

SURVEILLANCE AND MONITORING



A mapping and review of sexual behaviour survey data for the prevention of sexually transmitted infections in the EU/EEA, 2019–2024

ECDC SURVEILLANCE AND MONITORING

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Abbreviations

ANSER	The Academic Network for Sexual and Reproductive Health and Rights Policy
CENSE	Norwegian Research Centre for Sexual Health
CSR	Casual Sexual Relationship
EEA	European Economic Area
EFTA	European Free Trade Association
ESMN	European Sexual Medicine Network
ESPAD	European School Survey Project on Alcohol and Other Drugs
EU	European Union
HBSC	Health Behaviour in School Children
HIV	Human Immunodeficiency Virus
KAB	Knowledge Attitudes and Behaviours
Natsal	The National Survey of Sexual Attitudes and Lifestyles
NFP	National Focal Point
RFSU	Swedish Association for Sexuality Education
SDG	Sustainable Development Goal
STI	Sexually Transmitted Infections
TB	Tuberculosis
UK	United Kingdom
UngKAB	Youth Knowledge Attitude and Behaviour

Executive summary

Background and methods

Sexual behaviours and practices are proximate causes of the acquisition and transmission of sexually transmitted infections (STIs). Understanding the behavioural and social determinants of STIs is important to design and implement effective prevention and control measures. Self-reported data on sexual health and behaviours, largely collected through surveys, help identify and analyse sexual behaviour trends such as changes in contact patterns or mixing across population groups. There is a tradition of periodic sexual health surveys performed in a range of European countries. To provide information on the availability of relevant sexual behaviour data, ECDC has mapped sexual behaviour surveys conducted in the European Union/European Economic Area (EU/EEA) and the United Kingdom (UK) from 2019 to 2024. Surveys were identified via searches in scientific databases and via the ECDC STI network. Data reported in identified surveys were explored to generate insights on the useability and applicability of the survey data for understanding sexual behaviour.

Results

The mapping identified 35 relevant and representative surveys on sexual health and behaviour performed between 2019 and 2024 in the EU/EEA and the UK. Of the 35 surveys, 31 were repeat surveys, i.e. part of a series, 21 of which were part of the Health Behaviour in School Children (HBSC) series of surveys. Other repeated surveys found include the National Survey of Sexual Attitudes and Lifestyles (Natsal) from the UK, Youth Knowledge Attitude and Behaviour (UngKAB) from Sweden, and Sex Under 25 from the Netherlands, some of which had their latest edition in progress as of the mapping. Data from the HBSC surveys, as well as other repeated surveys in Estonia, the Netherlands, and Sweden, indicate a potential decrease in condom use in the younger population (around 15–25 years of age) in these countries. Data from the HBSC data browser for EU/EEA countries and the UK show a steady decrease in self-reported condom use at last intercourse for both boys and girls aged 15 years for the years 2014, 2018, and 2022.

The rich data collected in surveys are similar but not always comparable. There is an inconsistency in the terminology used to capture sexual behaviours and partner types, due to the complex and subjective nature of these issues. Other challenges to comparability include differences in the survey items used to measure the behaviours between survey rounds, countries, and over time.

Discussion and conclusions

The mapping shed light on the value of sexual behaviour data for STI prevention and control, as well as the lack of comparability across data sources due to diversity in methods and terminology used. This diversity is related to the constraints faced by researchers such as a lack of resources, and sociocultural differences that are addressed using different solutions based on context. These same constraints, particularly shortage of time and high costs involved, also prevent the implementation of large-scale surveys on sexual behaviour.

The mapping also highlighted ways to make behavioural data collection more robust, comparable, and applicable to the prevention and control of STIs. This can be accomplished, for instance, by clearly defining terminology used, as well as including core sexual health and behaviour indicators in EU-wide general health surveys, thereby allowing for comparisons over time and between countries. Conducting European level sexual behaviour surveys and facilitating behavioural data repositing and comparison could improve how sexual behaviour data informs the prevention and control of STIs.

1 Introduction

Trends in the acquisition and transmission of sexually transmitted infections (STIs) are influenced by the sexual behaviours and practices of individuals and communities, which are in turn shaped by cultural, economic, social, and political factors such as stigma and poverty. Understanding the social, and behavioural determinants of STIs is necessary to design and implement effective prevention and control measures [1-3]. Self-reported sexual health and behaviour data, largely collected through surveys, can support the creation of targeted prevention and control measures, including tailored public health communication on STI prevention, testing, treatment, and vaccination. Survey data can also provide insights into sexual behaviour trends, contact patterns, and mixing across population groups, and be used as input for modelling studies on the impact of interventions.

A recent analysis of STI case notifications between July 2022 and June 2023 in the European Union/European Economic Area (EU/EEA), found a 'sharp increase' in gonorrhoea, particularly in young people, as well as increases in syphilis [4-6]. This increase has brought back into focus the need for data on sexual behaviours and practices. A 2009 ECDC report found that collection of behavioural data on HIV/STI in the EU/European Free Trade Association (EFTA) differed in the level of 'formalisation' i.e. not all countries had formally documented procedures or systems of surveillance [7].

More recently, at the annual ECDC STI network meeting in June 2023, network members ranked behavioural data for disease monitoring as a prioritised topic for ECDC's STI-related activities. Suggestions included supporting behavioural studies among heterosexual and young populations to fill the knowledge gap and/or providing Member States with guidelines on behavioural survey methodologies. Furthermore, the need to adapt prevention and control programmes based on sexual behaviour data was discussed at the [ECDC Advisory Forum meeting of December 2023](#). As a response to the observed increase in STIs in young people, ECDC also developed a protocol for qualitative focus groups to discuss changes in sexual behaviours with young people and ask them what they are seeing in their peer group.

Countries in the EU/EEA and the United Kingdom (UK) have had a tradition of conducting periodic sexual health surveys. However, there is currently a lack of overview and insight into the type of data available in these surveys, specifically on sexual behaviours. Therefore, ECDC has conducted a mapping of surveys with the primary aim of identifying relevant surveys on sexual behaviour, conducted between 2019 to 2024.

In addition to providing insights on recent STI increases, the mapping aimed to identify the availability of key variables on sexual behaviour and contact patterns in young heterosexuals as well as men who have sex with men, which are needed for developing and improving ECDC's modelling on STI outbreaks. Furthermore, insights from the mapping on the availability of comparable and relevant behavioural data contribute to the ECDC Social and Behavioural Sciences team's longer-term vision of advancing the use of social and behavioural data to inform disease prevention and control programs. The report is targeted at epidemiologists, social and behavioural scientists, national public health authorities and others who are interested in using behavioural data for understanding infectious disease transmission and prevention.

2 Study design and methods

The mapping was conducted from April to September 2024 by a research team at ECDC consisting of a trainee and an expert from the STI team. The following inclusion criteria were applied:

1. Surveys aimed at the general public (no age limitations, but the population group of most interest was people aged 12–45 years);
2. Surveys aiming to reach a representative sample of the population (probability samples preferably);
3. Survey topics: sexual behaviour, sexual health, STIs (subtopics can include KAB [knowledge, attitudes, behaviours], specific sexual practices, contact patterns, etc.);
4. Surveys conducted in the EU, EEA, and the UK; and
5. Surveys conducted between 2019 and 2024.

Surveys were excluded based on the following exclusion criteria:

6. If focused on specific at-risk populations;
7. If using non-representative, convenience sampling; and
8. If outside the geographic focus.

Some representative surveys found during the mapping but conducted outside of the timeframe, including those whose relevant results were not published during the mapping, were documented in an overall list (see Annex 1).

Data collection

Identifying surveys via searches

A desk review was conducted to identify and collect behavioural surveys in relation to sexual behaviour and STIs performed in the past five years in Europe. Searches for peer-reviewed articles, public reports, and publicly available data sources pertaining to the topic of sexual health and behaviour data in the region were done with the search terms 'sexual' AND 'behaviour' or 'behavior' (MeSH terms) AND 'survey' in 'Europe' and the 'EU/EEA', as well as, 'sexual' AND 'behaviour' or 'behavior' followed by the name of target countries on Google and Google Scholar. A search for 'sexual' AND 'behaviour' or 'behavior', as well as 'Sexual Health Survey' was also conducted on Scopus and PubMed. This range of search terms, search engines, and databases were used to identify both academic and non-academic resources such as grey literature.

Identifying surveys via network outreach

In parallel, National Focal Points (NFPs) for ECDC's STI network were contacted via email with the aim of identifying surveys in their countries. The NFPs were provided with an overview of the project and its aims and were requested to share any information they had about any sexual behaviour surveys conducted in their countries or in the European region. They were also asked to provide the contact details of any relevant people who could provide further information about such surveys. With input from the STI team, as well as through insights from the desk review, a parallel list of researchers to contact was created. The list contained columns to track individuals' responses and pending follow-ups. A reminder was sent to non-respondents after the first request.

NFPs from 29 countries were contacted, of which 21 countries responded, giving a response rate of 72%. Some of the contacts were affiliated with networks such as the The Academic Network for Sexual and Reproductive Health and Rights Policy (ANSER) [8] and European Sexual Medicine Network (ESMN) [9], and were able to provide information on studies conducted by the network or by specific members.

