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MSM AND TRANS PEOPLE IN ESTONIA

**POPULATION SIZE,
INTERNAL HOMOPHOBIA,
INVOLVEMENT IN HIV PROGRAMS
AND SATISFACTION WITH THEM**

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Glossary

AIDS — acquired immunodeficiency syndrome

ART — antiretroviral therapy

Body positivity — acceptance of oneself and other people's bodies as they exist

Chemsex — the use of psychoactive substances before or during sexual intercourse

CI — confidence interval

CS — convenience sample

EHPV — Eesti HIV-positiivsete võrgustik — Estonian Network of People Living with HIV

GAM — The Global AIDS Monitoring (2024) — the system of standard indicators that enables to assess the progress of different countries in their fight against the HIV epidemic

HIV — human immunodeficiency virus

LGBTI — lesbian, gay, bisexual, trans and intersex people

MSM — men who have sex with men

N — sample size from which the percentage is calculated

NGO — non-governmental and non-profit organization

OR — odds ratio

p-value — the probability of obtaining test results at least as extreme as the result actually observed, under the assumption that the null hypothesis; *p*-values < 0.05 are generally considered to indicate that the nature of observed data distribution is non-random

Peer consultant — a person, who has the same personal experience as the people he/she advises and has undergone a special training

PLHIV — people living with HIV

PrEP — pre-exposure prophylaxis

PSE — population size estimation

RDS — respondent driven sample

Main results

A cross-sectional pilot study with a convenience sample based on quantitative methodology. The resulting sample (314 people) exceeded the coverage of previous studies of MSM due to the active involvement of the community.

In the sample, Estonian-, Russian-, and English-speaking MSM and trans-people were respectively represented by 39, 47, and 14%. The average age was 36 [35–37] years. 98% were cis men. 65% stated that to them only men are sexually attractive. About half (48%) have had sexual experience only with men.

Chemsex is popular among respondents (55% have used certain substances before or during sex during the last 6 months). Erection stimulation drugs are more popular among Estonian-speaking respondents. Half (47%) have experience in using several different substances during chemsex, and the most common are combinations of either poppers and erectile stimulants or poppers and cannabis.

40% are dissatisfied with their sexual life. The main reasons named were lack of a permanent relationship, small number of partners and/or the need for greater frequency of meetings, difficulties in relationships with the permanent partner as well as various psychological and social problems (including the distance between partners, rejection, stigma, and noncompliance with “beauty standards”).

The indicator of external stigma (2.6 [2.3–2.9] points out of 11) is not high, meanwhile it is significantly higher among Russian-speaking (2.9 [2.4–3.4]) MSM and trans people than among Estonian-speaking (2.0 [1.6–2.4]). Due to their sexual orientation, gender identity or sexual behaviour, participants of the study most often experienced insults, gossip and comments in their family and health care settings.

The level of internalised homophobia is close to the minimum value (2.9 [2.8–3.0] on a scale from 1 to 7), however, in Estonia, it is higher among Russian-speaking MSM (3.2 [3.0–3.4]), than among Estonian-speaking MSM (2.8 [2.6–3.0]). Moreover, predominantly heterosexual orientation and dissatisfaction with one's sexual life were associated with high levels of internal homophobia.

Half (54%) correctly answered all 7 questions regarding basic facts about HIV.

88% have been tested for HIV at least once in their lives and 67% in the last year. The odds to have been tested for HIV in the last year among respondents aged 25+ is four times higher compared to younger respondents. The odds are eight times higher among the respondents, who know all basic facts about HIV compared to the ones, who do not. The prevalent heterosexual experience is associated with the odds of being tested four times higher compared to those with prevalent homosexual experience. Respondents, who took psychoactive substances before or during sex, were five times less likely to be tested for HIV in the last year compared to those, who did not engage in chemsex.

Most respondents are tested for HIV in medical settings (78%) and prefer to continue doing it there (70% of all tested). Satisfaction with communication with a health care worker during the last test was high (4.4 [4.3–4.5] on a 5-point scale).

76% of respondents without HIV-positive status have ever heard of PrEP. Of these, 66% have never used PrEP mainly due to their certitude that there is no risk to be infected with HIV, lack of knowledge where to get the medication and other reasons, the most probable of which may be the lack of medication in pharmacies during the period of the field (only 26% among these without HIV-positive status used PrEP). Respondents are also discouraged by the cost of PrEP because it is substantially higher than generics available abroad.

Only one third (29%) of those, who do not use pre-exposure prophylaxis, are ready to use it under the current conditions in Estonia. Respondents aged 25 years and older were four times more likely to participate in PrEP compared to younger respondents. The odds of receiving PrEP among Russian-speaking respondents, was half the rate of Estonian- or English-speaking ones. Similarly, one-point increase in internal homophobia halved the odds of participating in PrEP.

PrEP was prescribed to 90% of users and their satisfaction with communication with a doctor averaged 4.4 [4.1–4.8] on a five-point scale.

Out of the two most well-known mobile dating apps for MSM and trans people in Estonia, Grindr is more popular (62%).

One third used the IHA.ee (35%) and Romeo.com (39%) during the last year. Both sites are more popular among Estonian-speaking than among Russian-speaking participants. Bluesystem.world (12%) is popular among the Russian-speaking and unknown to the Estonian-speaking respondents.

The popularity of the LGBTI-oriented business is comparable to online dating (“X-Baar” 37%, “Hello Bar” and “Bar Sveta” 31% each). The most frequently mentioned LGBTI events were Tallinn Pride (22%), LGBTI film screenings at Q-Space (13%) and visiting the Festheart Film Festival (11%).

In Table 1 presented the calculated GAM indicators, based on the study results.

Table 1 GAM Indicators

1.2B	MSM PSE ^{α)}	9,898 [9,628–10,166] ^{β)}
1.3B	HIV prevalence among MSM ^{α)}	8%
1.4B	HIV testing coverage and status awareness among MSM ^{α)}	67%
1.11	HIV-negative MSM ^{α)} who have ever received PrEP	34%
2.1	MSM ^{α)} living with HIV who know their HIV status	87%
2.2	MSM ^{α)} living with HIV on antiretroviral therapy	100%
2.3	MSM ^{α)} living with HIV who have suppressed viral loads	82%
6.5B	Stigma and discrimination experienced by MSM within their lives ^{α)}	53%

Notes: ^{α)} incl. trans-people; ^{β)} 2.0 [1.9–2.1]% among men aged 18+

Recommendations to stakeholders

Research teams and institutions

Nothing about us is without us. LGBTI community (including trans and intersex people) should be fully involved at all stages of planning and implementation of research and programs aimed at LGBTI people.

Each study involving LGBTI people should include separate sets of questions related to experiences of trans and intersex people.

Separate research should be conducted to analyse experiences of bisexual men and their partners.

A qualitative study of reasons for lower popularity of erection stimulants among Russian-speaking MSM and trans people in Estonia should be carried out.

LGBTI organizations

Proactive involvement in funding, planning, and implementation of LGBTI- and MSM-focused research and programs should be secured.

Services should be designed considering the large number of bisexual people (including those, who do not consider themselves to be a part of the LGBTI community but have experience of same-sex sexual contacts).

During implementation of sexual health programs, attention should be paid to chem-sex practices and minimization of their harmful consequences.

When conducting events aimed at LGBTI people, promotion of body-positive messages, counteracting stigmatization of certain subgroups in the LGBTI community, whilst during individual consultations, activities concerning stereotypical perception of gender and sexuality should be envisaged.

When documenting cases of stigma, discrimination, and hate crimes, analysis of cases based on the language or nationality of the victims, should be performed.

Awareness campaigns aimed at combating stigmatization, discrimination and hate crimes, considering their unequal intensity and specificity in Estonian- and Russian-speaking groups, should be run.

HIV service organizations and government institutions

Awareness-raising programs to inform MSM and trans people about modes of transmission, methods of prophylaxis (both pre- and post-exposure) and treatment of

HIV, as well as counteracting individual and group stigmatization of people living with HIV should be expanded.

The range of opportunities for voluntary HIV testing and counselling for MSM and trans people, including self-testing, dispensing tests by mail and remote consultations should be expanded. The specificities of bisexual people, who do not identify with the LGBTI community, but have experience of same-sex sexual contacts should be considered.

The index testing framework should be scaled up. The service of letters, which include message templates and offers to come for anonymous and free of charge testing in cases of new seroconversion should be suggested to contact persons.

Peer consultants, who can work with people at private sex parties, including where chemsex is practiced, should be trained.

Greater availability of pre-exposure prophylaxis medications drugs, including reduction of their cost and over-the-counter sales, with opportunity to receive online consultation on their use should be lobbied for. Even though Estonia has the national guidance on PrEP, it can be prescribed half price only by infectious diseases doctors in a few cities, but it could be expanded to other specialists, e.g. general practitioners, STI doctors, etc.

Implement programs with proven effectiveness and impact not only at the individual level, but throughout the whole gay and trans communities, e.g. PROMISE for HIP (<https://www.cdc.gov/hiv/effective-interventions/treat/promise-for-hip/index.html>) or d-up: Defend Yourself! (<https://www.cdc.gov/hiv/effective-interventions/prevent/d-up/index.html>).

When designing PrEP programs, specifics associated with the language or nationality of participants as well as presence of medium and high levels of internal homophobia should be considered.

Negotiations with the most popular online and offline dating services about publishing advertisements of services for MSM and trans people should be conducted.

Volunteers and community members

Own experience in HIV prevention and control should be shared with others as much as possible, including personal stories, habits, addictions, patterns, side effects, impressions of contacts with a doctor and other health-care personnel, etc. The personal example of familiar people helps to better remove psychological barriers compared to brochures and cold scientific arguments.

Active involvement in debate with critics, deniers, and peddlers of misinformation about HIV and PrEP should take place. During periods of supply disruptions, the approach to filling issued prescriptions should be reasonable, unwise purchase of drugs for future use should be avoided. When purchasing PrEP in pharmacies, the quantity of the drug remaining on sale should be checked. When purchasing several packages, be sure to leave at least one on sale for the emergency needs of other community members.

Tabooing and stigmatizing the topics of sexual health and HIV should be avoided.

