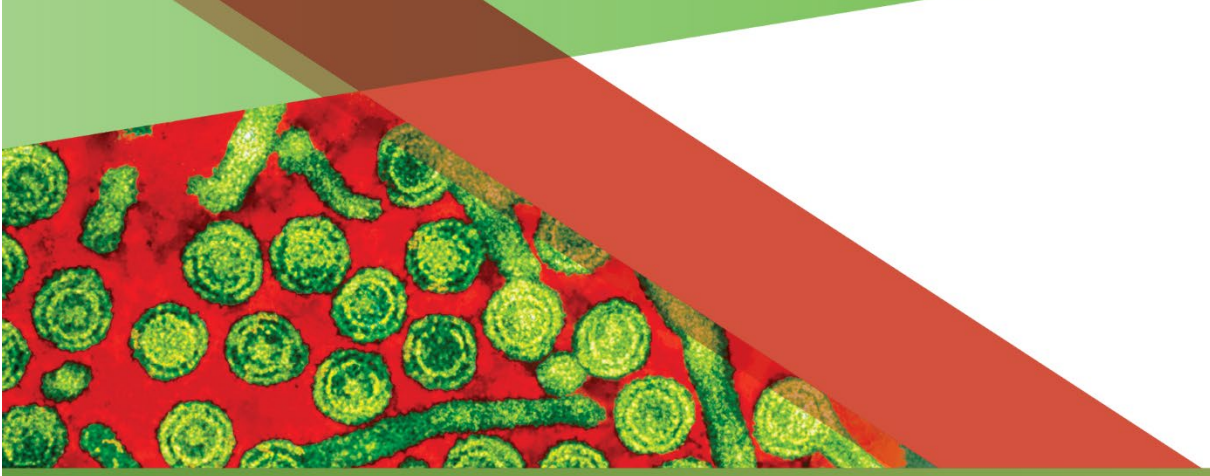

SURVEILLANCE REPORT

Hepatitis B

Annual Epidemiological Report for 2021

Key facts

- For 2021, 30 EU/EEA Member States reported 16 187 cases of hepatitis B virus (HBV) infection. Excluding the three countries that only reported acute cases, the number of cases (15 380) corresponds to a crude rate of 4.7 cases per 100 000 population.
- Of all cases, 7% were reported as acute, 43% as chronic, 43% as 'unknown' and 7% could not be classified.
- The highest rates of both acute and chronic infections were observed among 35–44-year-olds. The overall male-to-female ratio was 1.4:1.
- The rate of acute cases continued to decline over the last few years, which is in accordance with global trends and most likely reflects the impact of national vaccination programmes. A steeper decline was seen in 2020 followed by a slight increase in 2021, likely due to the impact of the COVID-19 pandemic.
- Among acute cases with complete information, heterosexual transmission was most commonly reported (30%), followed by transmission among men who have sex with men (16%) and nosocomial transmission (12%). Among chronic cases, mother-to-child transmission was the most common route of transmission reported (50%).
- Prevention and control programmes, including comprehensive vaccination programmes, need further scaling up if European countries are to achieve the goal of eliminating hepatitis B. Surveillance data are important in monitoring the epidemiological situation, and there is a need to improve their quality.

Methods

This report is based on 2021 data retrieved from The European Surveillance System (TESSy) on 7 December 2022. TESSy is a system for the collection, analysis and dissemination of data on communicable diseases.

For a detailed description of methods used to produce this report, refer to the Methods chapter [1].

An overview of the national surveillance systems is available on the ECDC website [2].

Errata, 24 March 2023: A sentence was added to the Key facts section: 'A steeper decline was seen in 2020 followed by a slight increase in 2021, likely due to the impact of the COVID-19 pandemic.' Figure 5 was adjusted to include 'Needle-stick and other occupational exposure'. In the Discussion, the paragraph starting 'The overall trend for acute hepatitis B cases in the EU/EEA' was rewritten to add more detail in the interpretation of the long- and short-term trend in acute cases.

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Stockholm, December 2022

A subset of the data used for this report is available through ECDC's online Surveillance atlas of infectious diseases [3].

This report includes data on newly diagnosed cases of hepatitis B reported to ECDC by EU/EEA countries. Countries were requested to apply the EU 2018 case definition for reporting at the European level, but other case definitions were also accepted [2].

Acute and chronic hepatitis B infections were differentiated by countries using defined criteria (Table 1).

