Trends in combination HIV prevention and HIV testing 2002-2022

Research brief

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Executive summary

- The proportion of gay, bisexual and other men who have sex with men (GBM) reporting combination HIV prevention (avoiding anal intercourse, or using condoms, pre-exposure prophylaxis (PrEP) or anti-retroviral treatments (ART)) with casual partners increased in 2022, after a steady decline 2002-2014
- Lifetime and recent HIV testing rates were the highest ever recorded in 2022. Sites of HIV testing are increasingly diversifying
- These overall trends were experienced by all key subpopulations. However, trends for some groups of GBM are not as high.

Background

"Combination HIV prevention" refers to the way multiple behaviours shown to be effective against HIV transmission can be combined together to limit HIV spread. For most of the HIV epidemic, this included consistent condom use or avoiding anal intercourse, especially with casual (non-regular) sex partners. From 2015 onwards, new biomedical tools such as HIV pre-exposure prophylaxis (PrEP) among HIV-negative people, and the use of anti-retroviral treatments (ART) by people living with HIV that can achieve an undetectable viral load (UVL), were added to this mix of options.[1] High and equitable coverage of combination HIV prevention behaviours by groups most at risk will be necessary to eliminate HIV transmission in Aotearoa New Zealand (NZ) by 2030.[2]

At the same time, frequent HIV testing, especially after someone has been exposed to HIV, is key to a timely diagnosis and epidemic control. People testing positive can be offered effective treatment and linked into care, and those testing negative but with ongoing exposure risks can be offered PrEP.

A better understanding of trends over time in combination HIV prevention and HIV testing can help evaluate past interventions, direct future responses, and interpret trends in the epidemiology of HIV (annual diagnoses).[3,4] Such insights are therefore a critical part of NZ's epidemic response.

Behavioural survey data

This research brief presents data from NZ's HIV behavioural surveillance programme 2002-2022. The experiences of 18,679 participants are included, drawing on large and diverse samples each round (see the Notes for more information).

To estimate combination HIV prevention behaviours, we combined participants' responses on: anal intercourse and condom use with casual male partners, HIV testing history, PrEP and ART.

We then allocated participants into a unique category, ordered from lowest HIV risk (no anal intercourse with casual partners, regardless of HIV status) to highest HIV risk (any condomless anal intercourse among HIV negative or status unknown participants not using PrEP). For the combination HIV prevention analysis, we limited the sample to participants who engaged in casual sex in the 6 months prior to survey. Rates of engaging in casual sex can vary over time, and in 2022 these declined sharply, to 60.4% (Figure 1). This likely reflected the COVID-19 lockdowns and physical distancing restrictions, that were common in NZ and especially Auckland in 2021 and 2022.

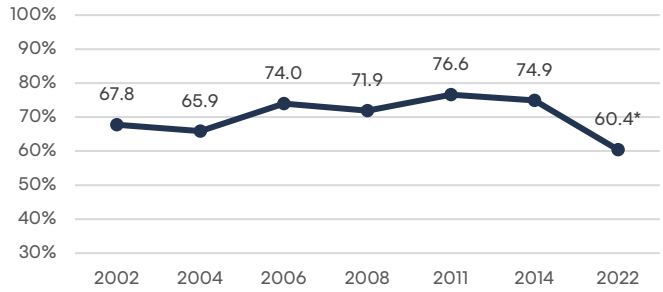

Figure 1. Trends in casual sex with a man <6 mths

We then examine trends over time in HIV testing. This collates participants' responses on their HIV test history, timing and result, and the place participants went for their last test.

We denote statistically significant trends over time by "*" in the Figures (see Notes at end). For both topics, we are also interested in whether changes over time are being experienced by all participants, or just some. To examine this, we separate ("disaggregate") the overall sample by certain participant characteristics, for example by age group, ethnicity, region and sexual behaviours. These trends only show whether the behaviours have increased or declined over time for that population subgroup. Other analyses presented elsewhere will examine if apparent differences *between* subgroups are statistically significant or not.

Trends in combination HIV prevention

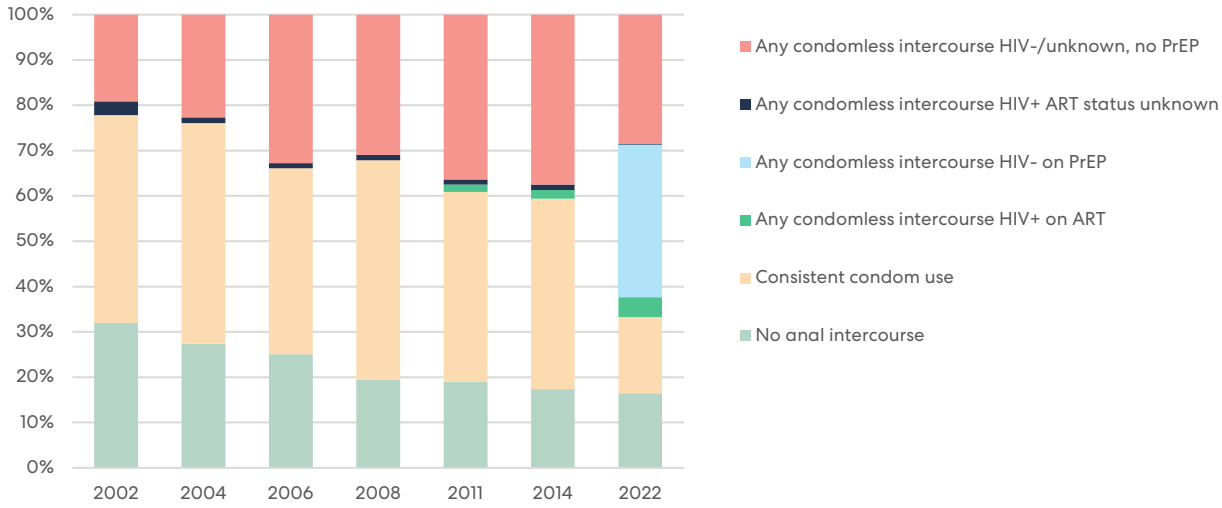

Figure 2. Trends in combination HIV prevention <6 mths

HIV combination prevention coverage during casual sex between GBM declined over time 2002-2014, then increased in 2022 (Figures 2 and 7). The overall decline in HIV prevention coverage over the first period was comprised of reductions in condom use, and increases in GBM having anal intercourse.