Documentation

Identified surveys were documented using Microsoft Excel. A spreadsheet was designed containing rows for survey entry and columns to document relevant characteristics of each survey project.

These characteristics included:

1. Name of project/survey;
2. Country/countries surveyed;
3. Years of data collection;
4. Data collection method;
5. Age of population under study;
6. Main topics covered in the survey;
7. Sampling method/representativeness;
8. Sample size;
9. Availability of variables of interest;
10. Links to relevant publications/resources;
11. Availability of data and survey questionnaires used; and
12. Contact details (if applicable).

A list of variables of interest was pre-defined by the STI and modelling teams at ECDC, with the objectives of 1) increasing understanding of sexual behaviour relevant to the rise in STIs among young heterosexuals and 2) informing ECDC modelling workstreams on STI outbreaks. Each survey project was examined to see if these variables of interest were covered in the surveys, based on the questionnaires and any related study publications and reports. Variables of interest were categorised into the following:

- 'A' the variable is available;
- 'B' the variable is not available, but similar variables are (similar variable was defined as capturing one or more of the key elements of the variable); and
- 'C' neither the variable nor any similar variables were available.

Notes were added to cells in the spreadsheet to document the phrasing of the variable. An example of categorisation can be seen in Box 1. The categorisations were validated within the research team.

All surveys meeting the inclusion criteria were documented in the spreadsheet. Repeated surveys were of particular interest as they can indicate trends over time. Studies outside the inclusion criteria that were relevant to STI outbreaks such as surveys on specific risk groups or non-surveys, were documented separately.

Once the mapping was complete, available and suitable data were presented with the aim of generating insights on sexual behaviour and exploring the useability and applicability of data from these surveys for understanding sexual behaviour and STI transmission/spread.

Box 1. Example of variable categorisation**For the variable 'Number of sexual partners during the last year'**

An 'A' categorisation was applied to -

"How many partners have you had sexual intercourse with in the last 12 months?"

A 'B' categorisation was applied to -

"Number of sexual partners in the last 3 months (1 or 2+)"

While 'A' covers both key elements i.e. focus on sexual partners and the correct timeframe, 'B' covers sexual partners but has a misaligned timeframe.

For consistency, the following criteria were used to define a study as a repeat study:

- The latest round should have taken place in 2019 or later; and
- The round preceding the latest round should not have taken place earlier than 2015.

3 Results

The flowchart (Figure 1) shows the selection of surveys, and the number of standalone and repeated representative surveys identified. The mapping identified a total of 99 surveys, of which 48 were representative surveys originating from 25 countries, including one multi-country study. Thirteen of the 48 representative surveys were out of timeframe. The map in Figure 2 shows the geographical distribution of the 35 surveys that were both representative and within the timeframe. Studies that fulfilled the inclusion criteria were from 23 of the 31 countries (74%) that form the geographical inclusion criteria. Estonia had the largest number of studies – four – fitting the main inclusion criteria.

Figure 1. Survey selection flowchart

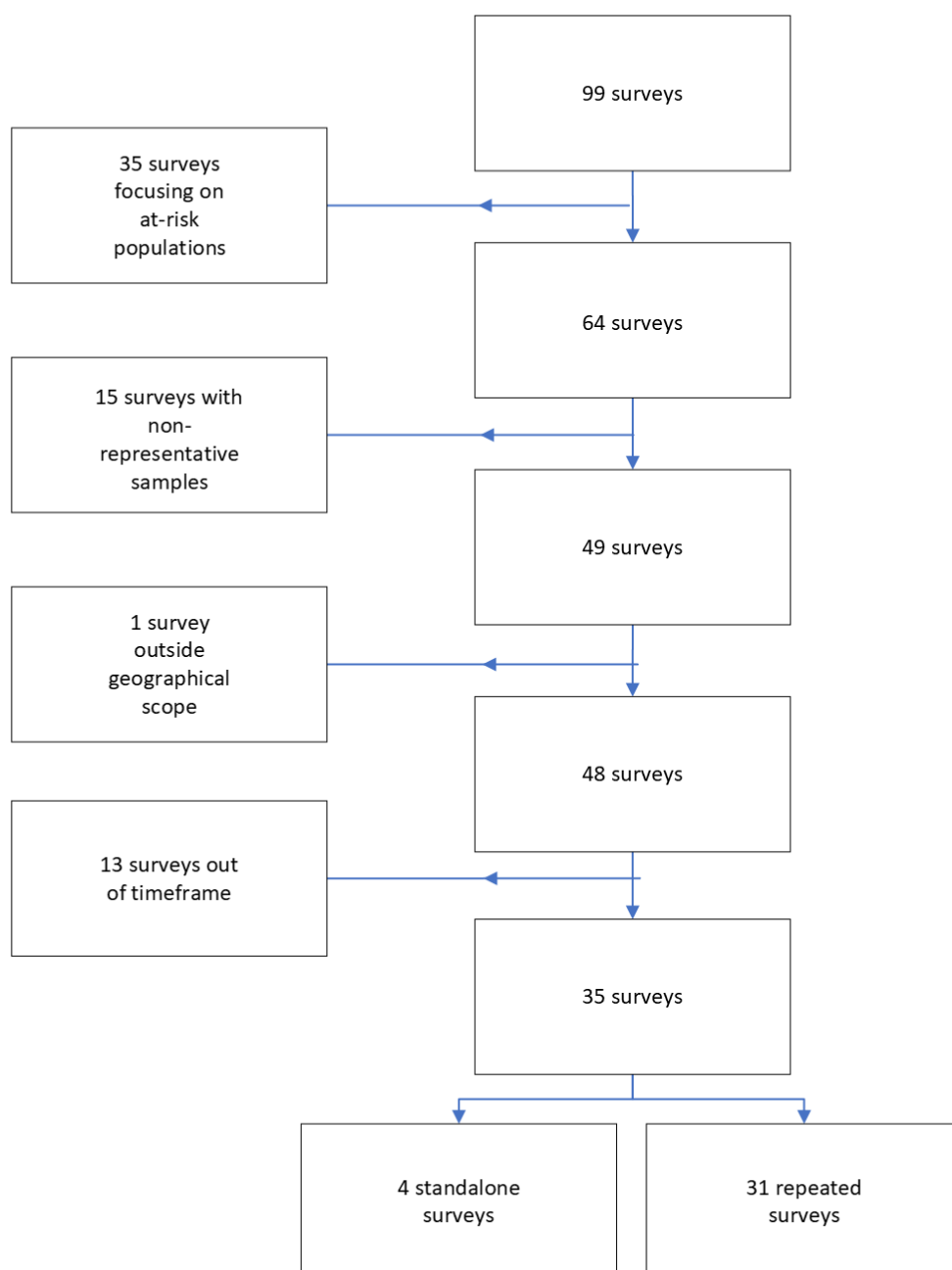
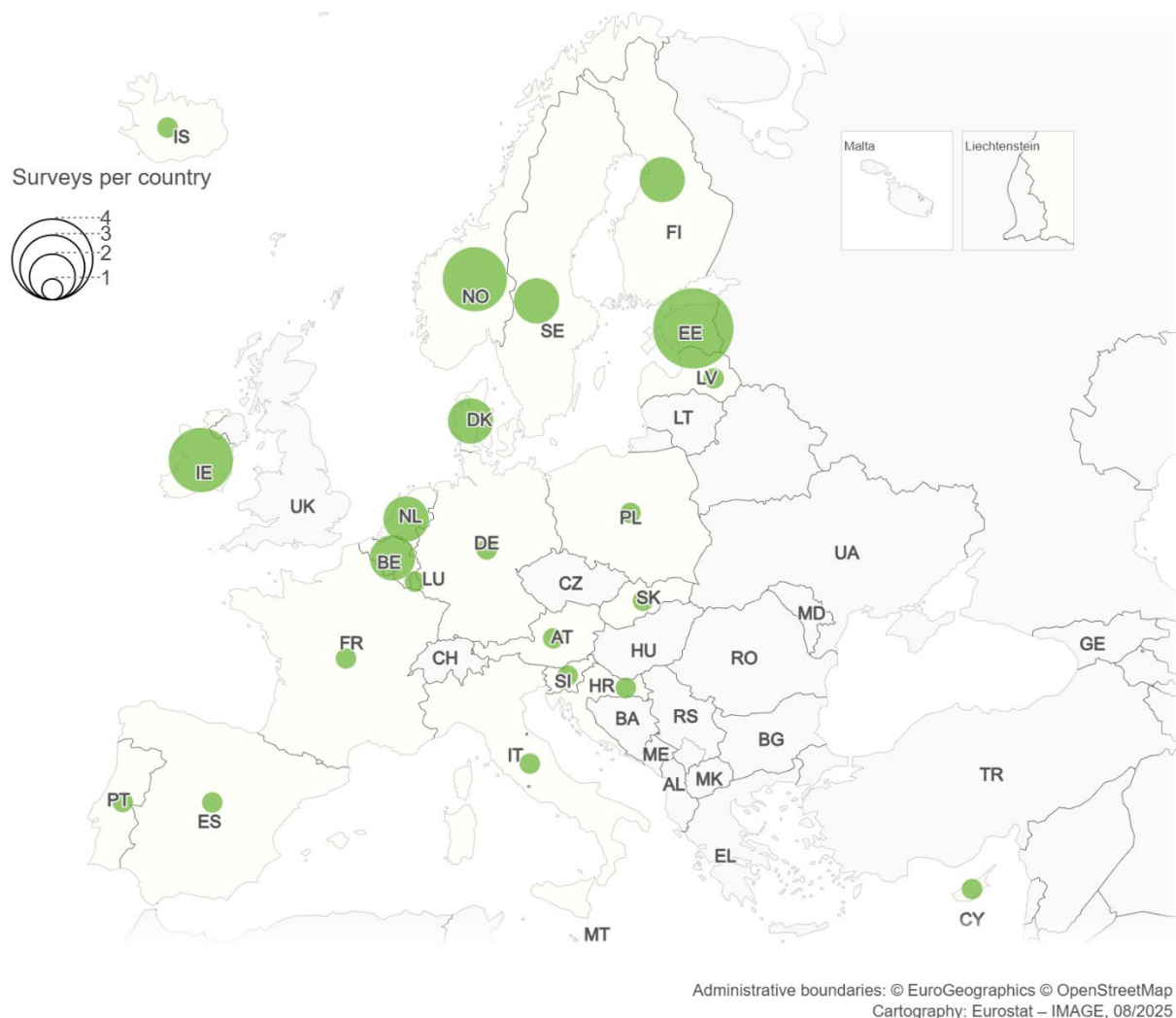