Table 1. Criteria for differentiating acute and chronic hepatitis B

Stage	Definition
Acute	Detection of IgM core antigen-specific antibody (anti-HBc IgM) or Detection of hepatitis B surface antigen (HBsAg) and previous negative HBV markers less than six months ago or Detection of hepatitis B nucleic acid (HBV-DNA) and previous negative HBV markers less than six months ago Any of the above with or without symptoms and signs (e.g. jaundice, elevated serum aminotransferase levels, fatigue, abdominal pain, loss of appetite, intermittent nausea, vomiting, fever)
Chronic	Detection of HBsAg or HBeAg or HBV-DNA and No detection of anti-HBc IgM (negative result) or Detection of HBsAg or HBeAg or HBV-DNA on two occasions that are six months apart*
Unknown	Any newly diagnosed case which cannot be classified in accordance with the above definition of acute or chronic infection

**: in the event that the case was not notified the first time.*

Surveillance systems across EU/EEA countries are heterogeneous [2]. Of a total of 30 countries, 22 countries submitted national data for 2021 based on the 2012 or 2018 EU case definitions. The 2012 and 2018 case definitions are essentially identical, except that the 2018 definition explicitly states that countries should differentiate between acute and chronic cases according to ECDC requirements [4,5]. Four countries used the 2008 EU case definition and four countries (Denmark, Germany Italy and Liechtenstein) used national case definitions. The 2008 EU case definition only allows for the reporting of acute hepatitis B cases, while the 2012 and 2018 case definitions include both acute and chronic cases. All reported cases were included in the analysis regardless of the case definition used.

Three countries (France, Hungary, and Spain) only submit data on acute cases to ECDC. Two countries (Belgium and Bulgaria) submitted aggregate data only and did not differentiate stages of infection. No data have been reported by the United Kingdom (UK) since 2019 due to its withdrawal from the EU on 31 January 2020.

Italy reported data using two data sources. One of these sources had national coverage but included only a limited number of variables and did not identify cases as acute or chronic, which limited its inclusion in this report. This data source used a national case definition. The other data source in Italy was a voluntary reporting system of acute cases covering 83.1% of the population in 2021 and uses the 2012 EU case definition. The sentinel population was considered representative of the wider population, so data were scaled up to 100%. This data source contains information on a range of variables and is used for certain epidemiological analyses, including the route of transmission and importation status. The data source for Belgium was a sentinel system with undetermined coverage. National rates were therefore not calculated for Belgium.

Annual notification rates were calculated per 100 000 population for countries with comprehensive surveillance systems using Eurostat population data[1].

Hepatitis B data are presented by the 'date of diagnosis' or, if not available, by 'date used for statistics'. When comparing data using these two dates across the database, there were only minor differences between them in a few countries.

Epidemiology

Overall trends

For 2021, 30 EU/EEA Member States reported 16 187 cases of hepatitis B virus (HBV) infection. Excluding the three countries that only reported acute cases, the number of cases (15 380) corresponds to a crude rate of 4.7

1 Eurostat database: http://epp.eurostat.ec.europa.eu

cases per 100 000 population. Of all cases, 1 142 (7%) were reported as acute, 6 998 (43%) as chronic, 6 935 (43%) as 'unknown', and 1 112 cases (7%) could not be classified due to an incompatible data format.

Twenty-five countries were able to provide data on acute cases (Table 2). The overall rate of acute cases was 0.3 per 100 000 population, ranging from <0.1 in Croatia, Iceland, Malta, and Poland, to 0.7 cases per 100 000 population in Finland (Figure 1). When restricting the analysis to the countries that reported consistently from 2012–2021, the rate for acute cases showed a steady decline from 0.7 cases per 100 000 population in 2012 to 0.27 in 2020, with a slight increase to 0.31 in 2021 (Figure 2).