In the 2022 survey, the rise in HIV prevention coverage since 2014 was due to a large increase in PrEP among HIV negative participants engaging in condomless sex, and also a rise in the proportion of participants with diagnosed HIV being on ART (almost all with a UVL) while engaging in condomless sex.

The increase over time in "any" condomless anal intercourse may understate the actual volume of condom use, since some GBM reporting at least once not using a condom may be using condoms some of the time, with some partners.

Figure 3 expands Figure 2 by showing the modality of anal intercourse and HIV testing history of respondents reporting condomless intercourse, and who were either not on PrEP, or not living with HIV on ART.

The proportion reporting any receptive condomless intercourse (and not on PrEP or living with HIV on ART) was increasing over time, then decreased for the first time in 2022. This is likely due to the increase in biomedical prevention coverage among GBM engaging in condomless sex with casual partners, including PrEP and UVL.

From 2006, among those engaging in condomless receptive anal intercourse, there was also a steady decline in the fraction that had never tested for HIV, from a high of 9.4% in 2006 to 2.5% in 2022 (Figure 3 and 6). This likely reflects an increase in HIV testing among such GBM, which should decrease the proportion living with undiagnosed HIV, and improve the time to diagnosis among those who contract HIV.

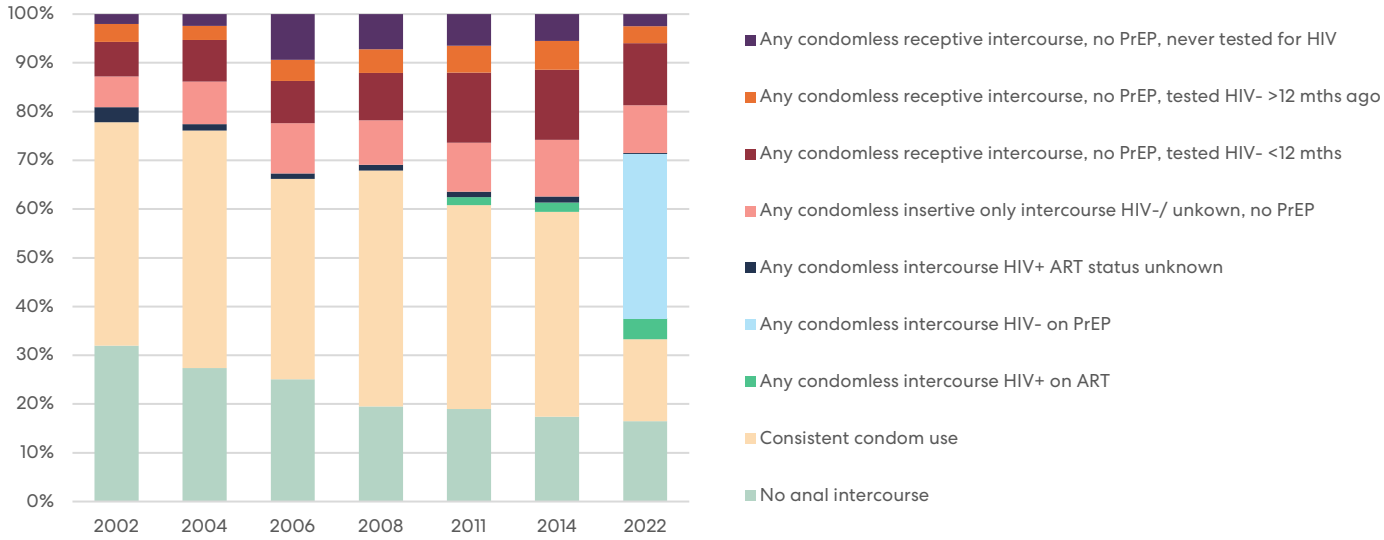

Figure 3. Trends in combination HIV prevention <6 mths by modality of anal intercourse and HIV testing history

Anal intercourse

Anal intercourse with casual partners became more common over time (Figure 4). Among those having sex with casual partners in the 6 months prior to survey, the proportion reporting anal intercourse rose from 68.0% in 2002, to a high of 83.5% in 2022.

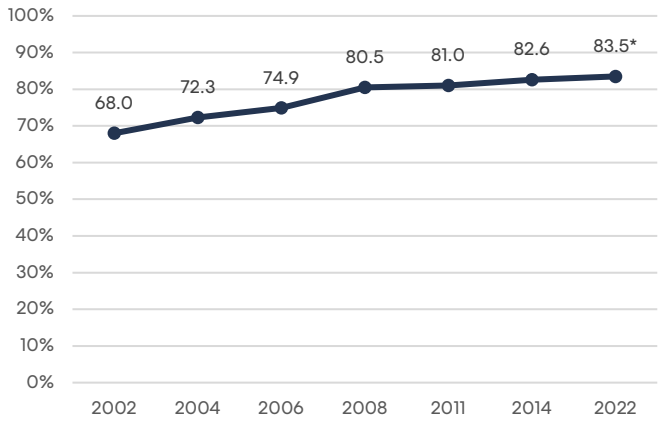

Figure 4. Trends in anal intercourse with casual partners <6 mths

Consistent condom use

Among GBM engaging in anal intercourse with casual partners, consistent condom use has declined over time (Figure 5). This was highest in 2002 (67.4%), decreasing to 50.8% by 2014, then more than halving to 20.2% (1 in 5 participants) in 2022.