Figure 2. Availability of surveys on sexual health and behaviour in the EU/EEA and the UK by country

In total, 35 surveys on sexual health and behaviour conducted from 2019 to 2024 in the EU/EEA and the UK were identified (Table 1). There were 31 relevant repeated surveys performed within the specified timeframe, 21 of which were part of the Health Behaviour in School Children (HBSC) series of surveys [10], collecting self-reported data on 11-, 13-, and 15-year-old school-going children and adolescents. HBSC is conducted periodically in all EU/EEA countries as well as the UK. Other repeated surveys found included Natsal from the UK [11], UngKAB from Sweden [12], and Sex Under 25 from the Netherlands [13], some of which had their latest edition still in progress at the time of the mapping.

Table 1. Representative surveys on sexual behaviour in the EU/EEA and the UK (2019–2024)

Survey	Country/ries	Year(s)	Age group asked about sexual behaviour	Overall Age group ¹
HBSC Austria [14]	Austria	2022	Grades 9 and 11	Grades 5, 7, 9, 11
HBSC Belgium – Flemish [15]	Belgium	2022	13+-year-olds	5 th and 6 th grade of primary education to 6 th grade of secondary education
HBSC Belgium – French [16]	Belgium	2022	2 nd and 3 rd level of secondary school	5 th and 6 th grade of primary school to 3 rd level of secondary school
STI Biobehavioural Study [17]	Croatia	2021	Same	18- to 25-year-olds
HBSC Cyprus [18]	Cyprus	2022	15-year-olds	6 th grade, 2 nd year of middle school and 1 st year of high school
HBSC Denmark [19]	Denmark	2022	9 th grade	5 th , 7 th , and 9 th grades
Sexual Health of Estonian Youth [20]	Estonia	2021	Same	14- to 18-year-olds
Estonian Health Interview Survey [21]	Estonia	2019	Same	15+ year-olds
Estonian Adult Population Health Behaviour [22,23]	Estonia	2020, 2022	Same	16- to 64-year-olds
HBSC Estonia [24]	Estonia	2022	13 to 15-year-olds	11-, 13-, 15-year-olds
HBSC Finland [25]	Finland	2022	9 th grade	5 th , 7 th and 9 th grades
ENCLASS (HBSC + ESPAD) [26]	France	2022	2 & 3 rd grade of middle school (collège) to end of high school (lycée)	6 th grade of middle school (collège) to end of high school (lycée)
GeSID [27] [53]	Germany	2019	Same	18-to 75-year-olds
Icelandic Youth Study (HBSC + ESPAD) [28]	Iceland	2022, 2023	10 th grade	Grades 4, 6, 8, and 10
Use of Pornography in Young Adults [29]	Ireland	2019	Same	20-year-olds
My World 2 [30]	Ireland	2019	Senior cycle and post-secondary level	12- to 25-year-olds
HBSC Ireland [31]	Ireland	2022	15 to 17-year-olds	9-to 18-year-olds
HBSC Italy [32]	Italy	2022	15- & 17-year-olds	11, 13, 15, 17-year-olds
HBSC Latvia [33]	Latvia	2022	15-year-olds	5 th , 7 th , and 9 th grades
HBSC Luxembourg [34]	Luxembourg	2022	13- to 18-year-olds	11- to 18-year-olds
Kondomkollen [35] [36]	Nordics	2019, 2022, 2023	Same	16- to 65-year-olds
Sexual Habits Survey (CENSE) [37,38,54]	Norway	2020	Same	18- to 89-year-olds
Ung I Oslo [39]	Norway	2021, 2023	Upper secondary school	Grades 5 to 7, middle and upper secondary school
Sexual activity in Polish Men [40]	Poland	2022	Same	18+ year-olds
HBSC Portugal [41]	Portugal	2022	Grades 8 and 10	Grades 6, 8, 10
HBSC Slovakia [42]	Slovakia	2022	15-year-olds	11-, 13-, 15-year-olds
HBSC Slovenia [43]	Slovenia	2021, 2022	15- and 17-year-olds	11-, 13-, 15-, 17-year-olds

¹ The standard HBSC methodology focuses on ages 11, 13, and 15 years with specific sampling approaches varying across countries. Age groups are presented as written in survey reports being specific where possible.

Survey	Country/ries	Year(s)	Age group asked about sexual behaviour	Overall Age group ¹
Informe Juventud [44]	Spain	2020	Same	15- to 29-year-olds
HBSC Sweden [45]	Sweden	2022	15-year-olds	Grades 5,7, and 9
Sex Under 25 [13,46]	The Netherlands	2023	Same	13- to 25-year-olds
HBSC Netherlands [47]	The Netherlands	2022	Secondary school	Grade 8 of primary education and secondary education
Natsal-COVID [11,48,49]	UK	2020, 2021	Same	18- to 59-year-olds
HBSC Scotland [50]	UK	2022	15-year-olds	Final year of primary school and 2 nd and 4 th years of secondary education
HBSC England [51]	UK	2022	15-year-olds	School years 7 to 11
HBSC Wales [52]	UK	2023	Year 11	School years 7 to 11

Data on 'Sexual Orientation' (34%) and 'Number of sexual partners during the last year' (20%) were most often collected in surveys, whereas results from STI testing done in the context of the survey (i.e. a bio-behavioural component) was only present in one of the 35 surveys (Table 2). When taking similar variables into account, data on 'unprotected sex/condom use in the last year' were the most prevalent, available in 91% of surveys. These similar variables often either lacked information on the timeframe or were focused only on the last sexual intercourse (as illustrated in Box 1).

Table 2. Number of surveys that include variables of interest

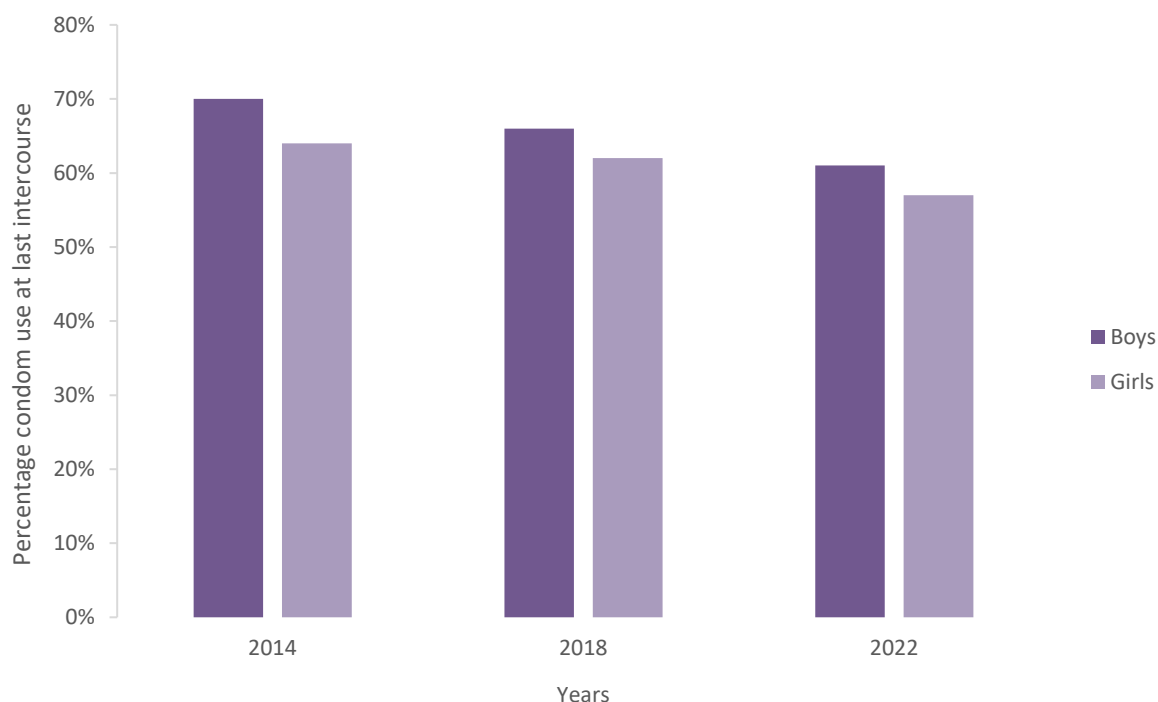
Variables of interest	Included (A) <i>N (%) of surveys in which variable is included</i>	Similar (B) <i>N (%) of surveys in which similar variable is included</i>	Total N (%) of surveys where variables of interest were available
Unprotected sex/condom use in the last year	5 (14%)	27 (77%)	32 (91%)
Sexual orientation	12 (34%)	1 (3%)	13 (37%)
Number of sexual partners during the last year	7 (20%)	3 (9%)	10 (29%)
Number of temporary/casual sexual partners in the last year	1 (3%)	7 (20%)	8 (23%)
Concurrent sexual partnerships	6 (17%)	2 (6%)	8 (23%)
Number of unprotected temporary/casual sexual partners per year	0 (0%)	6 (17%)	6 (17%)
Heterosexual and same sex encounters	5 (14%)	0 (0%)	5 (14%)
Frequency of sexual activity	4 (11%)	0 (0%)	4 (11%)
STI testing	4 (11%)	0 (0%)	4 (11%)
Recency of last sex	3 (9%)	0 (0%)	3 (9%)
STI diagnosis	3 (9%)	0 (0%)	3 (9%)
Bio-behavioural testing	1 (3%)	0 (0%)	1 (3%)