1 Background

Estonia is a country in Northern Europe with more developed economy compared to other post-Soviet countries.^[1] Estonia is characterized by a low level of corruption and high public confidence in the legislative, executive, and judicial powers.^[2] The population of the country is 1.3 million and the estimated population size of MSM in 2021 was 9,909 [6,279–14,243].^[3] It is also the only country in Eastern Europe and Central Asia where same-sex couples have the right to enter a civil partnership^[4] and gender-neutral marriage.^[5] The country has its own anti-discriminatory legislation^[6] and during 2022–2023, there was an active public discussion about the introduction of criminal liability for hate speech. In 2021, Estonia ranked 23rd out of 49 countries included in the Rainbow Index of the ILGA-Europe and was highest in the ranking among other countries of the region.

Data on the attitude of Estonian society towards LGBTI people can be obtained from several independent sources, e.g. CRONOS studies,^[7,8] ESS^[9–17] including regular surveys ordered by the Center for Human Rights.^[18] In addition, several other data were obtained by the Liberal Citizen Foundation (<https://salk.ee>). The analysis of these data allows to assert that the attitude of Estonian society towards LGBTI people is improving, while the processes happen at different pace in the Estonian- and Russian-speaking communities (the Russian-speaking community demonstrates significantly more conservative position).^[19] At the same time, the Estonian-speaking majority is not homogeneous. On one hand, there is a more socially active part of it, and on the other — those who consider nationality to be a citizenship, not an ethnic/kin category.

As a high-level income country, Estonia has not received the Global Fund funding since 2004. NGO activities, as a rule, are supported from local sources (state and

local authorities, trust funds, private donations, volunteer work, etc.), although LGBTI community projects can be supported from abroad.

Estonia has a developed LGBTI infrastructure, which includes regular cultural events (Rakvere Film Festival, Baltic Pride, etc.), NGOs, initiative groups, LGBTI-oriented businesses, which include nightclubs and informal meeting places (i.e. private sex parties, nudist gay beaches in Tallinn, Tartu and Pärnu). According to the pan-European study (<https://fra.europa.eu/en/data-and-maps/2020/lgbti-survey-data-explorer>), Estonia ranked seventh among 28 European Union countries on the participation of LGBTI people in activities of LGBTI organizations.

The literature on Estonian LGBTI people is very scarce and mainly relates to the context of MSM and HIV.^[20,21] As demonstrated in Table 2, except for the 2010 EMIS survey, studies of MSM in Estonia were based on small samples (less than 250 people) and covered mainly Tallinn. Trans people did not participate in studies until 2017.

The situation in Estonia regarding the empirical population size estimates (PSE) is not optimistic (Figure 1). The first one was published in 2013,^[22] although the data on which it was based had been collected in 2009. For more than ten years, the estimates were not updated. Only 2023 saw a new estimate based on the data of 2021.^[3] The data of the two studies (2000^[23] and 2020^[24]) were neither known in HIV services, nor used in planning of the public health policy.

Table 2 Data about studies of Estonian MSM in the context of HIV

Year	Name and methodology	Sample size
2004	HIV/AIDS-iga seotud teadmised ja käitumine gay-internetilehekülgi külastavate meeste seas (CS)	312 [25]
2005	HIV/AIDS-iga seotud teadmised ja käitumine gay-internetilehekülgi külastavate MSM-ide seas (CS)	232 [26]
2007	HIV-iga seotud teadmised ja käitumine gay-internetilehekülgi külastavate MSM-ide seas (CS)	361 [27]
2007	HIV-nakkuse levimus ja riskikäitumine meestega seksivate meeste seas Tallinnas ja Harjumaal: Piloottuurimus uuritava poolt juhitud kaasamise meetodil (RDS)	59 [28]
2010	European internet survey of MSM (CS)	500 [29]
2013	Meeste tervise heaks (CS)	228 [30]
2016	Meeste terviSEKS (CS)	223 [31]
2017	ECOM Study of internalized homonegativity (CS)	62 [32]
2017	European internet survey of MSM (CS)	212 [33]
2022	HIVi levimus ja riskikäitumine meestega seksivate meeste hulgas Tallinnas ja Harjumaal (RDS)	163 [34]

The PSE of transgender people in Estonia is unknown,^[35] although the survey data from 2020 (0.96% of population aged 18+) ^[24] are available. Estonian authorities (Department of Statistics / Statistikaamet¹, Health Department / Terviseamet²) reported that they did not have any information regarding the number of trans people. The number of changes in identity documents due to the changed gender marker was reported by the Ministry of the Interior / Siseministerium (Table 3), most gender change data is registered at the Tallinn Family Status Office / Tallinna Perekonnaseisuametis³.

Table 3 The number of changes in identity documents due to the changed gender marker by year according to the Estonian Ministry of the Interior

Year	Number of changed documents
2019	22
2020	15
2021	9
2022	23
2023	25

¹ Official reply dated 12.03.2024 to inquiry of EHPV

² Official reply dated 14.03.2024 to inquiry of EHPV

³ Official reply dated 09.04.2024 to inquiry of EHPV

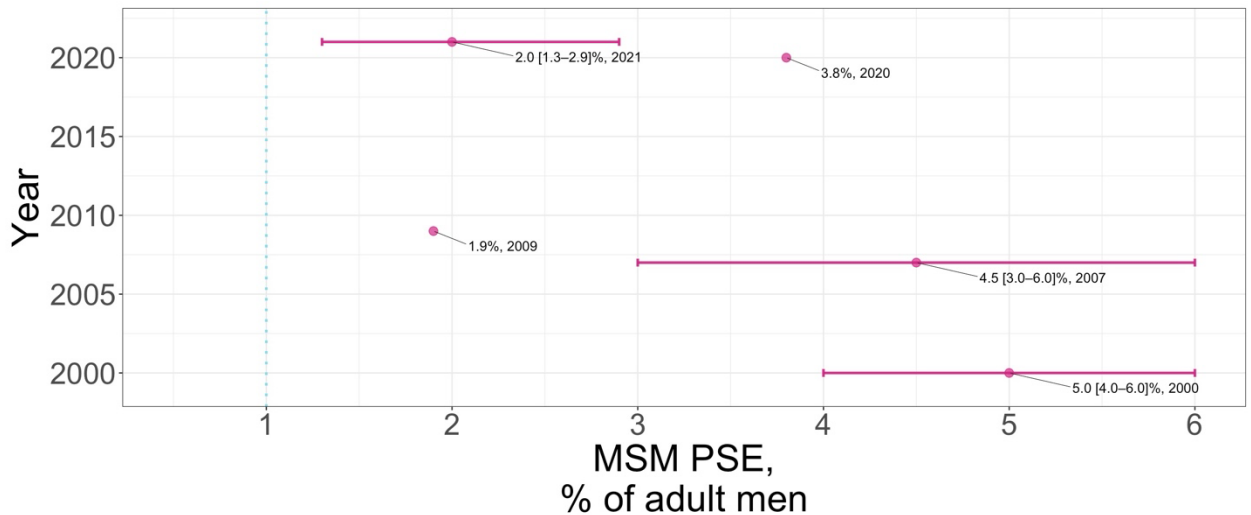


Figure 1 MSM PSEs in Estonia

Note: the figure is based on data [3,22,24,28]; the dotted vertical line indicates the minimum of 1% of adult men recommended by WHO [36]

The following brief overview of the existing HIV services for MSM in Estonia is based on the UNAIDS country report.[37]

HIV testing is voluntary and can be carried out only with the informed consent of an individual. Any physician can recommend HIV testing based on indication, risk assessment or patient request. Blood testing for HIV is carried out only in health care settings. If there is an indication for testing, a general practitioner or infectious disease specialist will test patients with health insurance free of charge. People without insurance may have other options, for instance, testing provided free of charge at anonymous testing sites.

Patients with the positive result are referred to an infectious disease specialist for observation, treatment, and counseling. No formal referral is required. HIV-related health services, including antiretroviral therapy (ART), are free for all patients. Pa-

tients receiving ART usually need to visit the clinic once a month to get drugs dispensed. Several non-governmental organizations provide consultations for people living with HIV and their loved ones on social, psychological, and legal issues, treatment adherence, HIV prevention, etc.

Condoms are sold everywhere. In many places and organizations, i.e. youth counseling centers, anonymous HIV testing sites, syringe exchange programs, infectious diseases clinics, drop-in centers, etc., they are distributed free of charge.

The efficacy of the pre-exposure prophylaxis (PrEP) is well known ^[38] and lots of EU countries provided reimbursed PrEP.^[39] In Estonia, PrEP has been officially available since the beginning of 2020. It is prescribed by an infectious disease specialist,^[40] to whom a referral from a family doctor is *de facto* required. Some family physicians have been trained to manage PrEP users and are authorized to prescribe PrEP, but the number is small. PrEP is available from pharmacies and reimbursed by 50–75% if a person has national health insurance.

According to data from Tervisekassa / Estonian Health Insurance Fund, in 2023, infectious disease specialists issued 1,246 prescriptions for PrEP, of which 1,028 were filled⁴. Ravimiamet / Department of Medicines based on the data reported by Tervisekassa⁵ informed that in 2023, PrEP in Estonia was received by 236 people.

There are three clinics for MSM that provide free counseling and testing for sexually transmitted infections. In most cases, treatment is also conditionally free of charge

⁴ Official reply dated 16.02.2024 to inquiry of EHPV

⁵ Official reply dated 23.02.2024 to inquiry of EHPV

(MSM-patient doesn't pay neither for a visit nor for testing; necessary medicine except HIV-therapy must be acquired by patients from any drugstore, price will depend on patient's insurance status and treatment coverage line. In some cases, i.e. obviously high risk of non-treatment — social situation, low level of self-confidence etc. — necessary medicine is offered by the clinic onsite).

The *purpose of the study* is to assess the availability and acceptability of existing services (such as HIV testing and pre-exposure prophylaxis), as well as to identify unmet needs of MSM and trans people related to sexual health, stigma and discrimination, update estimates of the population of MSM and create the HIV treatment cascade.

2 Methodology

The cross-sectional pilot study was based on the quantitative methodology. Initially, it was planned to use the online questionnaire and involve at least 150 people from Tallinn, Tartu, and Narva. However, during the field phase (from 19.12.2023 to 2.1.2024), it became clear that respondents from all over Estonia also took part in the survey. Most of the sample (71%) were people who filled out the questionnaire without coming to the EHPV offices.