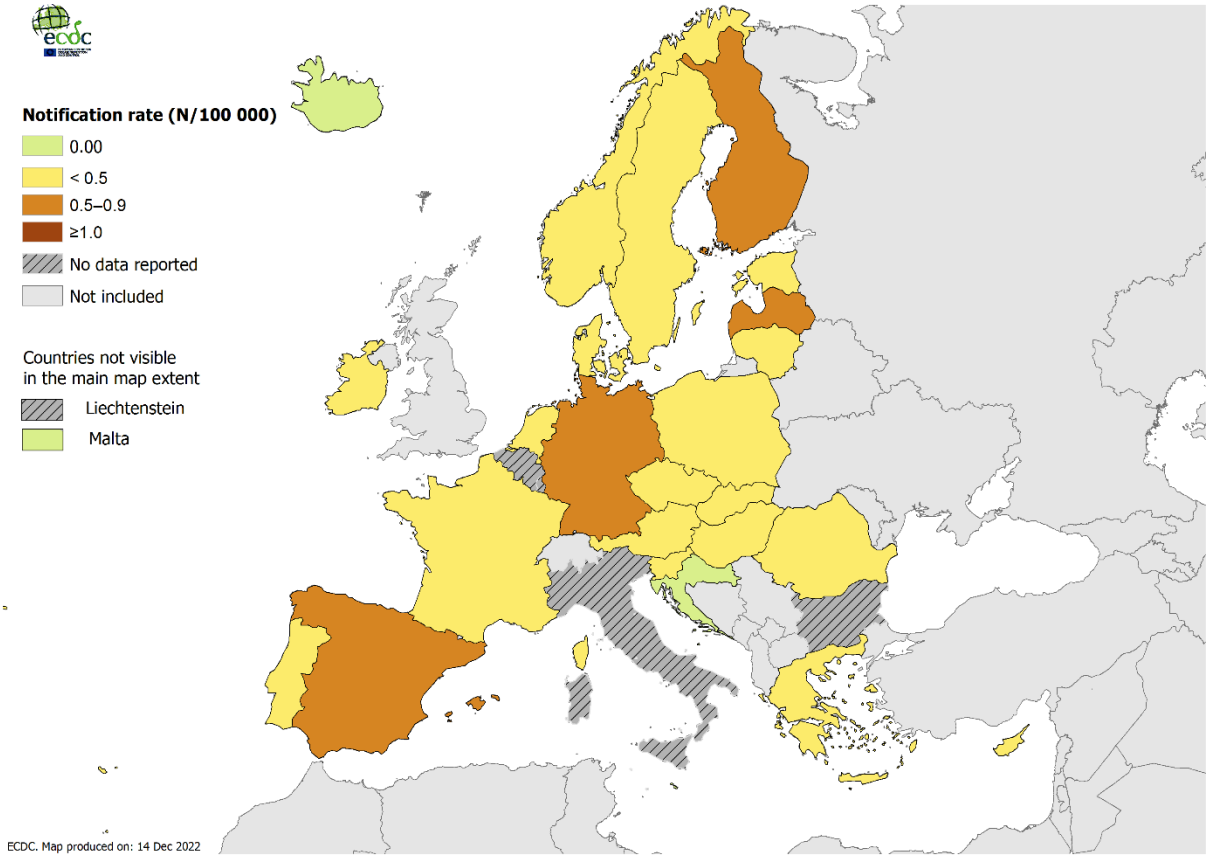
Twenty-four countries submitted data on chronic infections. The overall notification rate was 2.8 cases per 100 000 population, ranging from zero in in Luxembourg, Malta, Poland, and Romania to 8.1 in Iceland (Table 2). Among the 15 countries that reported consistently between 2012 and 2021, there has been a variable rate of reported chronic cases with a high of 6.6 in 2015 and low of 2.9 in 2020 and 2021 (Figure 2).

Table 2. Number and rate per 100 000 population of reported hepatitis B cases in the EU/EEA by country and year, 2017–2021