Recent trends in condom use

Data on condom use were most widely available, included in 91% of the surveys, some of which were repeated periodically. This made condom use the most suitable variable to examine further, providing the opportunity to extract data reported in surveys in at least a few different locations and time periods to identify potential trends in this one key sexual behaviour for STI prevention. The published data extracted here include the EU/EEA and UK survey data on sexual behaviour from the HBSC data browser (2014, 2018, and 2022)² [55], the Sex Under 25 study from the Netherlands (2017 and 2023), [13,46], the Estonian Adult Population Health Behaviour surveys (2020 and 2022) [22,23], and the Kondomkollen study (2022 and 2023) [35,36] by the Swedish Association for Sexuality Education (RFSU) in Sweden, Norway, Denmark and Finland.

Data from the HBSC data browser for EU/EEA countries and the UK for years 2014, 2018 and 2022 show a steady decrease in condom use at last intercourse for both boys and girls aged 15 years, with the proportion of girls being consistently less than boys in 2014, 2018 and 2022. The data browser indicated a significant difference between boys and girls in average condom use at last intercourse in 2022, but not in 2018 or 2014.

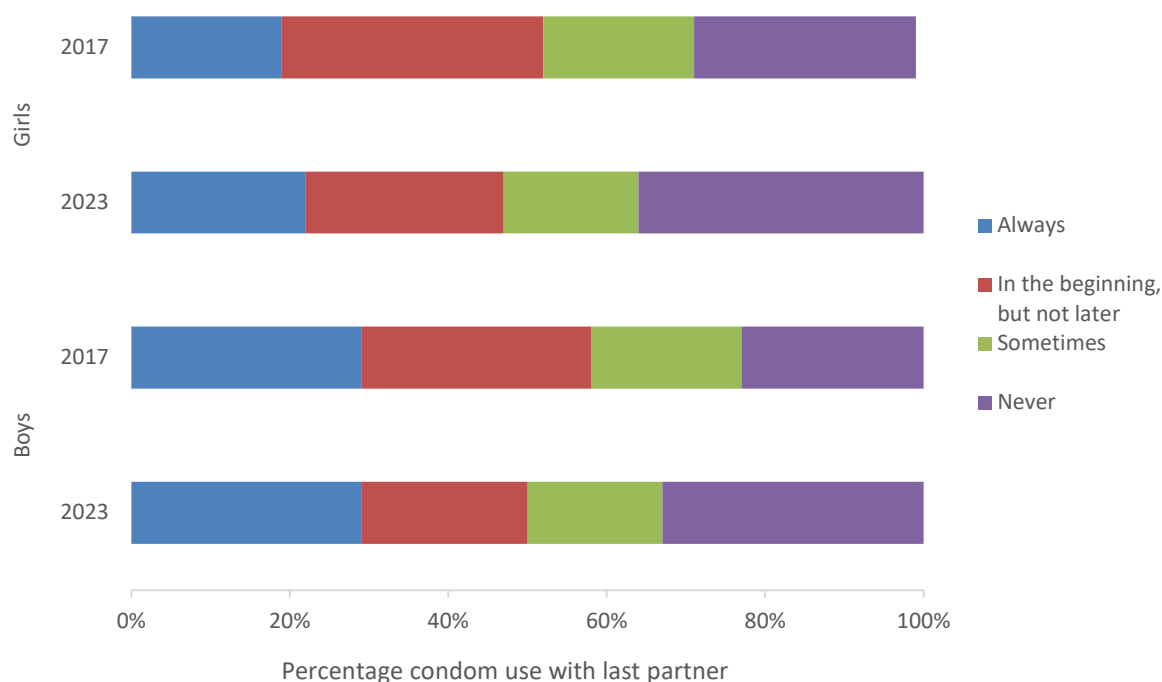
Figure 3. Condom use at last intercourse among adolescents aged 15 years (HBSC study 2014, 2018, and 2022)



Following a similar trend, the Sex Under 25 study from the Netherlands shows an increase in the percentage of girls and boys who reported never using condoms with their last partner between 2017 and 2023, by eight and 10 percentage points respectively. The report, overall, provides some information on magnitude of difference in outcomes between different demographic groups or time periods, but it is unclear if these are statistically significant differences.

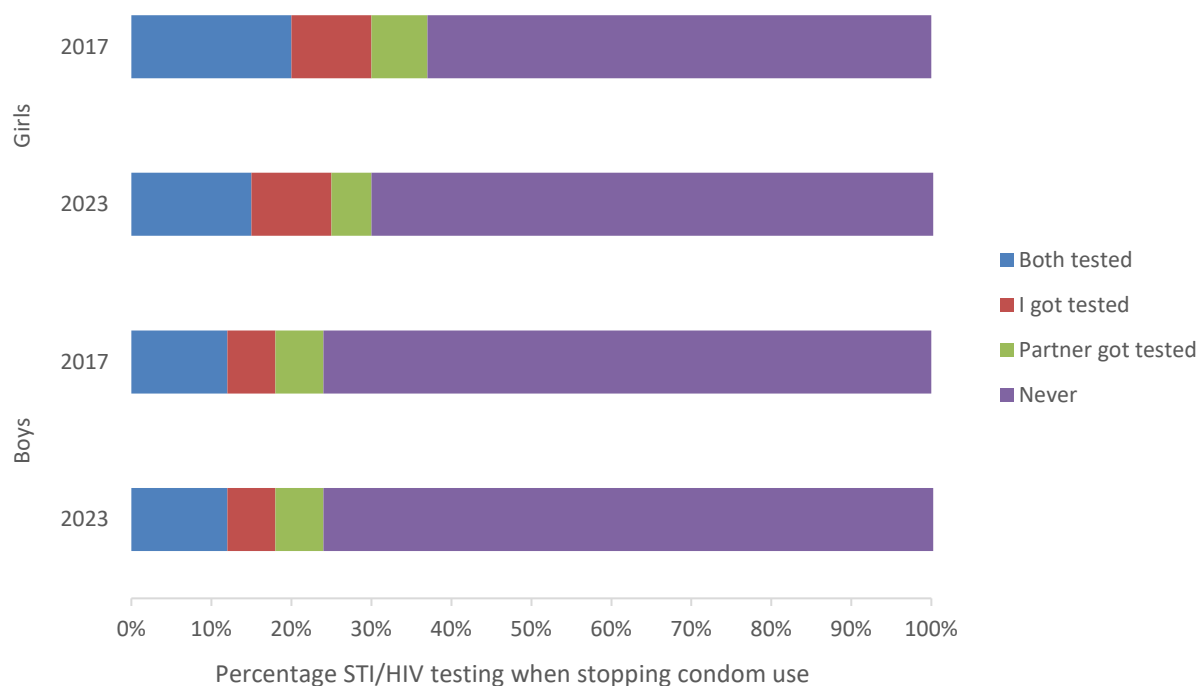
² HBSC was included as repeated surveys (see page 4). The survey data from 2014 was included to enable visualisation based on three time points.