The online questionnaire was available in three main everyday languages — Estonian, English, and Russian.

The criteria for inclusion in the sample were age (18 years and older), self-identification as a man who had had experience of sexual relations with men or identification as a homo-, bisexual or trans person. The informed consent to participate in the survey was also required. If a person completing the online questionnaire did not meet the inclusion criteria, their responses were excluded from analysis (5 women and 4 completely heterosexual men, who had sexual interest only in women and sexual experience only with women).

The questionnaire covered the following topics: socio-demographic characteristics, awareness of HIV and pre-exposure prophylaxis (EMIS 2017 ^[33]), experience in HIV testing (including GAM indicators ^[41] 1.3B, 1.4B), use of pre-exposure prophylaxis (for HIV-negative people, including GAM indicator 1.11), assessment of experience in HIV testing and use of pre-exposure prophylaxis, willingness for HIV testing and use of pre-exposure prophylaxis, HIV treatment cascade (GAM indicators 2.1–2.3), cases of experiencing stigma and discrimination related to sexual orientation (GAM 6.5B), including those in health care settings, internalized ho-

monegativity scale,^[42] alcohol consumption (EMIS 2017 ^[33]), substances used during chemsex (survey of Hornet users “COVID-19 and disparities among Gay, Bi, and Trans people”), use of services in LGBTI- and MSM-oriented organizations (including population size estimates, GAM indicator 1.2B).

The questionnaire was pretested in Estonian, Russian and English languages on 29.08.2023 with three EHPV clients in Tallinn.

The questionnaire was created with GoogleForms, filling the questionnaire in took 10 to 15 min in average. It was not possible to pause answering the questions. The informed consenting process did not differ between those who were recruited on-line and on-site.

Participants were invited both by social workers of the EHPV and through advertisements published on online social networks, in particular, Romeo, IHA, Grindr, Telegram channel “Eesti kutid”, Facebook group “Kõik mehed on head” etc., as well as with the help of Estonian LGBTI NGOs. People in EHPV sites were not specifically recruited, EHPV personnel proposed clients to fill the questionnaire during EHPV activities (in local computer or client’s mobile gadget).

There are no incentives for participation in the study.

Data processing. After completing the field phase, the database was checked for compliance with the inclusion criteria. The questionnaires, which did not meet the criteria were excluded. The analytical database was supplemented with calculated variables (HIV knowledge scale; PrEP readiness scale; external stigma scale; internal homophobia scale).

Considering both Estonia as a whole and its LGBTI community are clearly divided by the language, presented results provide not only one-dimensional distributions,

but also their breakdown into Estonian- and Russian-speaking subsamples (the English-speaking part is represented mainly by students at the University of Tartu and is not enough for analysis, $N = 43$).

The significance of differences in nominal variables was tested using the chi-squared test and differences were considered significant at $p < 0.05$. The significance of differences in scale variables was established through comparison of CIs.

Associations between key variables (internal homophobia, HIV testing coverage, willingness to take PrEP) and other characteristics of respondents were established using multivariate regression analysis (linear and binary logistic regressions). The initial model included external stigma scales, language, age, sexual orientation and sexual experience, consumption of alcohol, chemsex, knowledge of basic facts about HIV, etc.; significant variables were selected with the backward algorithm.

Population size estimation. There is a wide range of PSE methods.^[43] More reliable data can be obtained by combining several estimates into a consensus value.^[44] Taking into account the existing possibilities in Estonia, we have selected different options of the multiplier method, which is used in case there is quantitative information from at least two independent sources, it is known that the measured groups overlap, and the size of this overlap can be assessed. The first source, for example, a list of organizations, which are in contact with members of the assessed group (statistical reporting, program information and other databases), the second source being information received directly from representatives of the assessed group about their contact with this organization.

The research team sent letters to Estonian LGBTI organizations asking about the number of cis men and trans people, who had taken part in the organization's events in 2023. Answers were received from MTÜ SevenBow, MTÜ Vikerlased, VEK

LGBT, MTÜ Peemoti Raamatud, MTÜ Karuelu, GeiKristlaste Kogu, LGBT Ühing, although some of the letters did not contain necessary data.

Information on the number of viewers of LGBTI movies (MTÜ Q-Space) was obtained from the website <https://www.q-space.ee> and adjusted for the share of men.

Dating sites for MSM and trans people in Estonia were also monitored. The information from personnel of such sites (bars, nightclubs) was collected.

The formulae (1–3) were used to obtain point estimates:

$$P = I \cdot \frac{N}{n} \quad (1)$$

where P is estimated size of the group, I — number of members in the assessed group according to the independent source, N — survey sample, n — number of respondents, who mentioned their affiliation to the independent source

$$Var(P) = \frac{N \cdot I \cdot (N-n) \cdot (I-n)}{n^3} \quad (2)$$

$$95\% \text{ CI: } P \pm 1.96 \cdot \sqrt{Var(P)} \quad (3)$$

The PSE data was summarized using the Bayesian approach in the Triangulator library (<https://fellstat.github.io/triangulator/>). All calculations were performed in the statistical programming environment R.^[45]

Ethics. Project implementers and individuals were trained to guarantee the confidentiality of information received. Before answering the survey questions, partici-

pants were provided information about the study (including the principle of completely voluntary participation and possibility to stop completing the survey at any time without any sanctions) and were asked to confirm their consent to participation. No information was collected that could identify a respondent.

The study protocol was approved by the Ethics Committee of the Ukrainian Institute of Public Health Policy⁶ by Decision No. 27–23/IRB dated 5.12.2023.

⁶ The principal and co-researchers are employees of Ukrainian institutions; the IRB of the Ukrainian Institute of Public Health Policy is officially registered as the Board for consideration of international researches in the Office of Human Research Protection of the U.S. Department of Health and Human Services: IRB #00007612, FWA #00029648

3 Results and discussion

3.1 Socio-demographics and sexuality of respondents

The total of 323 questionnaires (314 valid ones) were collected between 19.12.2023 and 1.2.2024, two thirds of which (71%) were completed by respondents outside the EHPV offices in Tallinn, Tartu, and Narva. It should be noted that the resulting sample was larger than in most of the previous studies of MSM (Table 2) and covered the entire territory of Estonia due to the active involvement of the community in the process of recruiting respondents.

Estonian- and Russian-speaking people in the sample were respectively represented by 39 and 47% (Table 4), the average age of respondents was 36 years and did not differ languages-wise, the vast majority (98%) were cis gender men.

This composition differs from the results of previous studies (both offline ^[34] and online ^[33]), in which the ratio of Estonian and Russian speakers generally reflects the ratio of speakers of these languages in the general population of the country. The average age of the respondents coincides with the data.^[34]

Unlike recent studies, in which men, who considered only men as sexually attractive, accounted for about 80%, in this sample this proportion is lower (65%). Meanwhile there are correspondingly more bisexuals (sexual orientation and sexual behavior do not coincide — there are more behaviorally bisexual men than respondents, who indicated the sexual attractiveness of both women and men). The high prevalence of bisexuality was also recorded in early Internet studies of Estonian MSM.^[25–27]

Table 4 Demographics of respondents

Variable	% or mean, N = 314
Where a questionnaire filled	
Tallinn office of EHPV	10
Tartu office of EHPV	8
Narva office of EHPV	11
Out of the offices	71
Selected language	
Estonian	39
Russian	47
English	14
Age, years , mean and 95% CI	36 [35–37]
Gender	
Male	98
Transgender person: MtF	1
Transgender person: FtM	1

Two-thirds (65%, Figure 2) are sexually attracted only to men, while one third of respondents demonstrate some form of bisexuality. About half (48%) have had sexual experience only with men. Differences between sexual orientation and experience are statistically significant. Sexual orientation and experience do not differ among respondents with different languages ($p = 0.66$ and 0.19 respectively).

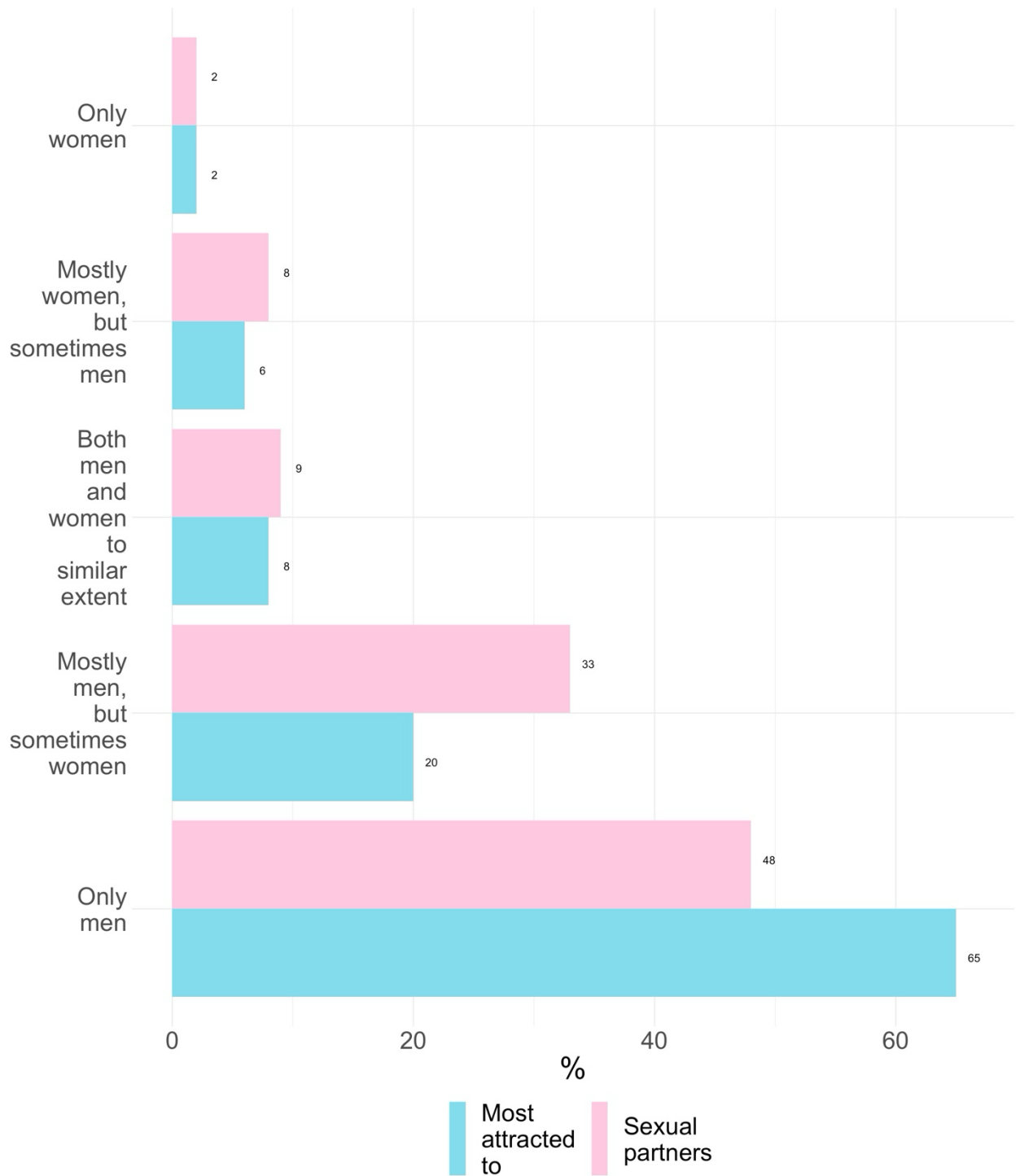


Figure 2 Attractiveness of different genders and sexual experience of MSM and trans people

