis testing during routine HIV clinical monitoring for HIV-positive MSM, quarterly testing of HIV-negative MSM who may be engaging in high-risk sexual behaviour (e.g. MSM using PrEP, MSM with a high number of sexual partners, MSM with prior syphilis diagnosis) and routine testing of STI clinic attendees. Testing of other risk groups (e.g. marginalised populations, sex workers, people who inject drugs) should be informed by local syphilis epidemiology.

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