Because an increasing proportion of GBM reported engaging in anal intercourse with casual partners over time (Figure 4), the overall proportion of GBM reporting consistent condom use with casual partners remained relatively steady 2002-2014, before declining in 2022 (Figure 5).

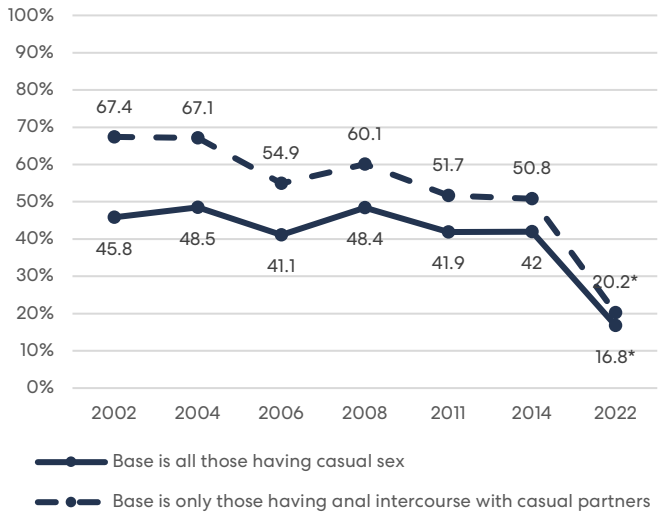

Figure 5. Trends in consistent condom use <6 mths

Condomless anal intercourse and PrEP

A third (33.7%) of GBM having casual sex reported taking PrEP in the 6 months prior to the 2022 survey and engaging in condomless sex (note: the 2014 and earlier surveys did not ask about PrEP). Among the subset of participants who were HIV negative or of unknown HIV status and who were engaging in anal intercourse with casual partners, this proportion equated to 42.9%.

Condomless receptive anal intercourse and never tested for HIV

The proportion of GBM having casual sex who had engaged in condomless receptive anal intercourse in the previous 6 months and had never tested for HIV increased to a high of 9.4% in 2006 then declined to 2.5% in 2022 (Figure 6).

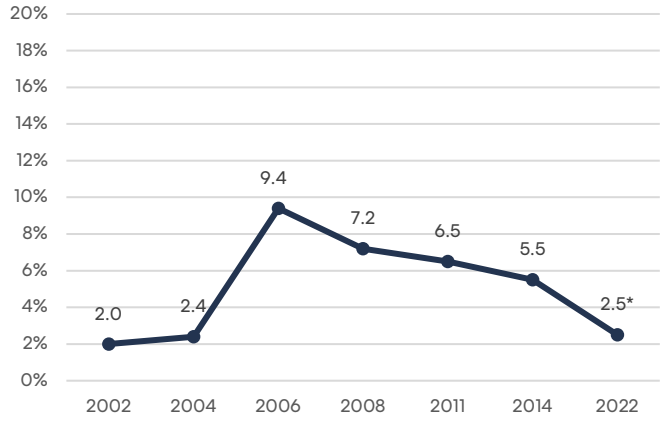

Figure 6. Trends in condomless receptive anal intercourse and never HIV tested

Combination HIV prevention coverage

Overall HIV combination prevention coverage during casual sex between GBM was highest in 2002 (77.8%) before steadily declining to a low point in 2014 (61.3%) (Figure 7). Combination HIV prevention coverage then increased markedly in the 2022 survey to 71.4%.

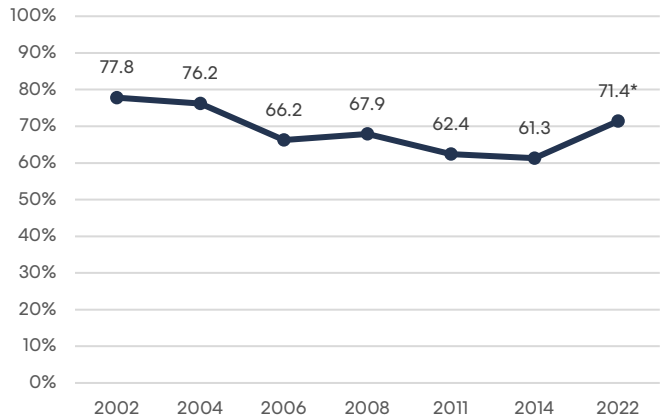

Figure 7. Trends in combination HIV prevention coverage <6 mths

Combination HIV prevention coverage by age group

Overall HIV combination prevention coverage during casual sex declined for all age groups until 2014 then increased in 2022 (Figure 8). Coverage was highest among those aged 45 and over, and lowest among those aged under 30.