Note: significance of differences $p < 0.001$, N = 314

Features of sexual behavior, in addition to the already noted widely spread relationships with people of both sexes, include the significant popularity of chemsex (55% have used certain drugs before or during sex in the last 6 months, Table 5). Before or during the sexual intercourse, respondents most frequently used poppers, erection stimulants (such as Viagra ®) and natural or synthetic cannabinoids. Differences by language were recorded only in the use of erection stimulants — they are less popular in the Russian-speaking population.

Approximately half of the respondents have experience in using several substances during chemsex. The most popular is the combination of poppers and erection stimulants or poppers and cannabis.

Just under two thirds (60%) had consumed alcohol during the past week. Previous studies have also documented relatively high levels of alcohol consumption, e.g. 48% of MSM surveyed in 2004 drinking alcohol once a week or more often.^[25]

Previous studies documented the widespread prevalence of poppers and other substances among Estonian MSM during chemsex (32% — poppers, 18% — erection stimulants during the last contact with a casual partner within one year^[33], 50% — poppers throughout the year among MSM in Harju County^[34]).

Although the most common indication for erection stimulants is impotence and psychological causes of erectile dysfunction, the use of such drugs during chemsex (evidenced by their frequent combination with poppers) aims at maintaining the erection during long-lasting sex marathons (for example, at private parties). The higher frequency of use among Estonian-speaking respondents can be explained by greater popularity of such private sex parties among them. Income gap between the two

language groups⁷ noted country-wide is unlikely to play a significant role, since more expensive simultaneous use of substances is the same among Estonian and Russian speakers.

Table 5 Substances used by MSM and trans people

Variable	%		
	All N = 314	Est. N = 122	Rus. N = 149

Which of the following substances have you used before or during sex within the last 6 months?

I have not used any of the substances listed below	45	43	48
Poppers	37	40	33
Viagra®, Cialis®, or other ED medications*	22	29	15
Extasy (E, XTC, MDMA)	11	13	8
Cannabis (hashish, marihuana, weed)	20	21	19
Methamphetamine (ice, crystal, Tina)	4	2	5
GHB / GBL (liquid E, Gina)	5	8	3
Heroin (fentanyl, nitazenes, Oxy)	1	1	1
Mephedrone (4-MMC, meow-meow)	3	2	1

Continued on the next page

⁷ According to the data of the Department of Statistics for 2022, 18% of Estonians earned income in the lowest quintile and 23% in the highest, while among non-Estonians the same figures were respectively 25% and 12%

(https://andmed.stat.ee/et/stat/sotsiaalelu__sissetulek/ST04)

Variable	%		
	All N = 314	Est. N = 122	Rus. N = 149
Cocaine / crack	7	8	5
Amphetamine (speeds)	8	7	8
Use of several substances during chemsex, N = 169			
1 substance	53	44	59
2 substances	21	26	18
3+ substances	26	29	23
<i>The signif. of difference btw Estonian- and Russian-speakers</i>		<i>p = 0.465</i>	
When was the last time you drank alcohol?			
Never	6	2	9
During the last 24 hours	27	35	22
During the last 7 days	33	29	34
During the last 4 weeks	19	21	16
More than a month ago	15	13	19
<i>The signif. of difference btw Estonian- and Russian-speakers</i>		<i>p = 0.065</i>	

Note: * difference between Estonian- and Russian-speaking subsamples is statistically significant, $p < 0.05$

Over one third of the respondents (40%) indicated that they were dissatisfied with their sexual life (no differences between the respondents from different language groups). The main provided reasons were (Table 6):

- I. desire for a permanent relationship
- II. small number of partners and/or the need for greater intensity of meetings (in some cases, absence of couple sex): *“I have a permanent partner. There could be more sex with him, but there could also be more with others”, “I would like a more open relationship, we don’t have sex very often anymore”, “just jerking off under Amphetamine”*
- III. difficulties in relationship with a partner: *“I lack sufficiently frequent sexual intimacy with a regular partner”, “for 6 weeks, my wife, my partners and my love conspired and continuously kept me sexually unsatisfied”*
- IV. various psychological and social problems:
 - a) physical distance between the respondent and his partners: *“I have a boyfriend, but I can’t be with him. I live in Valga and he lives in Tallinn”*
 - b) rejection and stigma: *“Estonians don’t like foreigners”, “who needs an HIV-positive alcoholic?”, “I haven’t had any sex since I fled Russia. Almost 2 years”*
 - c) noncompliance with “beauty standards” which are common among homosexual and bisexual men (e.g. young, thin/athletic): *“I don’t consider myself handsome, I’m always rejected, it seems like no one wants me”, “obviously, I’m already past the age of attractiveness”, “depression interferes with my sex life and although I’m an attractive man, after 40 it’s harder to cause interest of sexual partners”*
 - d) mental health problems and side effects of medications: *“I can’t find a suitable partner, and if I choose for fun, I feel remorse”, “the antidepressant drug I take kills libido”, “I would like to be normal (straight), and not a freak with low self-esteem”*
 - e) absence of conditions for a date: *“I don’t have much time for dating, I’m married and work”, “I don’t have own space to be together with someone”*

f) discrepancy between reality and expectations: *“most of attractive men are emotionally cowards and/or immature”, “people don’t share photos online; when they write to you, they finally send a photo of 20 pixels in size and with sunglasses, although from countries, where sometimes there is even a death penalty for gay sex, you get at least three clear, normal photos at once. Our society is advanced and safe, but photos are shared only at gunpoint”, “my problem is that I really would like to have an ‘unforgettable sex’, but my roommate does not want intercourse several times a day and today I treat him more like a good friend (i.e. when I think about him, I don’t shake all over)”, “anal doesn’t give as much pleasure as it seems, or is it my fault”.*

Table 6 Reasons for dissatisfaction with sexual life

	Responses
Too few sexual partners	16
I would like permanent relationship	12
I do not have sex at all	8
Issues with permanent relationship	5
Geographical distance	5
Stigma and exclusion from local communities	5
Depression / mental health issues	5
Noncompliance with “beauty standards”	4
Inflated expectations	4
I fear HIV and STIs	3
No time / place	2
I’d like to have more intensive sex with current partner	2
Other reasons	4

3.2 Experiences of stigma and discrimination

Most frequently, respondents experienced stigmatization due to their sexual orientation, gender identity, or sexual behavior (Table 7) i.e. insults, gossip and comments in their families and in healthcare settings. Prejudices were less often expressed in the form of physical violence. It should be noted that Russian-speaking MSM suffer from stigma more than Estonian-speaking MSM.

Indicator of external stigma (2.6 points out of 11, Figure 3) is not high, although it is significantly higher among Russian-speaking MSM and trans people, who took part in the study, compared to Estonian-speaking ones. These differences can be related to the attitude towards homosexuality existing in different counties. ^[30]

Table 7 Negative life experience related to homo-/bisexual orientation or homosexual behavior

Statement	%		
	All N = 314	Est. N = 122	Rus. N = 149
You were not invited to meetings, where your family traditionally gathers*	11	6	15
Family members have made comments to you or gossiped about you	33	31	31

Continued on the next page

Statement	%		
	All N = 314	Est. N = 122	Rus. N = 149
Your friends have avoided you	23	23	23
You have been afraid to go to medical institutions*	28	19	34
You felt that you were treated poorly*	18	10	21
You have heard health care workers talking about you*	15	9	19
The police have refused to protect you	6	7	8
You have been afraid in public places	28	21	32
You have been insulted	47	44	48
You have been blackmailed	17	12	20
You have been physically harmed (e.g. pushed, hit, choked)*	21	11	27
You have been forced to have sex against your will	10	10	11
Stigma experienced by MSM and trans people (GAM 6.5B)	53	48	56

Notes: The table shows the percentage of affirmative answers to the question “Have you ever found yourself in such situations because you are attracted to men or have had sex with them?”;

*differences between Estonian- and Russian-speaking samples are statistically significant, $p < 0.05$