Figure 4. Condom use with last partner among boys and girls aged 13–25 years in the Netherlands (Sex Under 25, 2017 and 2023)

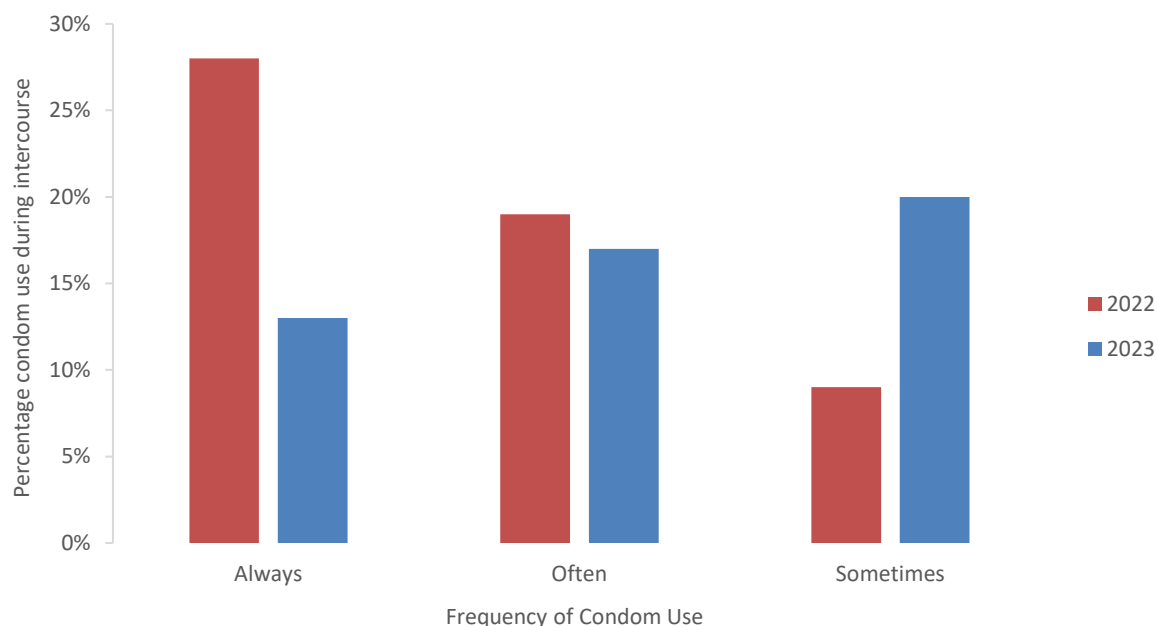


Sex Under 25 also asked participants if they tested for STIs/HIV when stopping condom use with a partner. In both 2017 and 2023, most people reported not getting tested after stopping condoms, with a minor increase in boys who had never tested (76% to 77%) and a larger increase in girls (63% to 71%).

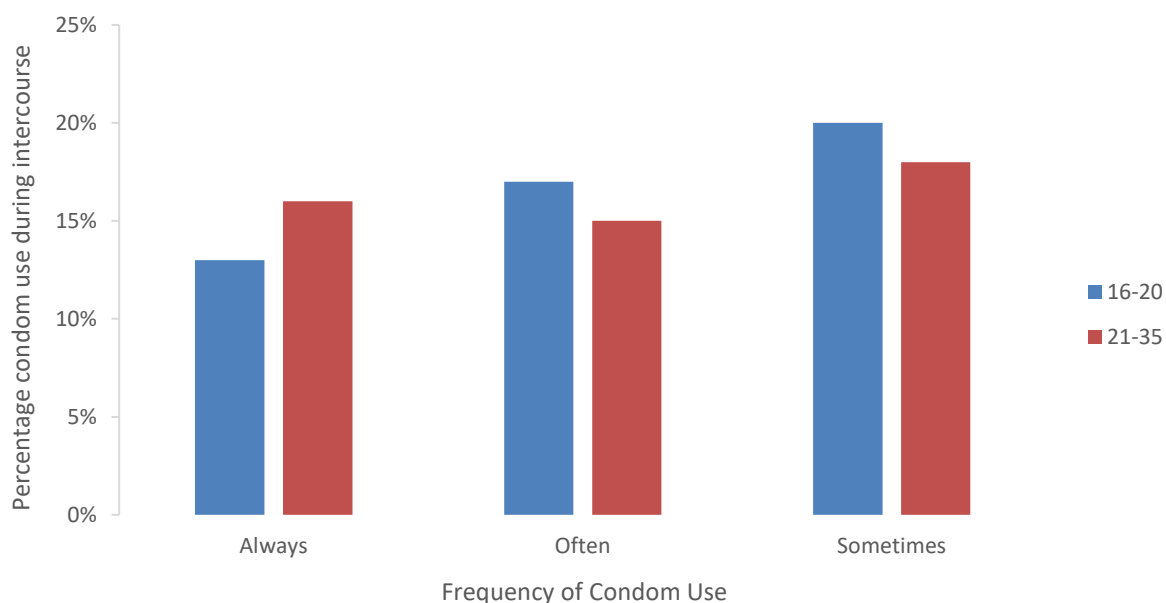
Figure 5. STI/HIV Testing when stopping condom use in girls and boys aged 13–25 years in the Netherlands (Sex Under 25, 2017 and 2023)



Data from Sweden (Kondomkollen 2023) show a decrease in the percentage of those who report always using condoms (28% to 13%) and an increase in those who report using condoms sometimes (9% to 20%) in the 16–20 years age group between 2022 and 2023.

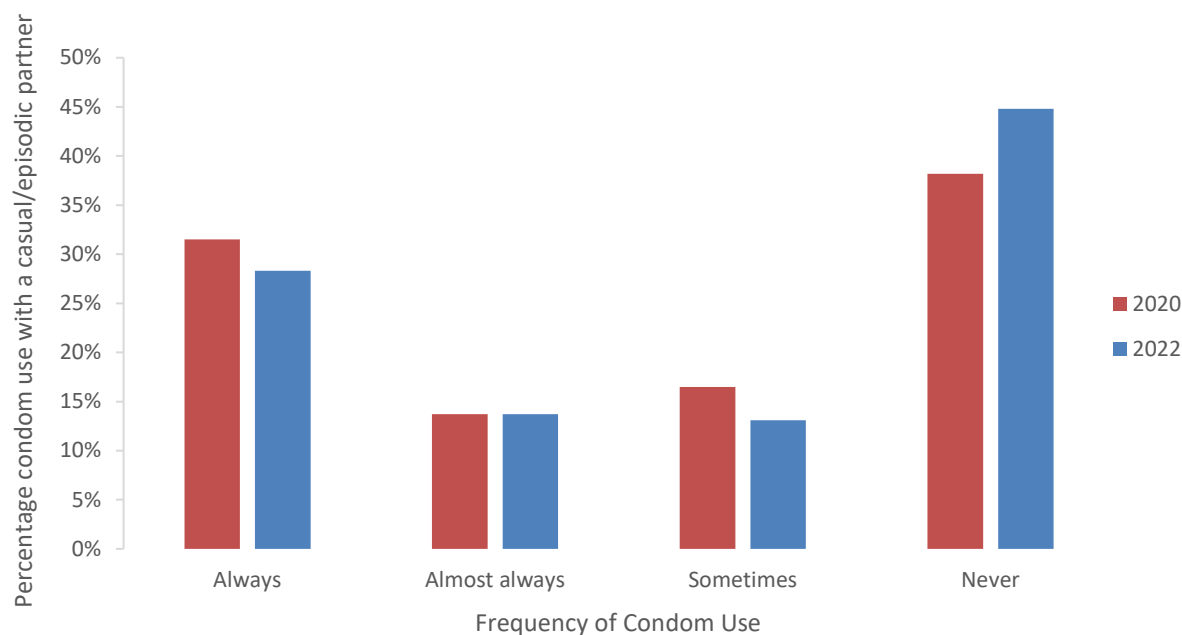
Figure 6. Condom use in those 16–20 years in Sweden (Kondomkollen 2022 and 2023)

In 2023, when compared to 21–35 age group, fewer respondents in the 16–20 age group reported always using condoms, and more report using condoms sometimes. No information on statistical significance was given in Kondomkollen.

Figure 7. Condom use in those aged 16–20 years and 21–35 years in Sweden (Kondomkollen 2023)

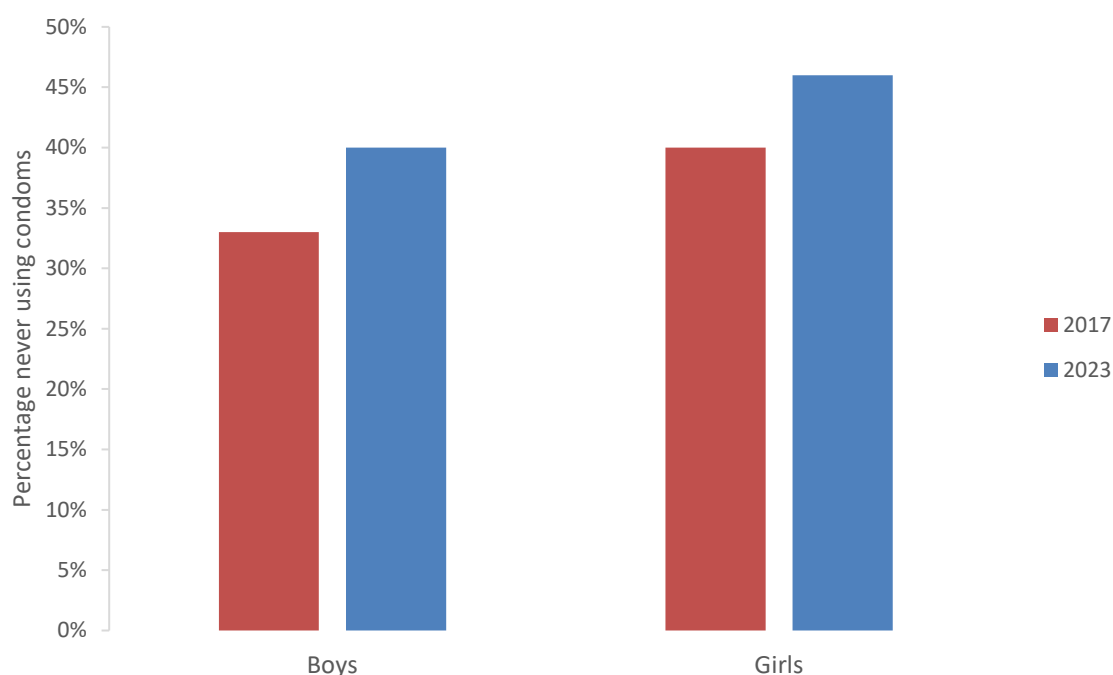
There were also some insights specifically on condom use in individuals who had lower levels of commitment with their last partner. Data from the Estonian study showed that from 2020 to 2022 there was a statistically significant increase in the percentage of people reporting never using condoms (38% to 45%), and a decrease in the proportion of those reporting always using condoms (from 32% to 28 %) and sometimes using condoms (from 17% to 13%) with a 'casual/episodic partner' in the last 12 months (Figure 8).