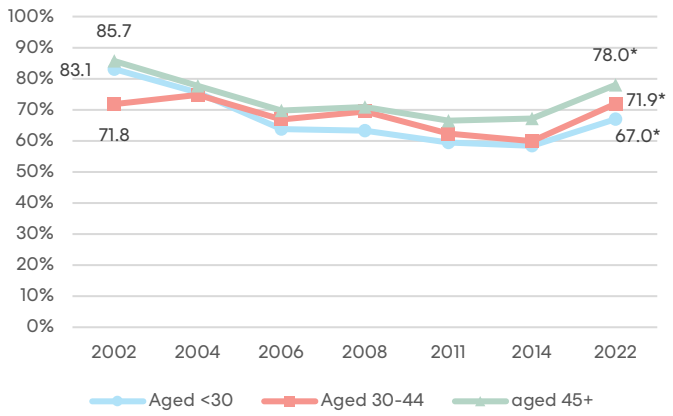

Figure 8. Trends in combination HIV prevention coverage <6 mths by age group

Combination HIV prevention coverage by ethnic group

HIV combination prevention coverage improved for all ethnic groups in the 2022 round compared to 2014 (Figure 9).

Participants categorised as an Asian or Other ethnicity (including Middle Eastern, Latin American, and African) had the highest combination HIV prevention coverage in 2022 (Figure 9). Conversely, participants who were Māori or a Pacific ethnicity had lower combination HIV prevention coverage in 2022.

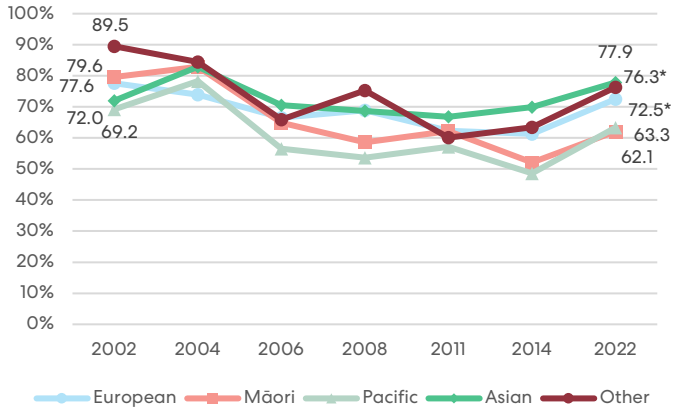

Figure 9. Trends in combination HIV prevention coverage <6 mths by ethnic group

Combination HIV prevention coverage by region

Participants living in Auckland, Wellington or Canterbury consistently reported higher HIV combination prevention coverage over time (Figure 10). Coverage for both groups improved in 2022, although the gap widened, with those living in Auckland, Wellington and Canterbury experiencing accelerated coverage.

Figure 10. Trends in combination HIV prevention coverage <6 mths by region

Combination HIV prevention coverage by number of partners

Combination HIV prevention coverage declined steadily over time for participants reporting up to 10 sexual partners in the 6 months prior to survey, with the decline stopping in 2022 (Figure 11). Between 2002-2014, participants with more than 10 partners had consistently reported lower coverage than less sexually active participants.

However, in 2022 this changed considerably, and participants reporting a higher number of partners also reported the greatest combination prevention coverage. This is likely due to more highly sexually active participants in 2022 being able to access PrEP, or being on ART with UVL, compared to 2014 and earlier.

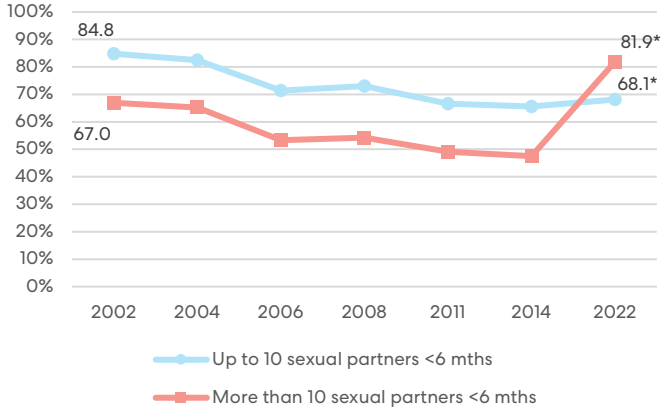

Figure 11. Trends in combination HIV prevention coverage <6 mths by number of partners

Trends in lifetime HIV testing

Lifetime HIV testing rates progressively increased after 2006. By 2022 these were the highest ever reported, with 86.9% having tested for HIV at least once in their life (Figure 12).

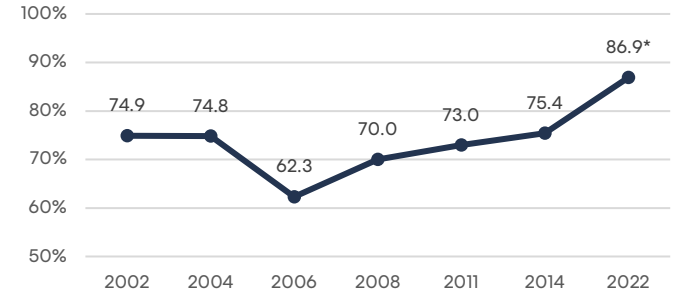

Figure 12. Trends in lifetime HIV testing

Trends in HIV status

Approximately 4% of participants across the surveys (1 in every 25) reported they had tested positive for HIV (Figure 13). In the 2022 survey, the proportion diagnosed HIV positive was higher in those classified as European or as Pacific (Figure 14), and among those aged in their 40s, 50s and 60s (Figure 15).