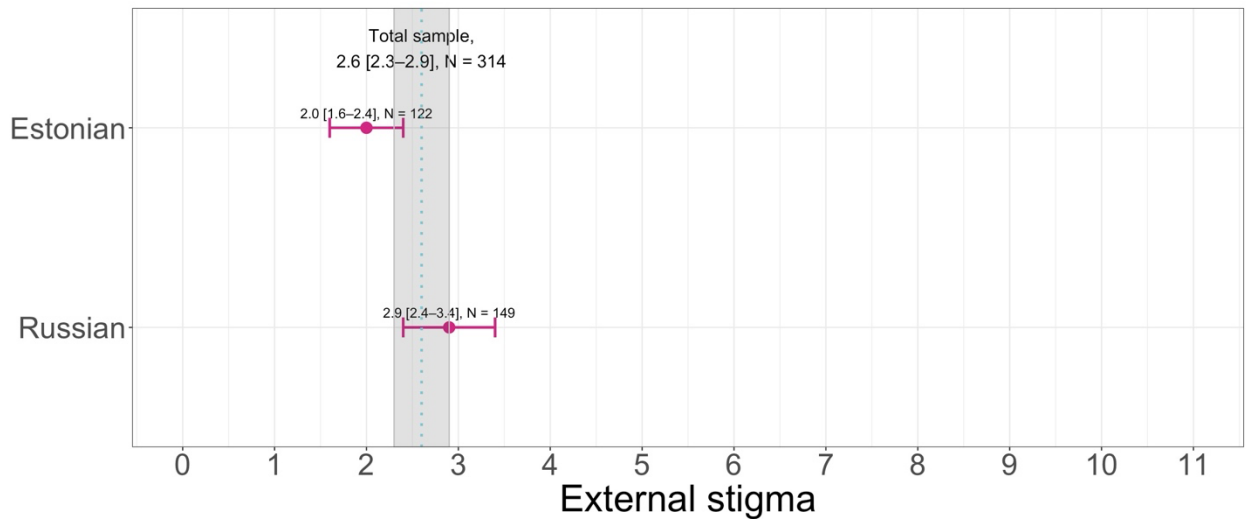


Figure 3 Indicator of external stigma related to sexual orientation in groups of MSM and trans people in Estonia with different languages of communication; scale from 0 (no stigma) to 11 (stigma is expressed to the most extent in hostile actions of others)

3.3 Internal homophobia

Short scale of internalized homonegativity ^[42] consisted of eight statements. Respondents rated their concordance with each of the statements with a score from 1 (completely disagree) to 7 (completely agree). The scale describes the rejection of one's homo- or bisexuality (the higher the score, the higher the internal homophobia). Cronbach's alpha is 0.79.

As can be seen from Figure 4, rejection of homosexuality among Russian-speaking MSM is significantly higher than among Estonian-speaking respondents. The level of internal homophobia (both in general and in individual language groups) is close to the minimum value.

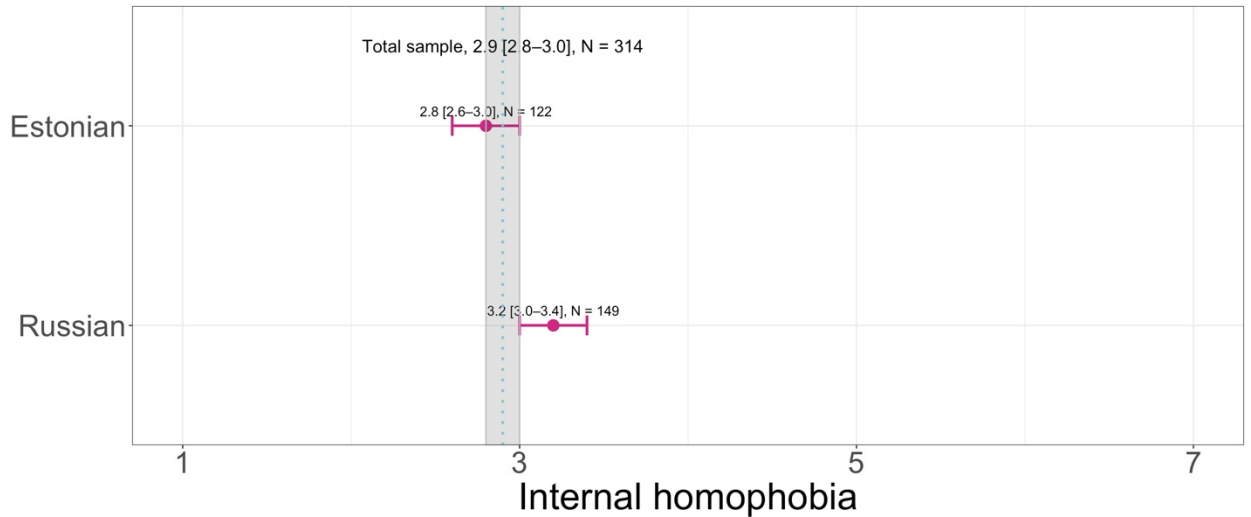


Figure 4 Levels of internal homophobia among Estonian MSM with different languages of communication; scale from 1 (no internal homophobia) to 7 (maximum internal homophobia)

Negative life experiences in connection with sexual orientation or homosexual behavior did not reveal significant links with the internal stigma of the respondents (CIs intersect, Table 8).

Table 8 Links between external and internal stigma

Level of internal homophobia	Index of external stigma, mean and 95% CI
low (1–3.5), N = 227	2.6 [2.2–2.9]
high (3.5–7), N = 87	2.5 [2.0–3.1]

Socio-demographic factors associated with internal homophobia are presented in Table 9. The significance of the intersection indicates that the level of rejection of one’s own homosexuality is impacted not only by the factors indicated in the table.

Language, sexual orientation, and satisfaction of respondents with sexual life associated with internal homophobia are:

- belonging to Russian-speaking and predominantly heterosexual men is associated with a higher level of rejection of one's own homosexuality;
- Satisfaction with the quality of sexual life is associated with lower levels of internal homophobia.

Table 9 Results of the regression analysis of links between demographics and the level of internal homophobia

Variable	Index	<i>p</i>
Intersection of the regression line with the axis of internal homophobia	3.2	< 0.001
Language of the respondent — Russian (ref = Estonian + English)	0.5	< 0.001
Sexually attractive for the respondent (ref = only men)		
Mostly men, but sometimes women, too	0.3	0.078
Both men and women to similar extent	0.4	0.079
Mostly women, but sometimes men, too	1.2	< 0.001
Only women	1.3	0.094
In general, are you satisfied with your sex life? — Yes (ref = no)	- 0.5	< 0.001

Note: Adj. $R^2 = 0.135$ at $p < 0.001$

The minority stress model ^[46] suggests that persistent stressors, i.e., repeated hostility and bullying due to minority individual's failure to conform to cultural expectations of the majority, are associated with incidental health problems, both mental and physical. People from persecuted minorities internalize negative attitudes of the majority towards their minority through the process of socialization and treat themselves with shame, contempt, and similar feelings.^[47] In case of homo- and bisexuality, internalized homophobia is shaped, i.e. internal reflection of the existing external stigma of homosexuality.^[48,49]

Although the results of our study do not confirm the association of experiences of bullying and violence with higher levels of internal homophobia (Table 8), the presence of such a link cannot be denied both because of the relatively small sample and because of the generally low values of the presumed independent (2.6 points out of 11, Figure 3) and dependent (2.9 points out of 7, Figure 4) variables.

Many studies of internalized homophobia are dedicated to its connections with alcohol and use of psychoactive substances.^[50,51] Our data, however, do not show such a link in either bivariate distributions or multivariate analyses, probably due to generally low values of internalized homophobia, which require larger samples.

Higher values of internal homophobia are associated with a respondent's Russian language and heterosexual orientation (Table 9).

Population surveys constantly record differences between the Estonian- and Russian-speaking parts of the Estonian society in their attitudes towards homosexuality and LGBTI people.^[7-18] Meanwhile, the attitude of the Russian-speaking population was and remains systematically worse than that of the Estonian-speaking population. Since, according to the minority stress model, internalized homophobia is shaped

under the impact of homophobic attitudes of the society,^[46] higher rates of internalized homophobia among Russian-speaking MSM in this and previous studies ^[30] look consistent.

Differences in levels of internalized homophobia between homosexual and heterosexual people were recorded previous studies of MSM in Estonia.^[30,32,33,52,53]

3.4 HIV knowledge, testing experience and satisfaction

The awareness of HIV in terms of separate facts was high (75% and above, Table 10). However, significantly fewer respondents — about half of the survey participants — are familiar with all the seven statements. At the same time, Figure 5 shows that the vast majority (80%) knows at least five facts out of the seven listed. There is no difference in the level of basic knowledge between the two language groups.

Two thirds (67%) of MSM and trans people were tested for HIV within one year prior to the survey, 88% — at least once in their lives (Table 11). In general, 8% know their HIV+ status, all of them receive ARV and 82% have reached, according to them, an undetectable viral load.

Factors related to HIV testing are provided in Table 12:

- the 25+ years old group has fourfold higher odds to be tested compared to younger people. Among those, who know all the basic facts about HIV, these chances are eight times higher than among those, who do not know;
- having predominantly heterosexual experience is associated with fourfold lower odds of being tested compared to those with predominantly homosexual experience. Using chemsex is related to fivefold lower odds of being tested compared to those, who do not use such substances.

Table 10 Knowledge of basic facts about HIV

Statement	%		
	All N = 314	Est. N = 122	Rus. N = 149
The HIV virus leads to AIDS	89	88	87
It's not possible to determine whether a person is infected with HIV based on a person's appearance	83	82	80
There are medical tests that can indicate whether a person is infected with HIV	92	92	87
If you are infected with HIV, it may take several weeks for the test to show the presence of the virus	76	75	76
There is currently no way to cure HIV infection	75	77	70
There are medications for HIV infection to minimize its impact on health	85	86	79
Effective HIV treatment reduces the risk of HIV transmission	79	80	73
Index of knowledge (% respondents, who know all basic facts)	56	56	54
<i>The signif. of differences btw Estonian- and Russian-speakers</i>		<i>p = 0.917</i>	

Note: the table includes the responses "Yes, I have already known that"

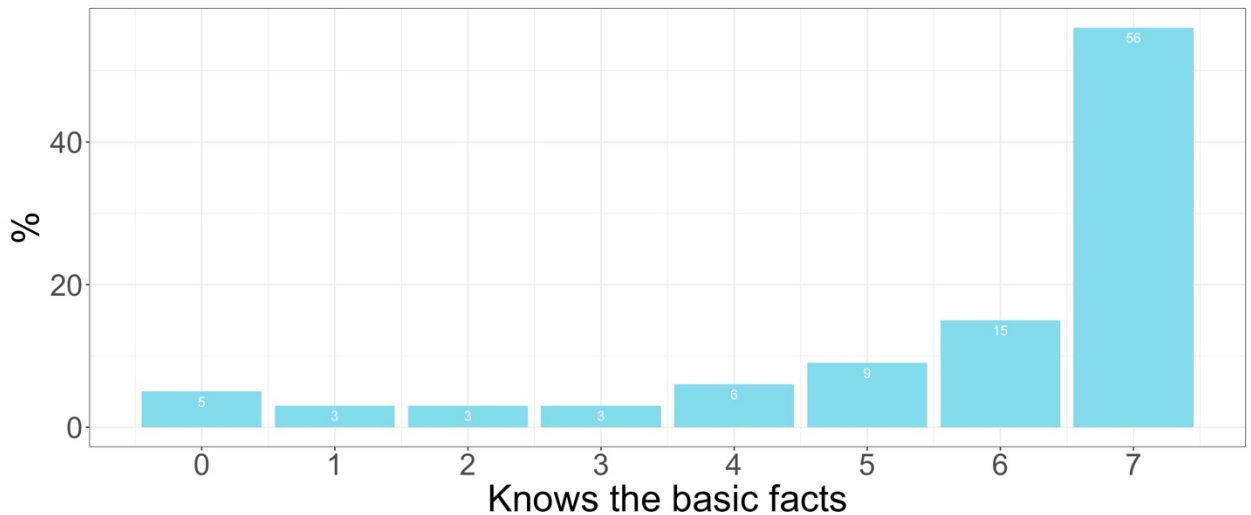


Figure 5 Distribution of MSM and trans people according to the level of their awareness of basic facts about HIV

Respondent’s language, internalized homophobia and negative life experiences related to sexual orientation or homosexual behavior did not show significant links with testing.