Country	2017		2018		2019		2020		2021							
	All		All		All		All		All		Acute[i]		Chronic[i]		Unknown[i]	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Austria	1 418	16.2	1 288	14.6	1 191	13.4	933	10.5	909	10.2	31	0.3	324	3.6	554	6.2
Belgium[ii]	1 634	NR	1 982	NR	2 021	NR	1 423	NR	1 029	NR	ND	NR	ND	NR	ND	NR
Bulgaria	249	3.5	215	3.0	198	2.8	112	1.6	83	1.2	ND	NR	ND	NR	ND	NR
Croatia	97	2.3	98	2.4	93	2.3	22	0.5	23	0.6	0	0.0	5	0.1	18	0.4
Cyprus	35	4.1	83	9.6	108	12.3	29	3.3	14	1.6	1	0.1	13	1.5	ND	NR
Czechia	303	2.9	323	3.0	317	3.0	169	1.6	144	1.3	17	0.2	127	1.2	ND	NR
Denmark	262	4.6	164	2.8	170	2.9	152	2.6	124	2.1	6	0.1	118	2.0	0	0.0
Estonia	14	1.1	19	1.4	18	1.4	23	1.7	23	1.7	3	0.2	20	1.5	ND	NR
Finland	265	4.8	239	4.3	238	4.3	166	3.0	236	4.3	40	0.7	196	3.5	ND	NR
France[iii]	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	82	0.1	ND	NR	ND	NR
Germany	3 594	4.4	4 524	5.5	8 935	10.8	6 807	8.2	8 262	9.9	481	0.6	3 720	4.5	4 061	4.9
Greece[iii]	ND	NR	ND	NR	ND	NR	ND	NR	165	1.5	10	0.1	155	1.5	ND	NR
Hungary[iii]	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	14	0.1	ND	NR	ND	NR
Iceland	68	20.1	44	12.6	49	13.7	33	9.1	31	8.4	0	0.0	30	8.1	1	0.3
Ireland	527	11.0	499	10.3	513	10.5	333	6.7	426	8.5	11	0.2	353	7.1	62	1.2
Italy	437	0.7	379	0.6	341	0.6	172	0.3	144	0.2	ND	NR	ND	NR	144	0.2
Latvia	348	17.8	328	17.0	295	15.4	222	11.6	145	7.7	12	0.6	133	7.0	ND	NR
Liechtenstein	ND	NR	ND	NR	ND	NR	ND	NR	5	12.8	ND	NR	2	5.1	3	7.7
Lithuania[iii]	ND	NR	ND	NR	ND	NR	25	0.9	27	1.0	9	0.3	18	0.6	ND	NR
Luxembourg	60	10.2	47	7.8	52	8.5	518	82.7	283	44.6	ND	NR	0	0.0	283	44.6
Malta	25	5.4	25	5.3	23	4.7	39	7.6	45	8.7	0	0.0	0	0.0	45	8.7
Netherlands	1 224	7.2	1 141	6.6	1 169	6.8	801	4.6	816	4.7	71	0.4	734	4.2	11	0.1
Norway	478	9.1	365	6.9	393	7.4	225	4.2	257	4.8	4	0.1	253	4.7	ND	NR
Poland	3 363	8.9	3 196	8.4	2 854	7.5	992	2.6	1 547	4.1	10	0.0	0	0.0	1 537	4.1
Portugal	181	1.8	189	1.8	201	2.0	128	1.2	125	1.2	15	0.1	53	0.5	57	0.6
Romania	133	0.7	119	0.6	103	0.5	21	0.1	18	0.1	18	0.1	0	0.0	ND	NR
Slovakia	141	2.6	131	2.4	141	2.6	89	1.6	77	1.4	10	0.2	67	1.2	ND	NR
Slovenia	77	3.7	78	3.8	60	2.9	94	4.5	128	6.1	6	0.3	32	1.5	90	4.3
Spain[iii]	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR	261	0.6	ND	NR	ND	NR
Sweden	1 239	12.4	1 130	11.2	1 098	10.7	804	7.8	744	7.2	30	0.3	645	6.2	69	0.7
United Kingdom	10 390	15.8	7 778	11.7	9 254	13.9	ND	NR	ND	NR	ND	NR	ND	NR	ND	NR
Total EU/EEA	**26 562**	**6.8**	**24 384**	**6.1**	**29 835**	**7.5**	**14 332**	**4.2**	**15 830**	**4.7**	**1 142**	**0.3**	**6 998**	**2.8**	**6 935**	**2.8**

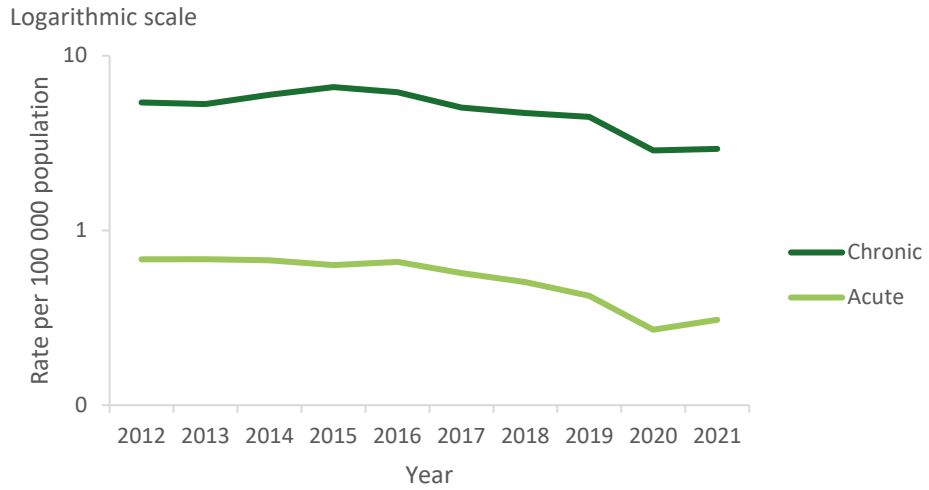
Data presented by date of diagnosis. ND: no data reported. NR: no rate calculated. i: Includes cases reported by countries as acute, chronic or unknown using the differentiation criteria. ii: Data from Belgium came from a sentinel system with undefined coverage, so population rates cannot be calculated. iii: 'All cases' not displayed for countries that only reported acute cases.