Figure 8. Condom use with casual/episodic partner in the last 12 months among (Estonian Adult Population Health Behaviour, 2020 and 2022, individuals aged 16–64 years)



Similarly, comparing 2017 and 2023 in the Netherlands, there is an increase in the percentage of people reporting having never used condoms among those who did not have a relationship with their last sexual partner, in both boys (from 33% to 40%) and girls (from 40% to 46%) aged 13–25 years (Figure 9).

Figure 9. Proportion of people stating that they never used condoms among those who had no relationship with their last sexual partner in the Netherlands (Sex Under 25, 2017 and 2023, individuals aged 13–25 years)



Kondomkollen 2023 in Sweden also found that of those who are not in a committed relationship, 52% report having used a condom in the past year. Additional data on variables of interest are presented in Annex 2.

Challenges for interpretation: (In)consistency of terminology

Types of partnerships

An important issue highlighted by the mapping is the diverse terminology used to describe partnerships. The inconsistency in terminology has also been highlighted by previous studies [3,56]. For instance, the 2023 Sex Under 25 surveys analysed condom use using four partner types: 'one-night stand', 'casual partner – more frequent sex', 'steady partner – also sex with others', and 'steady partner – monogamous'. Its 2017 edition includes the same four options and an additional one: 'steady partner, one-time sex'. The 2023 edition also provides an analysis of condom use in people 'who did not have a relationship with their last sexual partner' (Figure 9), which is a dichotomous category presumably derived from the four partner types mentioned earlier. The Estonian Health Behaviour Study, in comparison, uses the term 'casual/episodic' in their question on condom use. Kondomkollen also presents data on condom use in those who are 'not in a committed relationship'.

While a broad, dichotomous categorisation of relationship types as 'committed/steady' vs 'non-committed/casual' can be seen, these terms are not well-defined and are used inconsistently across the surveys. There is a diversity in relationship types which is hard to categorise in such binary categories, as illustrated in the categories created for Sex Under 25. Therefore, when a study presents analyses of preventative behaviours such as condom use, it is hard to interpret what type of sexual behaviours, networks or relationship characteristics are being captured.

Condom use

Similarly, condom use frequency is also captured differently in each survey. The Estonian survey, for example, uses 'always', 'almost always', 'sometimes', and 'never', whereas Sex Under 25 uses 'always', 'in the beginning but not later', 'sometimes', and 'never'. Kondomkollen reports 'always', 'often', and 'sometimes', but does not report any data for 'never'. It is unclear whether 'never' was given as an option in the survey. Condom use as a behaviour is also a nuanced one. It may differ greatly based on contextual factors such as time, availability of condoms, sexual activity, etc., which can lead to differing interpretations when terms are not clearly defined.

4 Discussion

Condom use and relationship characteristics

Data from the HBSC data browser [55] and repeated surveys in Estonia, Sweden, and the Netherlands [13,22,23,35,36,46] show a potential indication of decreasing condom use in young people. This is consistent with reports of trends of decreasing condom use in the United States and Europe in the last two decades [57]. HBSC data from the EU/EEA (Figure 3) show a decrease in self-reported condom use in the last sexual encounter in adolescents [58]. Kondomkollen data from Sweden show a decrease in condom use in those aged 16–20 years (Figure 6), but indicate an increase in condom use when all respondents, aged 16–65 years, are considered [35]. The decreasing trend among young people is concerning, as correct condom use is one of the most effective methods of HIV/STI prevention [59].

The analysis also points to decreasing condom use in partnerships broadly described as having low commitment. Sex Under 25 found an increase in the percentage of those who report never using condoms with their last partner, both overall and particularly in those who were 'not in a relationship with their last sexual partner' [13]. This data is relevant to STI prevention, as conventionally, individuals in 'casual/non-committal' relationships may be seen as having sex with more than one sexual partner and/or having concurrent sexual contacts and hence facing an increased risk of STIs [2].

The authors of Sex Under 25 hypothesise that more trust in 'casual' relationships may have led to a decrease in condom use. Decision-making on condom usage is impacted by relationship characteristics such as intimacy, trust, commitment, conflict, and power asymmetries [60–63]. Although two thirds of respondents' said their last partnership was 'steady', Sex Under 25 2023 also found an increase in those who reported not having a relationship with their last partner but having sex with them more than once [13]. 'Casual' partners who engage with each other often, could build trust and reduce perceived threats to health, contributing to decreased condom use [61,62]. A 2020 study from the Norwegian Research Centre for Sexual Health (CENSE), also found that 'the main reason for not using condoms during intercourse was both parties felt sure that they were healthy, especially those born within 1990–2002' [37]. This underscores the influence of relationship characteristics on behaviours such as condom use.

The COVID-19 pandemic also impacted sexual behaviours, such as by reducing the number of sexual partners [64] and potentially increasing age of sexual debut [13]. Of the studies analysed, only HBSC provided information over three time points, showing a decline in condom use even before the pandemic [55]. Additionally, Kondomkollen 2022 found that one in seven Swedes thought that condoms became more important after the pandemic [36]. However, these insights are insufficient for drawing conclusions on the pandemic's impact (or lack thereof) on condom use.

Capturing the complexity of sexual behaviour

To understand disease transmission and design effective prevention programs, information is needed on the number of concurrent sexual partners, frequency of sexual activity, when and how often condoms are used, and if they are used effectively. Knowledge of social, psychological and other contextual factors that influence sexual practices is also required. However, as seen, terms that have and are being used to collect self-reported sexual behaviour data are inconsistent and subject to diverse interpretations. Relationships are understood differently depending on context, and inconsistent definitions and interpretations hinder the identification of characteristics that are relevant to epidemiology and prevention. The term 'relationship' for instance, when used dichotomously—e.g. 'being in a relationship' or 'not in a relationship'—can be confusing when 'relationship' is not explicitly defined.

Similarly, the normative categorisation of partnerships as 'steady/long-term' or 'casual/temporary', does not accurately capture relationship characteristics in practice. For instance, Godinho et al.'s study of the relationship between types of Casual Sexual Relationships (CSRs) and condom use, found a variation in levels of emotional involvement even within so-called 'casual' relationships in which 'friends with benefits' and 'hookups' had higher levels of emotional involvement than 'one-night stands' [60]. The study also found intimacy to be an important mediator of condom use in different relationship types with more intimacy associated with increased condom use sexuality [60]. The authors attributed this to more comfort between partners allowing for open discussions and planned/regulated sexual activity which enables condom use. This applied to CSRs as well, especially as the authors determined no significant differences in condom use in vaginal sex between committed relationships and hookups [60]. This shows that relationship characteristics, like many other natural and social phenomena, do not fit neatly into two boxes. While a 'friends with benefits' relationship and a 'one-night stand' may both be categorised as 'casual' due to lower levels of long-term commitment, the former could have higher levels of trust and intimacy than the latter. CSRs may have characteristics usually expected in 'steady/committed' relationships, explaining the lack of significant differences in condom use.

Notably, Godinho et al. found condom use more frequently in vaginal sex than oral or anal sex, which points to condom use for contraceptive purposes rather than STI prevention [60]. If other forms of contraception are being used, it is possible that trust and comfort could reduce condom use. Swedish data from Kondomkollen 2023

suggest this, finding a decrease in condom use accompanied by an increase in the use of other forms of contraception such as pills and implants among those aged 16-20 [35]. Additionally, young people today may be moving away from normative understandings of relationships, further reducing the relevance of dichotomous categorisation for self-reported behavioural data collection [65].

This illustrates the challenges in interpreting condom use trends and data. Is condom use decreasing in short-term sexual relationships with reduced trust and intimacy? Or in longer-term, non-monogamous relationships? Or in those with a lack of long-term commitment? Terms like 'casual', 'steady' and 'permanent' are culturally specific, value-laden, and capture imprecise information. The terms used to define 'condom use' also only provide a basic insight into frequency of condom use, and do not elaborate on the nuances such as correct application of condoms etc. There is a need to develop terminology to capture data on sexual behaviours that are more nuanced and less reliant on narrow understandings of relationships and sex. While it may take time to develop and standardise such terminology, it is important to clearly define the terms used in both surveys and dissemination of research.