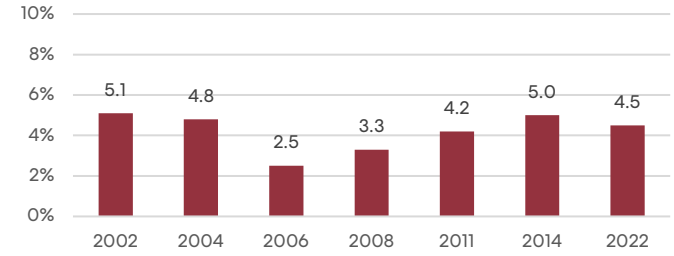

Figure 13. Trends in HIV status*

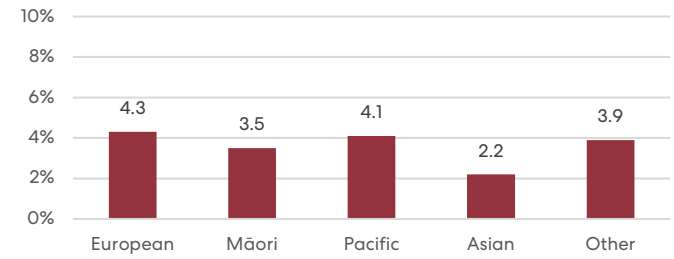

Figure 14. Proportion diagnosed HIV positive by ethnicity (2022 only)*

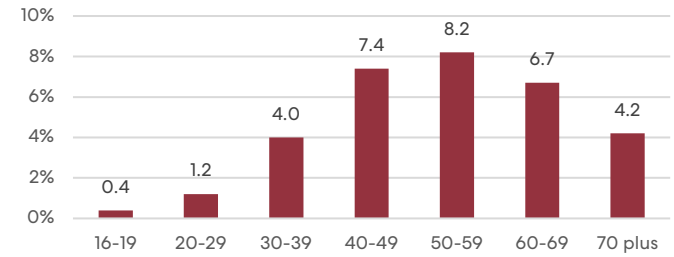

Figure 15. Proportion diagnosed HIV positive by age decile (2022 only)*

Trends in recent HIV testing

This section examines trends in recent HIV testing, defined here as having tested for HIV in the 12 months prior to survey. The sample is limited to participants who had not previously tested HIV positive.

The proportion that had tested for HIV at least once in the previous 12 months gradually increased over time 2006-2014, then increased significantly in 2022 to 59.6% (Figure 16). Conversely, the proportion with no recent HIV test (i.e those who had never tested for HIV, or who last tested negative more than 12 months ago) was the lowest ever in 2022, at 40.4%.

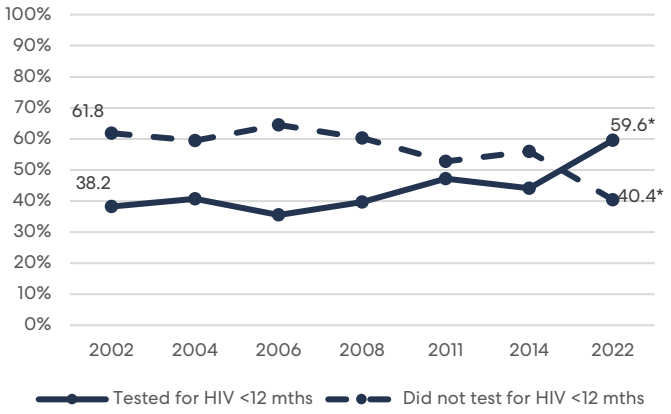

Figure 16. Trends in recent HIV testing

Recent HIV testing by age group

Recent HIV testing trends were similar for all age groups (Figure 17). Participants aged 30-44 showed the highest proportional increase, increasing from 36.0% in 2022 to 63.4% in 2022.

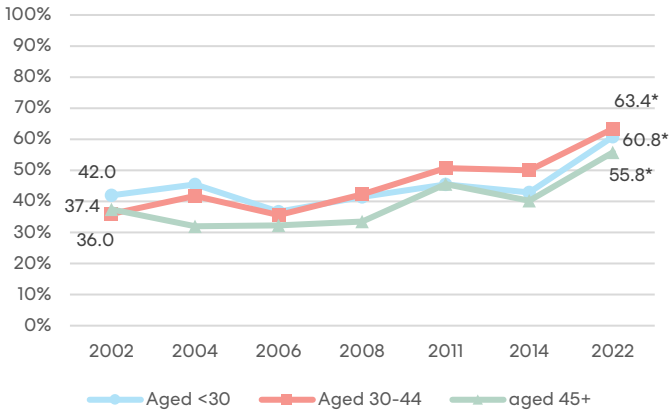

Figure 17. Trends in recent HIV testing by age group

Recent HIV testing by ethnicity

Recent HIV testing improved for all ethnic groups over time (Figure 18). This was especially seen from 2006, although for some participants it declined in 2014, before increasing substantially again in 2022.

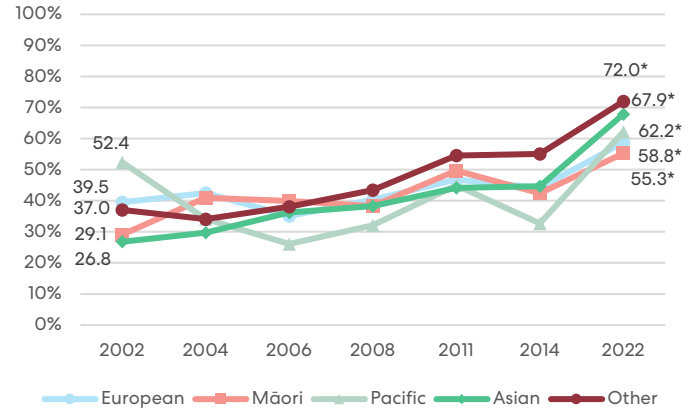

Figure 18. Trends in recent HIV testing by ethnicity

Recent HIV testing by region

From 2006, participants from Auckland, Wellington and Canterbury showed a similar increase in recent HIV testing to those living in other parts of NZ (Figure 19). Participants from both regions reported a noticeable increase in the 2022 survey.