Figure 1. Notification rate of acute hepatitis B cases* per 100 000 population by country, EU/EEA, 2021



**: Countries included if able to present data by disease status, used case definition that includes only acute cases (e.g. EU 2008) or known to only report acute cases and had national coverage.*
Source: Country reports from Austria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Figure 2. Notification rates of acute and chronic hepatitis B per 100 000 population by year in EU/EEA countries reporting consistently, 2012–2021



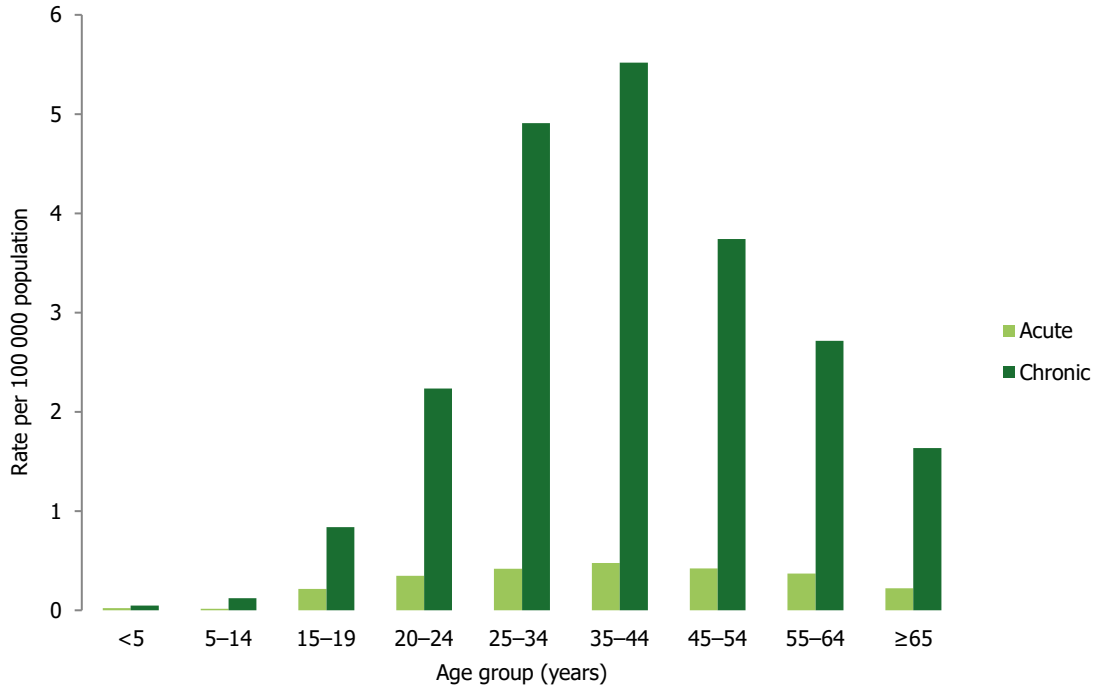
Source: Country reports.
Acute cases: Country reports from Austria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.
Chronic cases: Country reports from Austria, Cyprus, Denmark, Estonia, Finland, Ireland, Latvia, Malta, the Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, and Sweden.

Note that even though Germany has reported consistently, data on chronic cases are excluded as there was a change in case definition and reporting in 2019 that resulted in a large number of chronic cases in that year.

Age and sex

In 2021, 9 117 cases of hepatitis B were reported in males (5.5 cases per 100 000 population) and 6 611 cases were reported in females (3.8 cases per 100 000 population), excluding countries that only reported acute cases. This represents a male-to-female ratio of 1.4:1. The male-to-female ratio was higher among acute cases (2.4:1) than chronic cases (1.4:1). Almost half of all cases were among 25–44-year-olds. The age distributions among reported cases of acute and chronic infections were similar (Figure 3), with 11% of acute and 6% of chronic cases in people under 25 years of age. Among countries reporting consistently every year since 2012, the proportion of acute cases below 25 years of age declined from 13% in 2012 to 11% in 2021. The proportion of chronic cases under 25 declined from 19% in 2012 to 6% in 2021.