A way forward could be to place relationship types across a spectrum, with each type representing a clearly defined set of characteristics as in Estcourt et al.'s 2022 paper. Estcourt et al. defined five categories for classifying sexual partner types that go beyond 'regular and casual' [66]. The authors create a matrix that captures the varying levels of intensity and commitment between 'married/commitment' to 'one night stand', and assesses them across key biological, psychological and social characteristics such as potential for re-infection and type of sexual networks. Although this development is done in the context of partner notifications for STIs, the classification also provides ideas for changing how self-reported data on partner types can be collected to more accurately understand sexual behaviour in a population.

Naturally, there are other social and behaviour factors relevant to condom use that can be studied such as communication between partners [62], sexuality [13], risky sexual practices, gender norms, power dynamics, etc. [67]. The fluidity in relationships, their extent and their dimensions can also vary by cultural, socio-economic, and political contexts [1]. These diversities really underscore the importance of conducting qualitative research to understand specific contexts and audiences, and design non-stigmatising questions that reflect how sexual behaviours and relationships are understood and referred to in the target communities, while capturing the core information needed for to understand STI transmission and support prevention.

Increasing comparability of sexual behaviour data

The insights emerging from just four studies show the value and potential of sexual behaviour surveys in assessing trends across time (such as pre- and post-pandemic) and locations. The mapping identified many robust sexual behaviour surveys in the EU/EEA and the UK general populations, that collect data on variables relevant for STI epidemiology, modelling, and prevention. These results confirm the findings of de Graaf et al. [56] that there is a long tradition of periodic population sexual health surveys in Europe, but the methods used vary from one survey to another. The rich data collected in surveys, although similar, are not always comparable due to differences in terminology (as discussed earlier), and changes in survey items between survey rounds, countries, and over time. The population surveyed can also limit comparison such as for instance, HBSC's focus on school-going adolescents compared to Sex Under 25's inclusion of young adults.

This diversity in methods and terminology is related to the constraints faced by researchers such as a lack of resources, and sociocultural differences that are addressed using different solutions based on context. These constraints, particularly shortage of time and high costs involved, also prevent the implementation of large-scale surveys on sexual behaviour [56]. Despite efforts to guide the selection of survey items and increase comparability, for instance, by the ESMN's subgroup on European Sex Surveys, formulations of key survey items vary substantially. These constraints also explain the rarity of bio-behavioural surveys (linking survey data to self-sampled testing results), which are more resource intensive. The mapping found only one bio-behavioural survey (Landripet et al., 2023) [17].

Generating and using comparable sexual behaviour insights in Europe

The mapping highlighted avenues for generating robust, comparable, and applicable behavioural data for STI prevention and control. In-depth surveys, such as Sex Under 25, help identify trends in multiple sexual behaviours and health outcomes. STI transmission is driven by multiple psychological, environmental, and societal factors. Insights on sexual behaviours and societal attitudes to sex and relationships can be a useful starting point to understand and identify areas for further action. This includes designing more targeted and tailored interventions, for instance, by re-framing trust and intimacy to be facilitators of safe-sex practices in communication campaigns.

Questions in repeated surveys are also an important resource. More than half of the identified surveys were repeated, with more than half of these repeated surveys being part of the HBSC network. There is, therefore, potential to have questions on sexual behaviour and health in general health surveys despite the limited space for extensive questions on a specific topic. This could provide more frequent insights on core issues such as condom use and the number of sexual partners. ECDC NFPs from different countries have also expressed the need for dialogue at a European level on sexual behaviour data collection, and including sexual behaviour questions in future European Health Interview Surveys [68].

Sexual behaviour data must also become easier to access. Data and information on the variables covered in each survey were not always available or accessible. Aggregate country-level data from the HBSC study were relatively easy to visualise and access using the HBSC data browser. The data for the rest of the three surveys, Sex Under 25, Kondomkollen, and the Estonian Adult Population Health Behaviour survey, were extracted from reports published by the respective teams. More easily accessible data would allow for more knowledge-sharing and/or collaboration between countries when designing and implementing prevention and control measures. Data repositories of behavioural data from self-reported surveys could make insights more accessible.

Declining response rates and associated biased samples of respondents are a common challenge to epidemiological research, with young people being especially challenging to survey [69-71]. Alongside the mapping, the need to find alternative strategies for data collection was raised by both ECDC's external STI network and the in-house STI team, including the use of flash surveys via social media apps and utilising social marketing strategies to effectively reach young audiences, as in the case of Ireland's Sexual Wellbeing project. Complementary qualitative research may also help to gain deeper insights into how questions on relationships and sexuality may be phrased in future surveys, but also in messaging to ensure young people's sexual behaviour is understood more accurately.

Based on these insights, ECDC will continue to explore the efficient collection and use of behavioural data to inform and improve prevention and control programs, including calling for regular surveys or survey items on sexual health and behaviours for comparisons across various locations, contexts, and over time.

Limitations of the mapping

The mapping process had its limitations. Information on surveys was often not readily available or accessible. Few projects had all relevant information in one place. Information often had to be pieced together from websites, survey questionnaires and published papers, and not all three sources were available for all data. For instance, sometimes only the questionnaires were available without access to data or published results, which prevented proper assessment against the inclusion criteria. Only a few repeated surveys in the timeframe with variables of interest were available, which reserved the in-depth analysis to only the four-identified surveys, limiting the breadth of insights.

Many projects and surveys were also only available in national languages. Some projects might therefore have not been identified due to the use of English search terms. This limitation was addressed by the direct contact with NFPs to identify national/regional surveys with their support. This contacting process, however, was resource- and time-intensive, emphasising the need for more streamlined and coordinated implementation of surveys and access to data. Translation of text into English might also have led to the misinterpretation of survey questions and hindered the identification of relevant questions due to errors in translation.

Finally, some repeated and upcoming surveys could not be included due to not having any material or results available yet.

5 Conclusions

Under the backdrop of increasing numbers of STI cases within the region, this mapping exercise identified a range of recent sexual behaviour surveys targeted at the general population in the EU/EEA and the UK, particularly focusing on young people. With 35 surveys fitting the main inclusion criteria, data identified from relevant repeated surveys indicated a decrease in condom use among young people in the region and provided some insights into the social and behavioural factors influencing this decrease. These factors, such as more trust and intimacy in 'casual' sexual relationships, may not currently be appropriately understood or addressed. The potential decrease in condom use could contribute to the rise in STIs in EU/EEA along with other factors and should be more thoroughly studied.

A major challenge to sexual behaviour data collection is the identified inadequacy and inconsistency in terminology. Other barriers include heterogeneity in data collection and survey designs, as well as resource constraints. Nevertheless, the valuable insights derived from identified studies show the potential of sexual behaviour data for facilitating STI prevention. This underscores the need for robust and comparable sexual behaviour data. Avenues for further research and action include the development of standardised and specific terminology to capture data relevant to disease prevention, and a more critical, nuanced, and clear approach to defining and interpreting terminology. Additionally, European level sexual behaviour surveys, including core sexual behaviour indicators in European general health surveys and facilitating behaviour data repositing and comparison could help harness sexual behaviour data for the prevention and control of STIs.

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Annex 1. List of all identified representative surveys (within and out of timeframe)