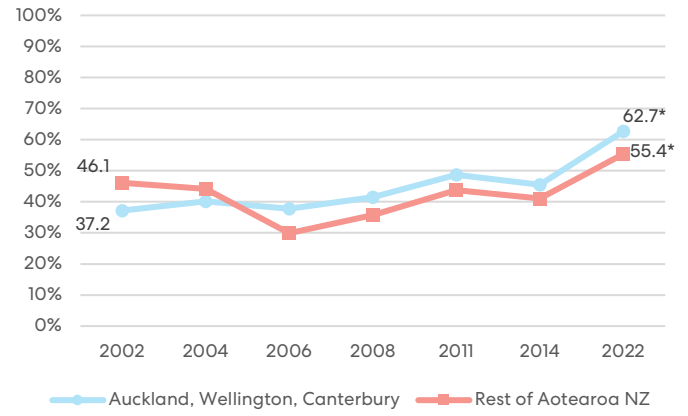

Figure 19. Trends in recent HIV testing by region

Recent HIV testing by number of partners

Participants with more than ten sexual partners in the 6 months prior to survey consistently reported higher rates of recent HIV testing compared to those with fewer partners (Figure 20). These trends diverged further in 2022, when 89.6% (approximately 9 out of every 10) participants with a greater number of sexual partners reported having tested negative for HIV in the previous 12 months.

The increase in recent testing among more sexually active GBM is likely influenced by the better availability of PrEP in 2022, which requires frequent HIV testing to obtain prescriptions.

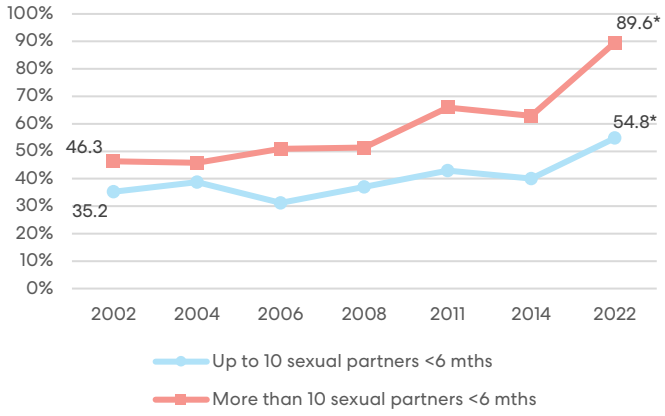

Figure 20. Trends in recent HIV testing by number of partners

Recent HIV testing by identity

Recent HIV testing rates gradually increased among gay identified participants from 2006, then rose noticeably in 2022 (Figure 21). Among participants who identified as bisexual, takatāpui, pansexual, queer or as another identity, recent testing rates appeared to be steady up to 2014, after which they also increased substantially.

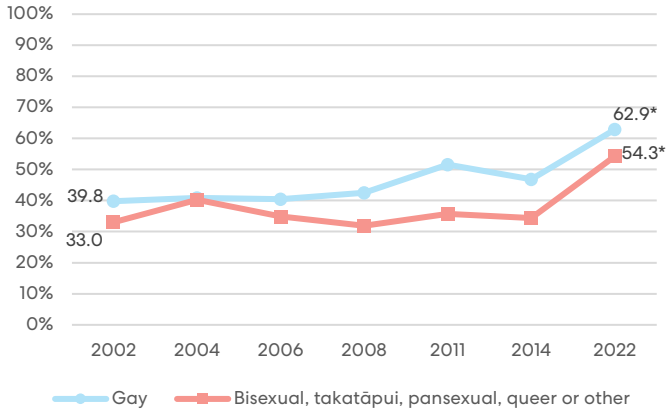

Figure 21. Trends in recent HIV testing by identity

Recent HIV testing by condom use with casual partners

Recent HIV testing was consistently higher among those engaging in anal intercourse with a casual partner (Figure 22). In 2022, this rose for all except those not having casual sex.

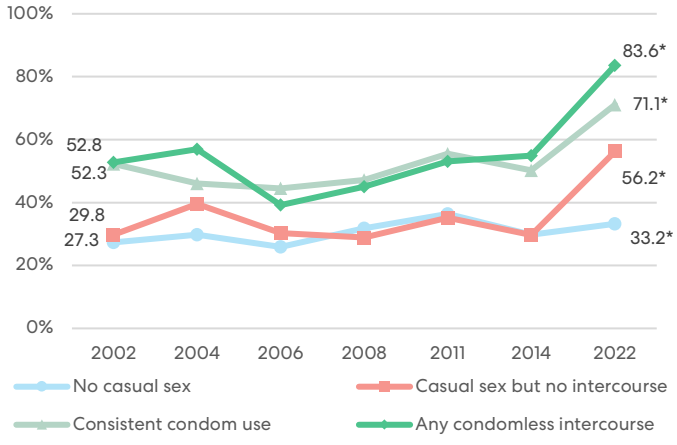

Figure 22. Trends in recent HIV testing by condom use with casual partners

Place last tested for HIV

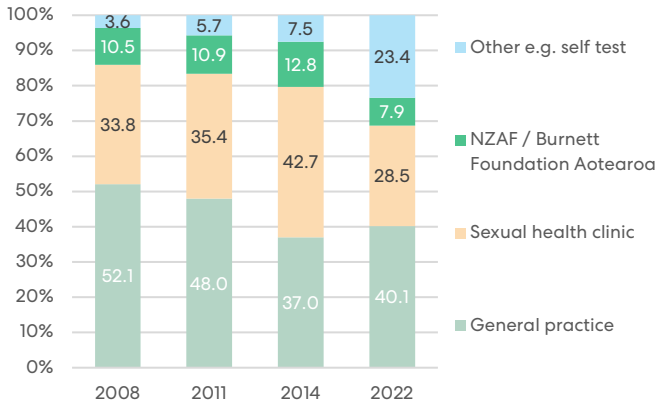

Figure 23. Trends in place last tested for HIV (among those testing recently)*

From 2008, participants testing for HIV were asked where they last tested. Among those who had tested in the 12 months prior to survey, the proportion testing at a general practice (GP) or sexual health clinic declined over time (Figure 23).