Popularity of places of the last and desired HIV testing (Figure 6) — most of them are tested in medical facilities (including anonymous sites) and prefer to continue doing it there.

Most of the answers in the “other” category relate to the willingness to self-testing: *“Doing a rapid test at home is most convenient. Unfortunately, they must be ordered online,”* however, the cost of such tests is quite high (30–40 € if this is a blood-test and even higher if this is a saliva-test). In case of testing in medical institutions, respondents would like to receive the result and support remotely: *“SMS / Call, if positive.”*

Table 11 HIV testing

Variable	%		
	All N = 134	Est. N = 122	Rus. N = 149

HIV testing coverage within the past 12 months (GAM 1.4B)

In the last 6 months	49	67	50	41
In the last year (not earlier than 6 months ago)	18		13	22
More than a year ago	21		23	25
No, I have never been tested for HIV	12		14	12

The signif. of differences btw Estonian- and Russian-speakers $p = 0.213$

Satisfaction with communication with medical

professional during the last test 1 (very bad) to 5 (very good), points, mean and 95% CI, N = 277 4.4 [4.3–4.5]

HIV-status (self-declaration) (GAM 1.3B)

HIV-negative person	71	73	63
HIV-positive person	8	5	13
I do not know	5	6	5
I do not want to answer	4	3	6

The signif. of differences btw Estonian- and Russian-speakers $p = 0.213$

Recipients of ART-therapy (among those, who know about their HIV+ status, N = 26) (GAM 2.2 and 2.3)

Yes, I have an undetectable viral load	82
Yes, I've not yet reached an undetectable viral load	14
Yes, I don't know / don't remember what my viral load is	4
No, I'm not taking them / I don't want to answer	0

Table 12 Results of the regression analysis of links between social-demographic variables and HIV testing

Variable	OR [95% CI]	AOR [95% CI]	<i>p</i>
Age — 25+ years (ref = by 25)	3.50 [1.67–7.36]	3.88 [1.62–9.30]	0.003
Sexual partners of the respondent (ref = only men)			
Mostly men, but sometimes women, too	2.17 [0.83–5.71]	1.92 [0.66–5.54]	0.231
Both men and women to similar extent	0.42 [0.16–1.12]	0.67 [0.20–2.20]	0.508
Mostly women, but sometimes men, too	0.38 [0.13–1.10]	0.24 [0.07–0.80]	0.020
Only women	0.13 [0.01–2.14]	0.55 [0.03–11.2]	0.701
Chemsex during last 6 months — Yes (ref = no)	0.27 [0.12–0.57]	0.19 [0.08–0.45]	< 0.001
Basic knowledge about HIV — Knows (ref = no)	6.71 [2.85–15.8]	7.86 [3.08–20.0]	< 0.001

Note: the case was considered with the combination of answers “tested in the last 6 months”, “in the last year”, “more than a year ago”, N = 314; AOR — Adjusted Odds Ratio

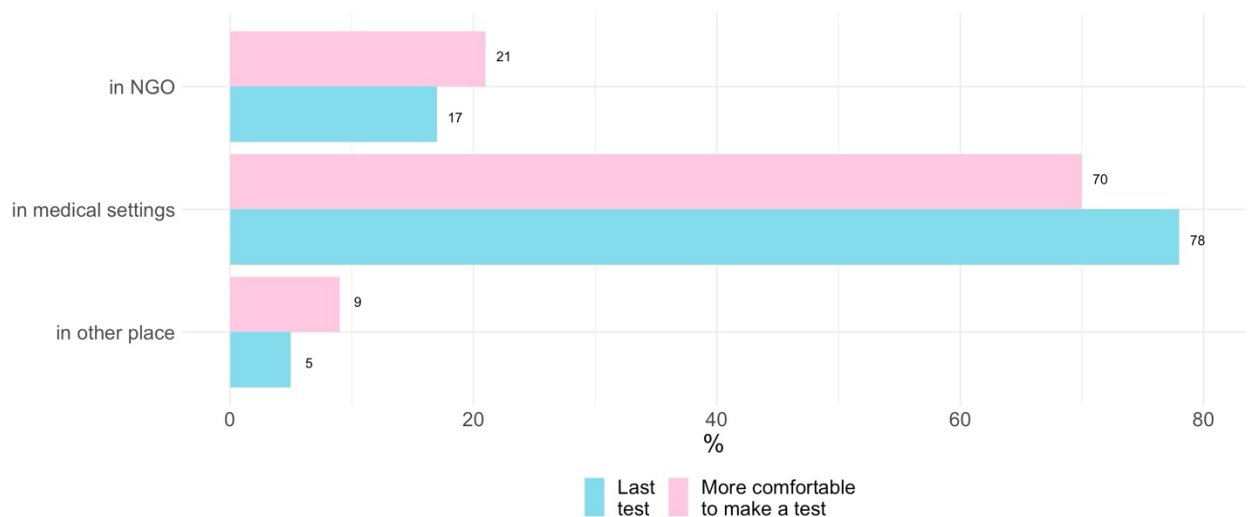


Figure 6 Popularity of current and desired places for HIV testing

Note: the significance of differences $p = 0.105$, $N = 277$

The obtained results do not differ from those of the previous studies, for instance, according to the results of a biobehavioural study of MSM in Harju County,^[34] 90% of MSM were tested for HIV at least once during their lifetime. Thus, we can conclude that the accessibility and acceptability of testing are high, which is confirmed by high satisfaction with communicating with a healthcare personnel during the last test (average of 4.4 points on a five-point scale).

However, there is still a potential to increase testing coverage. Some respondents would prefer to be tested at home, which suggests that self-testing (alternatively with remote pre- and post-test counselling) could be a perspective direction for developing services. In addition, the data in Table 12 shows that the uncovered subgroups of MSM and trans people are a) those under the age of 25, b) those, who identify themselves as rather heterosexual, and c) those, engaged in chemsex.

It is noted in the literature that HIV testing is directly associated with lower self-homonegativity,^[50] but our data do not show such a link (Table 12). Hypothetically,

this can be explained by the generally low level of internalized homophobia and the high quality of provided medical services, including confidentiality.

Overall, 8% of respondents know about their HIV-positive status and another 4% refused to answer. Considering the existing HIV stigma in society,^[54] it can be assumed that the true prevalence of HIV among MSM and trans people in Estonia ranges from 8 to 12%. This data is consistent with the previous biobehavioural study of MSM in Harju County (6.7 [3.4–11.8]%).^[34]

3.5 Awareness of PrEP, taking PrEP, and satisfaction with a doctor

Three quarters of respondents without HIV-positive status (76%, N = 288) have ever heard of PrEP, two thirds (68%) of them have never used pre-exposure prophylaxis (Table 13). The respondents cited three main reasons for not using PrEP: their own belief that there is no risk of HIV infection (25%), not knowing where to get the medicines (22%) and something that was not included in the list of answers (20%). It can be assumed that the “other” option presumes the chronic lack of PrEP drugs on sale in Estonian pharmacies from the summer of 2023 to the end of January 2024 (the period, during which the field phase of the study was carried out). Moreover, in their answers, the respondents pointed out the question about the reasons for dissatisfaction with their own sex life and the problem related to the cost of PrEP: “*since PrEP is expensive in Estonia even at half price, you can order it from India for 10 €*”, “*I am too careful and would like to get PrEP just in case, but I don’t know how, and since it costs money, I simply don’t have sex.*”

Table 13 Experience of using PrEP among HIV-negative respondents, who have ever heard of it

Variable	%		
	All N = 220	Est. N = 92	Rus. N = 88

PrEP was used within last 12 months (GAM 1.11)

Yes, I have used PrEP and I am still using it	23	34	22	18
Yes, I have used PrEP, but I am not using it now	11		11	11
No, I have never used it	65		67	69
I do not want to answer	1		1	1

The signif. of differences btw Estonian- and Russian-speakers $p = 0.682$

How did you get PrEP the last time? (among users, N = 50)

A doctor prescribed it for me	90
It was given to me by a friend	4
I got it in another way	6

Rating satisfaction of communication with a doctor with your last PrEP prescription

among those, to whom PrEP was prescribed by a doctor, N = 45, from 1 (very bad) to 5 (very well), points, mean and 95% CI 4.4 [4.1–4.8]

Why are you not taking PrEP? (among those, who have never used PrEP, N = 170)

I am embarrassed to talk about it with a doctor	11
I do not think I am at risk of contracting HIV	25
It is not available where I live	2
I do not know where to get the drugs	22

Continued on the next page

Variable	%		
	All N = 220	Est. N = 92	Rus. N = 88
I am worried about side-effects	10		
I do not have enough money	5		
Another reason	20		

Willingness to participate in the pre-exposure prophylaxis program is determined both by understanding of its usefulness, including one's own risks and by the existing conditions in the country (i.e. the cost of drugs) (Table 14). Of all individual factors that determine willingness to use PrEP, the most significant is the desire to reduce the risk of HIV infection (for 84% of respondents, this could be a reason to take PrEP). In general, only one third of respondents (29%) are willing to use PrEP under the existing conditions.