	Name of survey	Years conducted	Country/ies
	<i>Standalone</i>		
1	STI Biobehavioural Study [17]	2021	Croatia
2	GeSID [27]	2018–2019	Germany
3	Use of Pornography in Young Adults [29]	2018–2019	Ireland
4	Sexual activity in Polish Men [40]	2022	Poland
5	Project Sexus [72]	2017–2018	Denmark
6	Risky sexual behaviour and contraceptive use [73]	2018	Czechia
7	Danes' Sexual behaviour [74]	2012	Denmark
8	Factors and habits affecting SRH	2022–2023	Latvia
9	CZECHSEX [75]	2024	Czechia
10	Envie [76]	2022–2023	France
	<i>Repeated</i>		
11	NATSAL [11]	2012, 2020, 2021, 2024*	United Kingdom
12	Sexual Health of Estonian Youth [20]	2015, 2021	Estonia
13	Estonian Health Interview Survey [21]	2019, 2025*	Estonia
14	Estonian Adult Population Health Behaviour [22]	2018, 2020, 2022	Estonia
15	Sex Under 25 [13]	2017, 2023	Netherlands
16	Sexual Habits Survey [37,38]	2020, 2024*	Norway
17	Ung I Oslo [39]	2018, 2021, 2023	Norway
18	Kondomkollen [35]	2019, 2022, 2023	Sweden, Norway, Denmark, Finland
19	Informe Juventud [44]	2016, 2019–2020	Spain
20	My World 2 [30]	2012, 2018–2019	Ireland
21	ENCLASS (HBSC + ESPAD FRANCE) [26]	2018, 2022	France
22	Icelandic Youth Study (HBSC + ESPAD) [28]	2018, 2022, 2023	Iceland
23	HBSC Ireland [31]	2018, 2022	Ireland
24	HBSC Italy [32]	2018, 2022	Italy
25	HBSC Belgium – Flemish [15]	2018, 2022	Belgium
26	HBSC Belgium – French [16]	2018, 2022	Belgium
27	HBSC Austria [14]	2018, 2022	Austria
28	HBSC Denmark [19]	2018, 2022	Denmark
29	HBSC Estonia [24]	2018, 2022	Estonia
30	HBSC Finland [25]	2018, 2022	Finland
31	HBSC Latvia [33]	2018, 2022	Latvia
32	HBSC Luxembourg [34]	2018, 2022	Luxembourg
33	HBSC Netherlands [47]	2018, 2022	Netherlands
34	HBSC Portugal [41]	2018, 2022	Portugal
35	HBSC Cyprus [18]	2018, 2022	Cyprus
36	HBSC Slovakia [42]	2018, 2022	Slovakia
37	HBSC Slovenia [43]	2018, 2020–21, 2022	Slovenia
38	HBSC Sweden [45]	2018, 2022	Sweden
39	HBSC Scotland [50]	2018, 2022	United Kingdom
40	HBSC England [51]	2018, 2022	United Kingdom
41	HBSC Wales [52]	2018, 2023	United Kingdom
42	HBSC Spain [77]	2018, 2022*	Spain
43	HBSC Lithuania [78]	2018, 2022*	Lithuania
44	HBSC Germany [79]	2018, 2022*	Germany
45	UngKAB [12]	2015, 2023*	Sweden
46	Health Interview Survey [80]	2013, 2018, 2023–24*	Belgium
47	Sant��, vie affective et sexuelle [81]	2006, 2023*	France
48	Sexual Behaviour in Estonian Adult Population [82]	2017, 2027*	Estonia

* Results on sexual behaviour not published/found at the time of the mapping.

Annex 2. Additional figures with variables of interest

Figure 1A. Self-reported STI/HIV diagnosis in the past 12 months among youth 13–25 years in the Netherlands (Sex Under 25, 2017 and 2023)

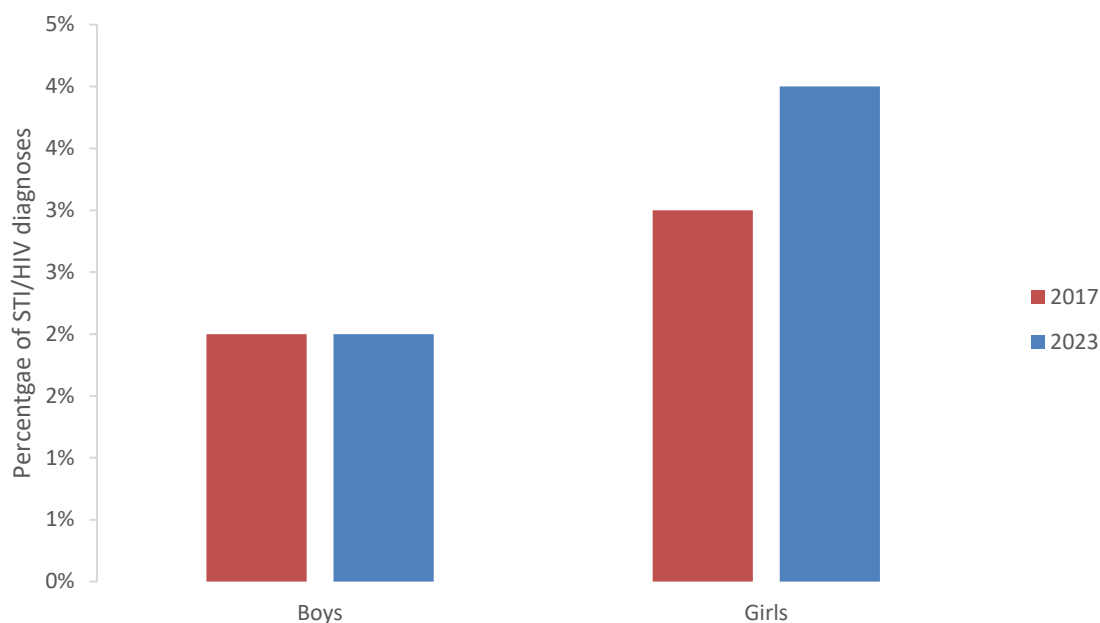


Figure 2A. Self-reported STI/HIV testing in the past 12 months among youth 13–25 years in the Netherlands (Sex Under 25, 2017 and 2023)

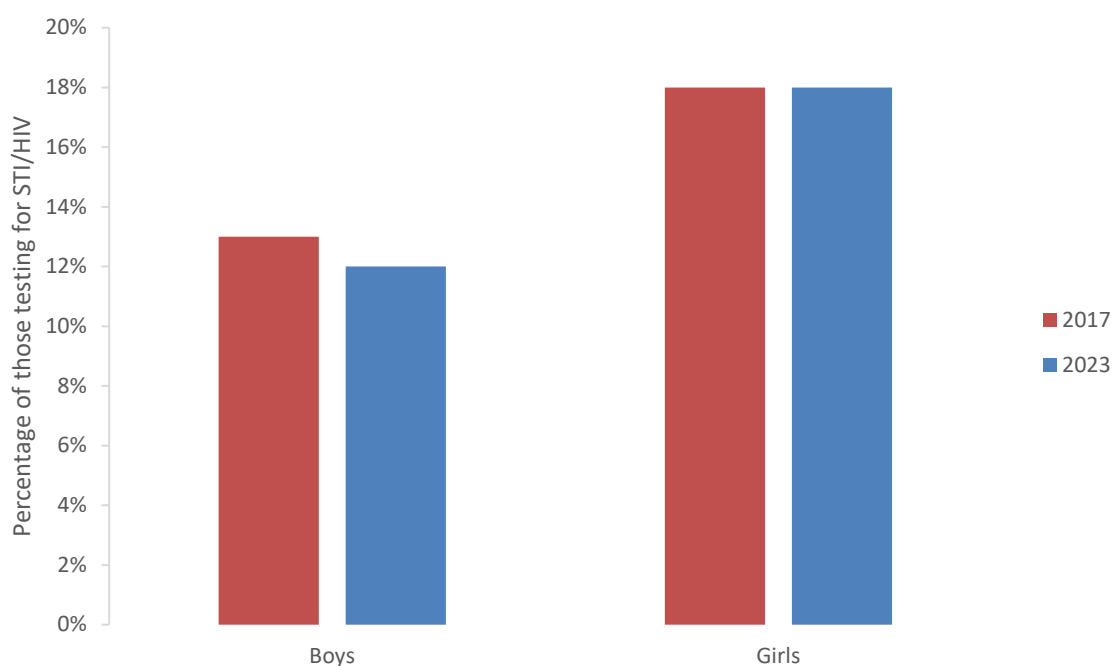
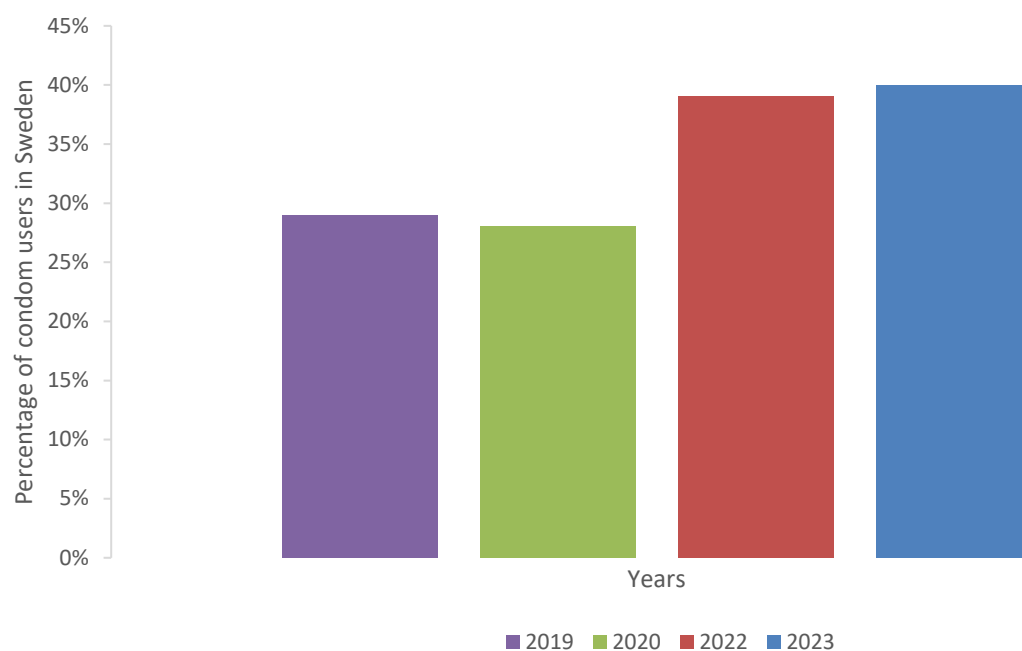


Figure 3A. Overall self-reported condom use in Sweden (including 'always', 'often', and 'sometimes') ages 16–65 years from 2019 to 2023 (Kondomkollen)



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