In 2022, there was a sizable increase in the proportion stating they had last tested for HIV at another place (23.4%). Responses included "Self-test kit (at home)" (18.6%), "Sauna" (1.1%), "Body Positive" (0.8%), "At an event" (0.4%), "Other" (2.5%).

Summary

Trends in combination HIV prevention

- Combination HIV prevention in the context of casual sex between men declined over time 2002-2014, then increased in 2022
- The overall decline in combination HIV prevention coverage over the first period 2002-2014 was comprised of reductions in condom use, as well as reductions in GBM avoiding anal intercourse with casual partners
- In the recent 2022 round, the increase in HIV prevention coverage since 2014 is comprised of a large increase in PrEP use among HIV-negative participants (even though they were engaging in condomless sex), as well as a rise in the proportion of participants with diagnosed HIV being on ART (even while engaging in condomless sex)
- The increase in participants engaging in condomless anal intercourse while on PrEP in 2022 appears to be comprised both of HIV-negative or previously untested GBM who had in prior years engaged in condomless sex without any HIV biomedical prevention coverage, as well as GBM who in prior years used condoms consistently (i.e. PrEP has shifted both). Note however, these data are anonymous and cross-sectional, not longitudinal, so we cannot say which participants have shifted behaviours or not
- The overall rise in "any" condomless anal intercourse may understate how many condoms are being used, since some participants reporting at least once not using a condom may use condoms some of the time. It is also affected by a general increase in anal intercourse with casual partners over time
- In contrast, the sudden drop in casual sex partnering seen in 2022 (likely due to COVID-19) will have reduced even further the already declining proportion of participants that had engaged in condomless receptive anal intercourse and never tested for HIV
- Trends in combination HIV prevention coverage for key subgroups of participants (e.g. by age, ethnicity, number of partners) generally reflected these overall trends.

Trends in HIV testing

- There has been a gradual increase in HIV testing coverage over time
- In the 2022 round, the proportion of non-HIV positive participants reporting having recently tested for HIV (i.e. in the 12 months prior to survey) was the highest ever recorded
- The substantial increase in recent HIV testing seen in 2022 was seen among all key subgroups of participants, but especially among those with higher potential HIV exposure risk (e.g. those with more sexual partners or who had engaged in condomless anal intercourse with casual partners)
- In the 2022 round, the proportion living with diagnosed HIV was similar across ethnic groups (slightly higher among European and lower among Asian participants). Participants aged in their 40s, 50s and 60s had the highest proportion living with diagnosed HIV
- Of those testing for HIV in the previous 12 months, the place of last HIV test is diversifying over time. In 2022, a significant proportion had last tested using a self-test or home-test.

Discussion

- HIV behavioural surveillance conducted over 20 years reveals substantial shifts in risk, protective and screening behaviours among GBM in NZ
- The behavioural shifts are consistent with trends in HIV diagnoses, that peaked in 2016, then have steeply declined.[5] This suggests NZ is tracking in the right

direction to virtually eliminate HIV transmission by 2030, although more work is needed to reach that target

- We highlight three notable and interrelated features of the 2022 findings

- Firstly, among people living with HIV, uptake of ART and consequently the proportion living with a UVL escalated from 2017, when Pharmac agreed to fund HIV treatments regardless of CD4 count.[6] This not only improved the wellbeing of all people living with HIV, but also rendered GBM living with HIV with a sustained UVL (around 4% of GBM in NZ) sexually non-infectious

- Secondly, PrEP was publicly funded on a targeted basis in early 2018, NZ being one of the first countries to do so.[7] This followed an initial demonstration project in Auckland from early 2017.[8] Some GBM will have also been using PrEP prior to this e.g. via personal import, but because of the behavioural surveillance gap 2014-2022, it is difficult to know when PrEP uptake started to rise in a meaningful way. PrEP suitability criteria changed (widened) again in July 2022,[9] near the end of the 2022 data collection round

- Thirdly, because testing for HIV has become the entry point for both HIV care and PrEP, testing rates had sharply increased in 2022. This undoubtedly reflects the stronger emphasis on and promotion of HIV testing by community organisations (for example the "Ending HIV" social marketing campaign extolling the benefits of an early diagnosis), that until 2017 had been a less noticeable feature of NZ's HIV control programmes. Community agencies also increased the variety of HIV testing options in NZ, as witnessed by the jump in non-traditional testing sites reported by participants in 2022. HIV sector agencies have also strengthened their public awareness campaigns to de-stigmatise HIV, addressing an additional barrier to HIV screening

- Collectively, this meant that by 2022 more condomless anal intercourse no longer equated to more HIV exposure. A shrinkingly small proportion of GBM over time are reporting risky exposures and no HIV testing, which likely reduces the number of GBM living with undiagnosed HIV

- Furthermore, sexual mixing means many GBM not using at least one form of combination HIV prevention will now be indirectly protected by GBM who are. For example, it is possible that progressively fewer participants engaging in condomless anal intercourse without PrEP or ART coverage are being exposed to HIV, if an increasing proportion of them are having sex with casual partners who have no potential to sexually transmit HIV (i.e if their partners are on PrEP or have UVL)