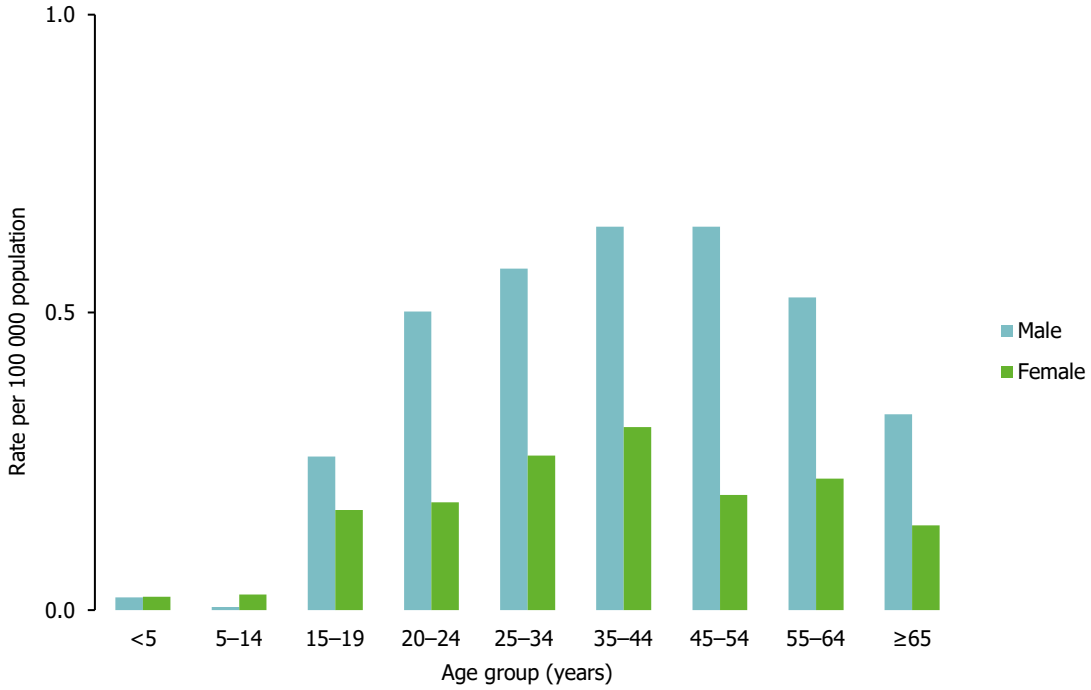
Figure 3. Notification rates of acute and chronic hepatitis B per 100 000 population by age group and disease status, EU/EEA, 2021



Source: Country reports.
Acute cases – Austria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.
Chronic cases – Austria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, Germany, Greece, Iceland, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, and Sweden.

Rates were higher among females in the youngest age groups, but in all age groups 15 years and older, the rates were higher among males (Figure 4).

Figure 4. Rate of reported acute hepatitis B cases per 100 000 population by age group and sex, EU/EEA, 2021

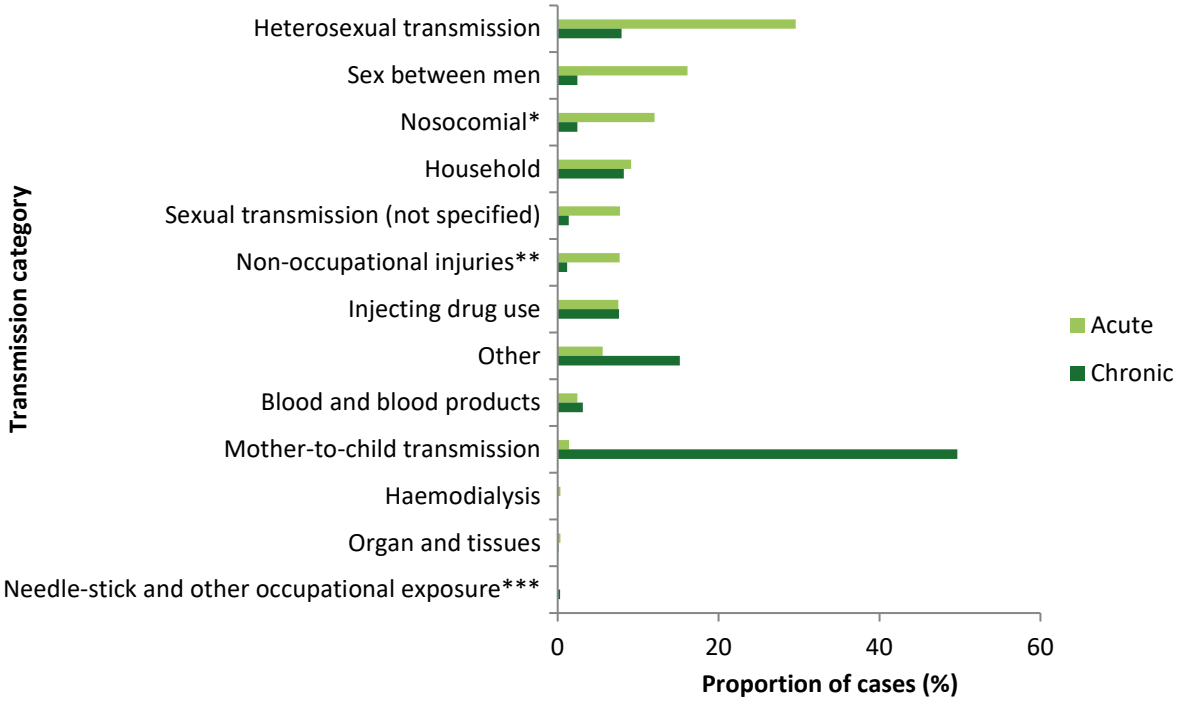


Source: Country reports.
Austria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Route of transmission