Table 15 lists factors associated with willingness to participate in the PrEP program:

- the 25+ year old group has fourfold higher odds of participation compared to younger respondents;
- belonging to the group of Russian-speaking respondents reduces the chances of being ready to participate in the program by half, compared to the Estonian- or English-speaking groups;
- an increase by one point in internalized homophobia also reduces the odds of participation in PrEP by half.

Table 14 Readiness to join PrEP programs taking into account existing restrictions

Statement	%
The drug can protect a person from HIV infection	84
To obtain the drug, you need a doctor's prescription	53
To receive the drug in Estonia, you need to partially pay for it	55
A person who starts taking the drug needs to take an HIV test every 3 months	55
A person who starts taking the drug should still use a condom every time they have sexual intercourse	58
Willingness to participate in PrEP (% of respondents, who answered "Yes" to all 7 statements)	29

Note: the table shows the ratio of answers "Yes" to the question "Would you be willing to participate in the PrEP program, if you knew that ...?" among HIV-negative people not taking PrEP, N = 170

In most cases (90%), the ones, who took PrEP, received it by prescription and their satisfaction with communication with doctor was very high (4.4 points on a five-point scale, Table 13).

Table 15 Results of the regression analysis of links between social-economic variables and willingness to participate in PrEP program

Variable	OR [95% CI]	AOR [95% CI]	<i>p</i>
Age — 25+ years (ref = by 25)	0.88 [0.38–2.02]	0.67 [0.27–1.68]	0.399
Language of communication of the respondent — Russian (ref = Estonian + English)	0.37 [0.18–0.77]	0.42 [0.20–0.90]	0.022
Scale of internal homophobia	0.53 [0.37–0.77]	0.54 [0.37–0.80]	< 0.001

Note: the case in the analysis was the answer “Yes” to all questions specified in Table 14 among HIV-negative respondents not taking PrEP, N = 169; AOR — Adjusted Odds Ratio

Factors determining willingness to participate in the PrEP program among those, who have ever heard of PrEP (76% of HIV-negative), play an important role in scaling up this program (Table 13). Only one third (29% of HIV-negative people, who have not previously used PrEP) are ready to participate in the PrEP program under all the existing conditions (including the need to obtain a prescription and pay between half and a quarter of the cost of the medications).

The main reasons for not using PrEP were personal belief in the absence of the risk of HIV infection (25%) and lack of knowledge of where to get the medications (22%). Analysis of socio-demographic factors also reflected (Table 15) that young, Russian-speaking persons, who are less knowledgeable about basic facts about HIV, use pre-exposure prophylaxis significantly less. Perhaps the main reason is linked with both linguistic and geographical isolation of young residents of North-Eastern Estonia.

Likewise, it is important to note that internal homophobia is also significantly associated with less willingness to participate in PrEP and the minority stress model suggests the influence of anti-LGBTI environment in the society. In the study, there was no connection between bullying based on sexual orientation and gender identity as well as the level of internal homophobia (Table 8), meanwhile, there are no arguments to deny such a connection. Thus, both educational work with the wider society towards overcoming prejudice and provision of psychological services for both MSM and trans people could help to implement PrEP.

3.6 Cascade of HIV services

The cascade of HIV services visualizing the 90-90-90 goals (90% of HIV+ know their status, 90% of those, who know their status, are receiving ARV and 90% of those receiving ARV have achieved an undetectable viral load) can be indirectly derived from the obtained results: if 13% have never been tested for HIV, then assuming the even distribution of testing coverage, 87% of HIV+ know their status (GAM 2.1, conservative estimate). All those, who know their status, are receiving ARV (GAM 2.2), 82% of whom achieved a self-reported undetectable viral load (GAM 2.3).

Extrapolating enables to estimate that $(100 - 87) + (87 * 0.18) = 29\%$ of HIV-positive MSM or in absolute figures $9,909 * 0.067 * 0.29 = 192$ people (approximately 2% of MSM in Estonia in general) have a detectable viral load and can transmit HIV to a partner through unprotected sex (i.e. without a condom or PrEP with the partner). Part of them ($13 * 100 / 29 = 45\%$) are aware of their status, which may increase the likelihood of using a condom or PrEP, but some are not.

3.7 Services used

As stated in Section 1, Estonia has the developed LGBTI infrastructure, including cultural events, public organizations, initiative groups, LGBTI businesses and informal meeting places. At the same time, this infrastructure (except for online dating) is concentrated in Tallinn and Tartu, while MSM and trans people from other regions are forced to either use only online opportunities or travel to these two cities: *“My regular partners live 150 km. from me. And in a godforsaken village in the middle of the forest, I don’t have any sex except masturbation”, “I can’t find a partner. I live far from cultural centres”*. This entire infrastructure covers groups of different languages and ages. Systematization of this information is necessary for estimating numbers (see Section 3.8) and planning HIV interventions.

As can be seen from Table 16, of the two most well-known mobile dating apps for MSM and trans people in Estonia, Grindr is more popular (62% of respondents have their profiles). Both Estonian- and Russian-speaking participants of the sample use Grindr and Hornet equally.

Over the past year, one third of respondents have used the websites of IHA.ee (a local Estonian erotic site for both straight and LGBTI people, operating since 2007 without changing the interface) and Romeo.com (an international gay/bi/ trans-dating, operating since 2009, but acquired the function of searching for partners by their geolocation). Both sites are significantly more popular among the Estonian-speaking respondents than among the Russian-speaking. In contrast, Bluesystem.world, also an old Russian-language site, aimed at homosexual men and being in operation with minimal interface changes since 2004, is generally justifiably popular among the Russian-speaking respondents and practically unknown to the Estonian-speaking.

Table 16 Ways of communication of respondents with other homo- and bisexual men as well as trans-people

	%		
	All N = 134	Est. N = 122	Rus. N = 139

Do you have your profile in Grindr or Hornet?

Yes, only on Hornet	3	1	6
Yes, only on Grindr	35	40	36
Yes, on both Hornet and Grindr	27	23	17
No, I do not use these apps	32	35	31
I do not want to answer	4	1	10

The signif. of diff. btw Estonian- and Russian-speakers $p = 0.241$

During the last year, how have you communicated/met online with other gay or bisexual men?

Bluesystem*	12	4	20
IHA*	35	52	28
Romeo*	39	48	32
Facebook group «Kõik mehed on head»*	11	16	7

Continued on the next page

	%		
	All, N = 134	Est., N = 122	Rus., N = 139
Facebook group «LGBT virtuaalne kogukond»	13	16	11
Telegram channel «Eesti kutid»*	19	27	13
Listed below are active LGBT and MSM organizations in Estonia. Have you used the services of such organizations over the past year?			
MTÜ Peemoti Raamatud (Tartu)	5	6	3
MTÜ SEKY (Tallinn)	1	1	1
Eesti LGBT Ühing (Tallinn)	12	13	11
Geikristlaste Kogu (Tallinn)	5	7	4
BEK ЛГБТ (Narva)*	7	0	15
You have participated in the Rakvere LGBT Film Festival (MTÜ SevenBow)	11	11	10
MTÜ Karuelu	3	5	2
You have participated at a Pride march in Tallinn (MTÜ Tallinn Pride)	22	14	22

Continued on the next page

Continuation of Table 16

	%		
	All N = 134	Est. N = 122	Rus. N = 139
You have sung in the choir Vikerlased (MTÜ Vikerlased, Tallinn)	6	7	5
MTÜ Tartu LGBT+*	4	8	1
You have attended screenings of LGBT films at the Film Museum in Tallinn (MTÜ Q-Space)*	13	5	19
MTÜ Eesti Transinimeste Ühing (Tallinn)	2	0	4
Have you visited the porn cinema in the sex shop “Sex max” (Tartu mnt 62, Tallinn) over the past year?			
Yes	23	30	17
No	75	69	79
I do not want to answer	2	2	4

The sign. of diff. btw Estonian- and Russian-speakers $p = 0.019$

Continued on the next page

	%		
	All, N = 134	Est., N = 122	Rus., N = 139

The respondents visited the listed night clubs over the past year

X-baar (Tallinn)	37	39	31
69 (Tallinn)	29	30	29
9/11 (Tallinn)	19	21	16
Bar Sveta (Tallinn)	31	27	32
Hello Bar (Tallinn)	31	29	28

Note: * the differences between the Estonian- and Russian-speaking subsamples are statistically significant, $p < 0.05$

Online social networks such as Facebook and, more recently, Telegram messenger are also used for internal communication of LGBTI communities corresponding through virtual groups / channels. Two Facebook groups and currently the largest Telegram group for MSM in Estonia were selected for the purposes of this study. Although generally their popularity is not high, they allow to reach predominantly Estonian-speaking homo- and bisexual men.

Participation in LGBTI organizations events is not very popular among the surveyed. The most frequently mentioned events were Pride in Tallinn (22%), LGBTI film screenings at the Q-Space organization (13%) and visiting the Festheart Film

Festival (11%). At the same time, there are also differences in the Estonian- and Russian-speaking parts of the sample. Thus, Q-Space events are significantly more popular among Russian-speaking respondents than among Estonian-speaking, while Tartu LGBT+ is more visited by Estonian-speaking survey participants. The data obtained do not contradict with the results of the 2019 pan-European study (<https://fra.europa.eu/en/data-and-maps/2020/lgbti-survey-data-explorer>), according to which 21% LGBTI people in Estonia responded positively to the question “Are you involved in one or more LGBTI people’s organizations?”

LGBTI-oriented businesses (nightclubs, bars and porn cinemas) are concentrated in Tallinn and rival online dating in popularity. Visitors to nightclubs and bars did not differ in language background, while one of the porn cinemas⁸ was more popular among Estonian-speaking respondents than Russian-speaking.

3.8 Population size estimation

As mentioned in Section 3.6, the service data covers both Estonian- and Russian-speaking populations, as well as those residing outside Tallinn, Tartu, and Narva. Thus, they can be used to generally estimate the population of MSM in Estonia (GAM 1.2B).