- Encouragingly, the improvements in combination HIV prevention and testing have been seen in all groups, but especially among some that are strategically vital in controlling HIV spread. GBM reporting the most partners increased their rates of recent HIV testing the most. This group also showed the most dramatic shift in combination HIV prevention coverage; from below 50% coverage in 2014 to 81.9% coverage by 2022. Their high sexual connnectivity means better coverage among this group will disproportionately quell HIV transmission across sexual networks of GBM

- Nevertheless, the improvements in combination HIV prevention and testing are still patterned, and some subgroups of GBM defined by their age, ethnicity, identity or place of residence are still reporting lower uptake than others. These disparities need to be understood in more detail, and this will be investigated in other research briefs

- Improvement in these behaviours beyond 2022 is not inevitable. Behavioural surveillance programmes monitor modifiable behaviours that are relevant to eliminating HIV transmission in NZ. Continual public health action and innovation will be required to engage GBM, promote behaviour change, make services more accessible, and ensure they are suitable.

References

[1] World Health Organization. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach – second edition. Geneva: World Health Organization; 2016.

[2] Ministry of Health. National HIV Action Plan for Aotearoa New Zealand 2023–2030. Wellington: Ministry of Health; 2023.

[3] Saxton P, Dickson N, Hughes A. Who is omitted from repeated offline HIV behavioural surveillance among MSM? Implications for interpreting trends. *AIDS and Behavior*. 2013; 17:3133-44.

[4] Holt M, Chan C, Broady TR, MacGibbon J, Mao L, Smith AK, Rule J, Bavinton BR. Variations in HIV Prevention Coverage in Subpopulations of Australian Gay and Bisexual Men, 2017–2021: Implications for Reducing Inequities in the Combination Prevention Era. *AIDS and Behavior*. 2023:1-6.

[5] AIDS Epidemiology Group. AIDS – New Zealand. Issue 82. Dunedin: Univerity of Otago; May 2023.

[6] https://pharmac.govt.nz/news-and-resources/consultations-and-decisions/decision-relating-to-widening-funding-criteria-for-antiretroviral-agents-for-the-treatment-of-hiv

[7] Saxton PJ, Giola M, Coughlan EP, Rich JG, Azariah S, Ludlam AH, O'Toole C, Pohl M, Myers JM. Implementing HIV preexposure prophylaxis (PrEP): Let's not get caught with our pants down. *NZMJ*. 2018; 131(1481):64-73.

[8] Azariah S, Saxton P, Franklin R, Forster R, Werder S, Jenkins R. NZPrEP Demonstration Project: protocol for an open-label, single-arm trial of HIV pre-exposure prophylaxis (PrEP) to determine feasibility, acceptability, adverse and behavioural effects of PrEP provision to gay and bisexual men in publicly funded sexual health clinics in Auckland, New Zealand. *BMJ Open*. 2019; 9(6):e026363.

[9] https://pharmac.govt.nz/news-and-resources/consultations-and-decisions/2022-06-15-decision-to-widen-access-to-antiretrovirals-and-nitrofurantoin

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Notes

- The HIV behavioural surveillance programme combines data previously collected in the Gay Auckland Periodic Sex Survey (GAPSS) and Gay men's Online Sex Survey (GOSS) up to 2014, with the Sex and Prevention of Transmission Study (SPOTS) in 2022

- From 2002-2014, eligibility criteria were being a man who had had sex with a man (MSM) in the previous 5 years. In 2022, eligibility was expanded to include men (cis or trans) who had ever had sex with a man, or men (cis or trans) who had not yet had sex with a man but identified as gay, bisexual, takatāpui, pansexual or queer. The 2022 survey also included a small number of transwomen and non-binary people who had had sex with MSM in the previous 5 years. For simplicity, in this research brief we refer to all participants as "GBM", even though this might not reflect a particular individual's gender or sexual identity

- As HIV behavioural surveillance employs non-random sampling, care must be taken before generalising findings to all GBM. GAPSS sampled participants in person at a gay community fair day, gay bars and sex-on-site venues in Auckland. GOSS sampled participants online via internet dating sites across the whole of NZ, once GAPSS recruitment had completed that year. SPOTS sampled participants online via social and news media, gay dating apps and websites, community organisations and physical promotion e.g. posters and fliers nationwide over 3 months

- These surveys are voluntary, self-completed and anonymous

- This research brief reports basic statistical tests of trend (Cochran-Armitage tests) over time. We have chosen 2006 as the baseline, as this was the first year national data were available. Statistically significant findings (where $p<0.05$) are denoted by an asterisk ("*") by the corresponding data in Figures. In the accompanying text, we describe how the proportions have changed over time, however, more rigorous statistical testing is needed to know whether any differences over time (and for a specific time point or period) remain significant after accounting for changes in sample characteristics each round. Other research briefs will examine whether apparent differences *between* subgroups are statistically significant or not

- Data on ART status was asked for the first time in 2011 and 2014 without information on undetectable viral load (UVL). In 2022, both ART status and UVL status were collected; almost all those on ART had UVL, so we have not differentiated participants based on UVL status. For comparisons over time, all participants with diagnosed HIV prior to 2011 are recorded as ART status unknown

- Data on PrEP status is based on self-reported PrEP use in the 6 months prior to survey. It does not take account of adherence or dosing regimen. PrEP use and condomless anal intercourse may not coincide for some participants (e.g. some may have engaged in condomless intercourse prior to starting PrEP within the 6-month recall period. Also, some participants taking PrEP but consistently using condoms with casual sex partners are coded as consistent condom users (i.e. the Figures presented in this research brief will underestimate overall PrEP use)

- Behavioural surveillance was not conducted 2015-2021, therefore we cannot tell from these data when some of the large changes in behaviours seen between 2014-2022 (such as PrEP) occurred.

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