Data on transmission were complete for 25% of the acute and 15% of the chronic hepatitis B cases reported in 2021. For the 287 acute cases with complete information, heterosexual transmission was most commonly reported (30%), followed by transmission among men who have sex with men (16%) and nosocomial transmission (12%; Figure 5). Italy accounted for 38% of the 32 acute cases attributed to nosocomial transmission. For the 1 021 chronic cases with complete information, mother-to-child transmission was the most common route of transmission reported (50%). Poland reported 97% of chronic or unknown cases attributed to nosocomial transmission. Among chronic cases attributed to mother-to-child transmission, 62% were reported by the Netherlands, 16% by Sweden and 12% by Denmark. Of the chronic cases attributed to mother-to-child transmission, 93% were classified as being imported. Due to incompleteness and variation of reporting over time, route of transmission trends are difficult to interpret and not reported.

Figure 5. Transmission category of hepatitis B cases by acute and chronic disease status, EU/EEA, 2021[a]



[a]Cases with known transmission status.
**: Nosocomial transmission includes hospitals, nursing homes, psychiatric institutions, and dental services. This category refers mainly to patients exposed through healthcare settings, distinct from 'needle-stick and other occupational exposure', which refers to staff.*
***: 'Non-occupational injuries' include needle sticks that occur outside a healthcare setting, bites, tattoos, piercings.*
Source: Acute reports from Austria, Denmark, Finland, France, Germany, Ireland, Italy, Latvia, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, and Sweden.
****: 'Needle-stick and other occupational exposure' refers to occupational injuries.*
Chronic reports from Austria, Croatia, Denmark, Estonia, Finland, Germany, Ireland, the Netherlands, Norway, Portugal, Slovakia, and Sweden.

Importation status

Of 6 233 cases (39% of all reported cases) with information on importation status from 18 countries, 2 296 (40%) were reported as imported. The majority of these imported cases (93%) were chronic infections, and among those, 80% were reported by four countries (Germany, the Netherlands, Norway, and Sweden). The proportion of chronic cases (68%) reported as imported was higher than the proportion of acute cases (13%), indicating that migrant populations are disproportionally affected, mainly because migrants are already infected with hepatitis B prior to arrival. Data completeness on importation status among chronic cases varied across countries, but among the nine countries with complete data (>75%), the proportion of cases classified as imported ranged from <10% (Estonia and Slovakia) to over 90% (Cyprus, Denmark, Iceland, Lithuania, and Norway).

Discussion

The number of newly diagnosed hepatitis B infections reported from countries across Europe remains high, with the majority of these infections classified as chronic. A marked variation between countries in the distribution of acute and chronic cases was observed. This geographical variation most likely reflects differences in local testing and reporting practices as well as underlying epidemiological differences. For acute hepatitis B cases, no important geographical trends were observed in the European surveillance data, even though the underlying prevalence of chronic hepatitis B infection is known to be highest in eastern Europe [6]. These data are also likely to suffer from underreporting – for example, underreporting of acute hepatitis B in France was estimated at 73% in 2016. For newly diagnosed cases of chronic hepatitis B reported to ECDC, the geographical trends are unclear as data for many countries are missing. However, some of the highest rates were reported from northern and western European countries, such as Iceland, Ireland, and Sweden which is contrary to what may be expected based on seroprevalence surveys that indicate these countries to be of low endemicity (<1.0%) [6]. The discrepancy between reported notifications and prevalence estimates highlights the difficulty in interpreting routine surveillance data for chronic infections which are mostly asymptomatic until the late stages of the disease. The chronic hepatitis B data reported appear to reflect the intensity of local testing and screening policies, with the highest rates reported from countries that are known to have comprehensive testing programmes [8,9]. Prevalence surveys using rigorous sampling methods give a better indication of disease burden. However, prevalence surveys from European countries with high levels of immigration may underestimate the true prevalence of hepatitis B, as their studies might not include the migrant populations from intermediate and high (>1.0%) endemicity countries [7]. The high number of cases of chronic hepatitis B reported from northern Europe also has a strong influence on overall EU/EEA estimates.

The overall trend for acute hepatitis B cases in the EU/EEA has shown a steady decline from 2012 to 2020, although with a steeper decline in 2020 relative to the trajectory in earlier years. This is followed by a slight increase in 2021. The long-term decrease is most likely related to national hepatitis B vaccination programmes [10]. The steeper decline in rates of new diagnoses in 2020 may be the result of a combination of changes in healthcare seeking behaviours and testing practices during the COVID-19 pandemic. For acute cases, changes in behaviours and reduced sexual contact patterns may also have resulted in a reduction of new infections. The slight increase seen in the rate in 2021 relative to 2020 may be due to healthcare-seeking patterns and risk behaviours starting to return to pre-pandemic levels.