All obtained data and calculations are provided in Table 17. The point values of the population estimate have a 30-fold range, with the smallest value (513) and the lower limit of its CI (460) being greater than the number of EHPV clients tested for HIV

⁸ There are two porn cinemas: one in Tallinn and one in Tartu

in Estonia in 2023 (i.e., the actual number of MSM and trans people from an independent source), allowing all point estimates to be included in the calculation of the consensus value (Figure 7).

The resulting consensus estimate for the number of MSM and transgender people is 9,892 [9,628–10,172] people or 2.0 [1.9–2.1]% of men aged 18+ (according to <https://www.stat.ee> at the end of 2023).

The estimated number of MSM and trans people has increased by 7% since 2009 (9,195 ^[22] and 9,898, respectively). The change in the number of adult men in the country (difference between 2009 and 2023) is 5% (Figure 8). Thus, the numbers of MSM and trans people in Estonia generally reflect the increase in the male population of the country. However, it is worth noting that due to the larger sample size and more source data used, the accuracy of the new estimate has increased by approximately ten times compared to the 2021 estimate.

Table 17 Compilation of data from all available sources and point estimates of the number of MSM in Estonia

Independent source	I	N	n	P	95% CI	
					lower	upper
Bluesystem	538 ^{α)}	314	36	4,693	3,299	6,086
IHA	2,040 ^{α)}	314	108	5,931	5,049	6,813
Romeo	1,416 ^{α)}	314	118	3,768	3,254	4,282
Facebook group “Kõik mehed on head”	216 ^{β)}	314	34	1,995	1,414	2,576

Continued on the next page

Independent source	I	N	n	P	95% CI	
					lower	upper
Facebook group “LGBT virtuaalne kogukond”	1,600 ^{α)}	314	41	12,254	8,801	15,706
Telegram channel “Eestikutid”	203 ^{α)}	314	58	1,099	883	1315
Grindr	483 ^{α)}	314	193	786	732	839
Hornet	160 ^{α)}	314	98	513	460	565
TallinnPride	2,333 ^{γ)}	314	68	10,775	8,541	13,008
Festheart	673 ^{β)}	314	38	5,557	3,948	7,166
GeiKrislaste Kogu	55 ^{β)}	314	14	1,234	688	1,779
Karuelu	225 ^{β)}	314	10	7,065	2,853	11,277
Peemoti Raamatud	816 ^{β)}	314	15	17,082	8,724	25,439
Q-Spice	825 ^{δ)}	314	42	6,168	4,476	7,859
X-baar	2,950 ^{ε)}	314	112	8,271	7,066	9,476
Hello Bar	1,000 ^{ε)}	314	31	10,129	6,797	13,461
MSM on PrEP	236 ^{ζ)}	314	74	1,001	836	1,167

Notes: designations I, N, n, P are used in accordance with formulas (1–3); ^{α)} monitoring during the field stage; ^{β)} information received upon request to the relevant organizations / groups; ^{γ)} information from Eesti LGBT Ühing considering demographic characteristics; ^{δ)} information from the site of the organization adjusted for demographic characteristics; ^{ε)} information from an interview with a bartender; ^{ζ)} information received upon a request to Ravimiamet.

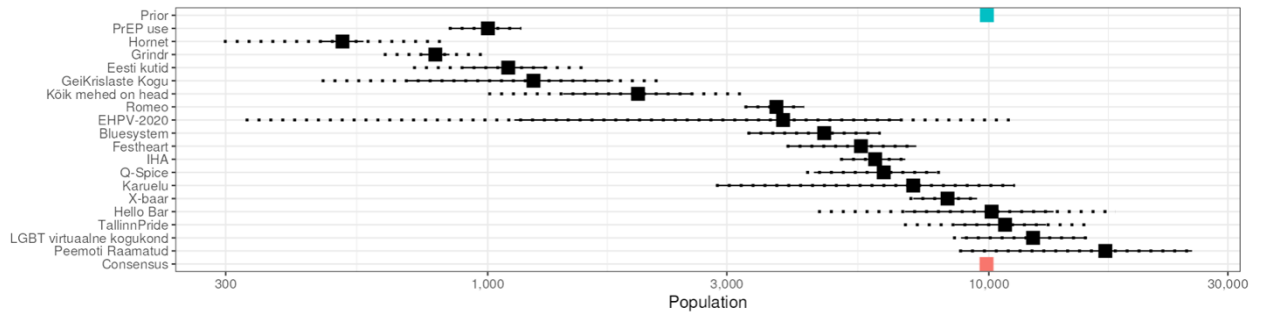


Figure 7 Obtaining consensus estimates of the population of MSM and trans people in Estonia using the Bayesian approach

On the figure: Prior — value of previous population estimates ^[3] (9,909 [6,279–14,243]); Consensus — the resulting new population estimate based on a combination of point values and their 95% CI (solid horizontal lines) considering the expert assessment of the reliability of each individual value (punctual horizontal lines)

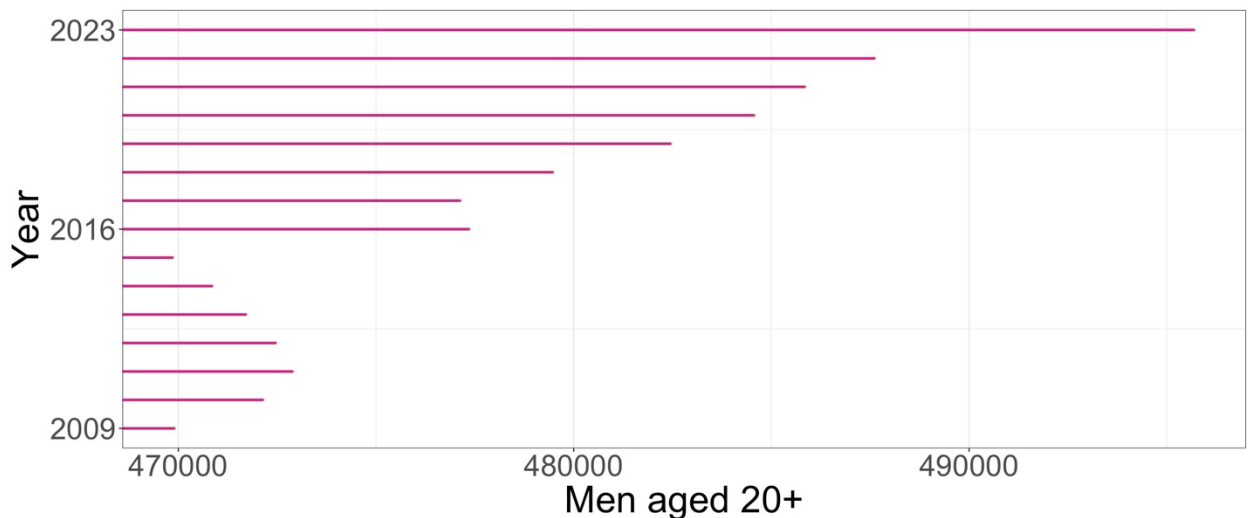


Figure 8 Changes in the number of adult men in Estonia according to the data of the Statistics Estonia (<https://www.stat.ee>)

Conclusions and limitations

The purpose of the study was to assess the accessibility and acceptability of existing services, as well as to identify some of the unmet needs of MSM and trans people, including those related to stigma and discrimination, to update the estimate of the number of MSM and to build a cascade of HIV treatment. Therefore, 314 people, mostly cis men aged 18 years or older, living in Estonia, were interviewed between December 2023 and January 2024.

It has been demonstrated that the availability and acceptability of HIV testing is high, as is satisfaction with communication with a health worker at the last test. At the same time, there is potential to increase testing coverage (including self-testing) among young MSM and trans people, as well as those men who do not identify with the LGBT community and engage in same-sex sexual activity.

Between 8 and 12% are HIV positive and know their status, all are receiving ART, 82% have achieved an undetectable viral load.

Most of those, who took PrEP medications received them by prescriptions and their satisfaction with the communication with their physicians was high.

Although knowledge about PrEP is widespread among HIV-negative MSM and trans people, most of them have never taken PrEP and are not ready to use it under the current conditions. Willingness is lower among young people, Russian-speaking people as well as among respondents with higher levels of internal homophobia. Respectively, currently the use of PrEP in Estonia is low.

External and internal stigma related to homosexual orientation or homosexual behavior is small, but there are significant differences between groups of MSM and trans people with different languages of communication: Russian speakers have a

higher feeling of stigmatization than Estonian and English speakers. Study participants most often encountered insults, gossip, and comments in their families and in medical institutions. Heterosexual orientation and dissatisfaction with one's sexual life were primarily associated with high levels of internal homophobia. Internal stigma was associated with willingness to participate in the PrEP program.

In general, the unmet needs of survey participants are related to:

- issues in own sex life;
- availability and cost of PrEP medications;
- with the feeling of insecurity due to various manifestations of stigma in the subgroup of Russian-speaking and mostly heterosexual respondents.

The HIV treatment cascade was created and a number of other GAM indicators were obtained for country to report to UNAIDS.

An independent estimate of the number of MSM and trans people in Estonia was carried out using the significantly larger number of information sources than in the previous studies. It is shown that the number of MSM in Estonia is 9,892 [9,628–10,172] people or 2.0 [1.9–2.1]% of men aged 18+ and changes in the numbers of MSM and trans people over time reflect the growth of the male population in the country.

The presented results have several limitations due to the methodology used to obtain them, specifically:

- cross-sectional design of the study does not allow the determined statistical relationships to be interpreted in terms of cause and effect;
- the structure of a convenience sample limits the possibility of generalizing the data to the entire population (which is especially true for trans people). The relatively small number of respondents (314 people) restricted our ability to

see the links between external stigma known from the scientific literature and internal homophobia, as well as between internal homophobia and alcohol consumption;

- the questionnaire did not provide a separate set of questions assigned to trans and intersex people and in the set about sexual orientation and experience there was no option “no sexual experience,” which could reduce the interest of the trans population in this study;
- the online form of the questionnaire resulted in a small number of considered topics, which focused on HIV-related issues and, except for aspects of chem-sex, did not touch upon common sexual practices in communities, including high-risk (such as sex without a condom or fisting).

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