A survey of wide range of actors involved in the provision of testing services found that the majority reported service disruptions and declines in testing volumes during the COVID-19 pandemic, in particular, in the early part of 2020 [11]. A study in the Netherlands found a 40% reduction in the number of diagnosed chronic cases in 2020 compared to 2019 and found that the weekly relative reduction in new chronic HBV and HCV diagnoses mirrored the weekly number of COVID-19 admissions [12]. Another study did not find a reduction in the number of acute cases, likely because acute hepatitis B infection is often symptomatic and diagnoses rates are less likely to be impacted by changes in testing efforts or healthcare seeking behaviours [13]. It will be important to monitor trends in 2022 and beyond to gain a more complete picture.

Data completeness for several variables is poor, including for route of transmission and importation status. Only age and sex are reported with greater than 95% completeness and most variables are below 50% completeness. The number of countries reporting data has remained stable over the last few years.

Data on importation status of cases remain incomplete, but the impact of migration on reported cases of hepatitis B in Europe is striking for some countries, especially among chronic infections. In recent decades, migrants to many countries in Europe have come from countries with high prevalence of hepatitis B and prevalence among some of these migrant groups is high [7,14]. A study on the epidemiological burden of hepatitis among migrant populations estimated that migrants account for an estimated 25% of the chronic hepatitis B cases[14]. The study concluded that migrant populations are often disproportionately affected by hepatitis B and are a key risk group for chronic hepatitis B in certain EU/EEA countries. The influence of migration on hepatitis B highlights the need for countries to develop evidence-based screening interventions that target the most affected migrant communities. It also highlights the importance of monitoring routine surveillance indicators of migration, such as importation status and country of birth.

Transmission data are key to understanding the epidemiology of hepatitis B. While transmission data completeness is better for acute cases than chronic cases, the overall incompleteness impairs the interpretation of differences between countries and data are unlikely to be fully representative. The most common routes of transmission reported among acute cases include heterosexual contact, sex between men and nosocomial transmission. Although nosocomial transmission is uncommon for acute cases in most European countries, it remains a key route of transmission in some, highlighting the importance of maintaining robust infection prevention and control practices across healthcare settings. Mother-to-child transmission was the most common route of transmission among reported chronic cases but is dominated by the large number of cases reported by three western European countries (Denmark, the Netherlands and Sweden), with most of these cases classified as imported. The validity of the reported route of transmission among imported cases is not known and could

form a subject for future study. Changes over time in the completeness of transmission data reporting impede comparisons of the data over time.

Public health implications

Robust epidemiological information is essential to inform effective prevention and control priorities, assess the impact of implemented strategies and monitor progress towards achieving the global elimination targets. The interpretation of hepatitis B data collected through routine notification-based surveillance is challenging because of the asymptomatic nature of chronic infections, differences in testing programmes, continued differences in surveillance practices between countries and data quality issues. Despite such challenges, the relatively high number of reported cases (especially of chronically infected persons) and diversity in reported transmission routes across Europe suggest that countries need to maintain and strengthen local prevention and control programmes, including comprehensive vaccination programmes. Robust evidence of ongoing transmission and the continued importation of cases to many European countries demonstrate a clear need to improve the quality of surveillance data, especially regarding data on transmission routes, country of birth and whether cases are considered imported. Further work is also needed to assist countries in adopting the current EU case definition to standardise surveillance across countries. ECDC will continue to support Member States in this area and develop alternative epidemiological methods to complement routine surveillance, such as seroprevalence surveys and sentinel surveillance which will help provide a more complete understanding of the epidemiology.

In May 2017, the World Health Assembly adopted the first global health sector strategy on viral hepatitis that aims at elimination by 2030 [15]. The concept of elimination for these infections is based on reducing the incidence of chronic infections by 90% and associated mortality by 65% by 2030 compared to 2015 levels. Achieving these targets will require significant scaling up of key interventions, including comprehensive hepatitis B childhood vaccination, birth dose vaccination or other means to prevent mother-to-child transmission, improved systems to assure safe blood transfusions/blood products, injection safety, interventions aimed at prevention of transmission among people who inject drugs and increased testing with linkage to care and treatment. To support the implementation of this strategy, it is important that countries maintain a strong surveillance system to monitor the impact of the interventions. This also highlights the need for continued efforts to improve the quality of the collected and reported data, together with using other sources of data such as prevalence data and mortality data, given that surveillance data are limited by several factors, such as testing rates and their ability to measure outcomes.

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