Article:
Bartholomew, K., Maxwell, A., Yang, L.P.H. et al. (2026) Clinician and patient experiences with opportunistic offer of HPV self-testing in Aotearoa New Zealand primary care clinics: interview and survey findings. BMC Primary Care. ISSN: 2731-4553

https://doi.org/10.1186/s12875-026-03247-z

BMC Primary Care

https://doi.org/10.1186/s12875-026-03247-z

Article in Press

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Received: 12 November 2025

Accepted: 23 February 2026

Published online: 03 March 2026

Cite this article as: Bartholomew K., Maxwell A., Yang L.P.H. *et al.* Clinician and patient experiences with opportunistic offer of HPV self-testing in Aotearoa New Zealand primary care clinics: interview and survey findings. *BMC Prim. Care* (2026). https://doi.org/10.1186/s12875-026-03247-z

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Abstract

Background

To support the introduction of human papillomavirus (HPV) self-testing in the New Zealand National Cervical Screening Programme, we conducted an implementation study aimed to explore the acceptability and feasibility of opportunistically offering HPV self-testing in the general practice from both clinician and participant perspectives with a home testing option and centralised follow-up.

Methods

Primary care clinicians trained to offer the HPV self-test were invited to semi-structured interviews exploring their perception of receptivity to the opportunistic offer and challenges and enablers to implementation. Reflexive thematic analysis was undertaken on transcripts. Participants (aged 30-69 years) were sent a link to an online survey after HPV result notification. Survey results were analysed using descriptive statistics with an inductive approach to analysis

of free text responses. Participant recruitment and data collection occurred between November 2021 and January 2024.

Results

Of the 40 clinicians trained to offer HPV self-testing, 12 primary care clinicians from six ethnically diverse primary care sites in Auckland completed an interview. ‘Positive reception’ was the strongest theme with clinicians reporting that overwhelmingly, participants were receptive to the HPV self-test offer. The four enabler themes were: ‘supportive practice systems’, ‘importance of the discussion’, ‘options for testing and ‘specialised support and consistency’. Key challenge themes in implementing opportunistic self-testing were ‘competing demands’ and ‘communicating what it’s all about’.

Of the 3524 study participants, 394 responded to the survey. Most (93%) found the amount of information they received about HPV self-testing ‘about right’ and were comfortable in their decision to self-test (86%). Considering their next cervical screening, more respondents preferred home-based self-testing options than self-testing at a clinic (46% versus 37%).

Conclusion

Offering the HPV self-test opportunistically to people due for screening when they visited their GP for any reason was generally well received and feasible for clinic staff. The option to take kits home for sampling was an enabler of participation. Supportive systems and resources for clinicians will be important if opportunistic HPV self-testing is offered more widely in primary care, including further consideration of a central specialist team to follow-up and support home testing and participants with HPV detected results.

Trial registration

This study did not reach the ICJME or WHO criteria for clinical trial registration.

Keywords

Cervical screening; human papillomavirus (HPV); self-sampling; at-home testing; primary care; clinician perspectives, participant perspectives, Māori health, Pacific health, health inequity; implementation science.

Introduction

In September 2023 the National Cervical Screening Programme (NCSP) in Aotearoa New Zealand (New Zealand) transitioned from cytology to human papillomavirus (HPV) testing as the primary screen, with the option of self-testing using a vaginal swab. The screening age range is 25-69 years with a routine recall interval of 5 years (1). New Zealand has longstanding disparities in screening rates, reflected in high cervical cancer rates among Māori, the Indigenous population, Pacific and under-screened people (≥2 years since due date) (2-4). Cervical screening is mainly accessed through an appointment at a general practice (GP) clinic, and with a small number of community provider outreach services. The HPV self-test is well-suited to being offered 'opportunistically' when eligible patients present to their GP for any reason. Opportunistic HPV self-testing is potentially an important strategy that could reach many of those who are due for screening or have never been screened who visit a primary care provider.

Previous research among primary care clinicians in Australia and the US has shown that opportunistic integration of HPV self-testing into the GP encounter facilitated uptake, and clinicians considered it an important strategy for reducing barriers and screening disparities (5-9). A large-scale trial of opportunistic HPV self-testing with 'non-attenders' in ethnically diverse London practices (YouScreen) found it both feasible and acceptable, with a small increase in screening coverage in participating clinics (10).

In New Zealand, there is an established role of nurses in primary care who are accredited to take cervical samples. As well as having a role in the renewed programme as 'HPV screen takers', health professionals who can facilitate HPV testing are well placed to provide opportunistic HPV self-testing in GP clinics.

While for most people the HPV self-test itself is straightforward to perform, integrating opportunistic self-testing into the workflow of a busy clinic is likely to come with significant logistical, resource and communication considerations. Additionally, for those who have HPV detected results, skilled communication is needed to ensure that they understand their result and complete the recommended follow-up (11, 12).

As part of a broader research programme on the implementation of HPV self-testing, funded by the New Zealand Ministry of Health to help inform the programme change, we trialed opportunistic offer of HPV self-testing in primary care, together with result notification and management by a centralised nurse-led coordination team. Participation and test completion rates have been reported previously (13). Consideration of health professional and consumer perspectives has been shown to be important for implementing health services that align with patient needs (14). Therefore, this study, aimed to understand the acceptability and feasibility of opportunistic offer of HPV self-testing in general practice clinics from both a heath professional and participant perspective.

Method

Study design and setting

This mixed methods study involved interviews and surveys. Participant recruitment took place in six GP clinics from November 2021 to September 2023 in Auckland, New Zealand, stopping just prior to the change in the NCSP to primary HPV screening. The GP clinics, which were part of a metropolitan primary healthcare organisation (PHO), were selected for the high proportions of enrolled Māori and Pacific people living in areas associated with high levels of socioeconomic deprivation and overall low cervical screening participation. Clinics in this PHO offer a mix of appointment and unbooked services. In New Zealand, PHOs provide primary healthcare services to their enrolled patients through general practices.

Clinician and participant study populations

Forty clinical staff (9 GPs and 31 nurses, most of whom were experienced cervical screen takers) were trained to offer HPV self-tests using specifically designed credentialing modules. Modules provided knowledge on HPV and self-testing, the HPV swab (13), laboratory reporting format, screen taker requirements, study procedures and pathways, results management, clinical scenarios and frequently asked questions. The clinic nurses had support from a central team of cervical screening research nurses that acted as an advisory resource and took responsibility for HPV result notification and management.

The potentially eligible population (presenting to one of the six participating clinics in the study period and due screening) comprised 9,292 people (Māori 14.8%; Pacific 41.8%; Asian 35.6%; European/Other 7.8%). Those aged 30-69 years who were due for cervical screening and without a history of high-grade abnormalities were identified on the practice management system (PMS)

dashboard when they presented to a participating clinic. In some clinics those due screening received a PMS-generated text message about the self-test availability while they were in the clinic waiting room. Potentially eligible participants attending the clinic were given a study brochure and verbal explanation of the HPV self-test and answered further eligibility questions (e.g. for gynaecological symptoms). Those who consented to participate were encouraged to complete the self-test in the consultation room or clinic bathroom. If they preferred, they could take a test kit home, returning their sample to the clinic or a laboratory collection centre. Details about the HPV test, study participant data management system and results management have been reported previously (13).

Clinician interviews

Clinicians trained to offer the self-test were invited to an interview at the end of the study (October – November, 2023). A semi-structured interview schedule was developed with open-ended questions that explored the following broad domains: receptivity to the opportunistic offer; challenges to the offer and uptake of the self-test; enablers to the offer and uptake of the self-test; and their experience of the central specialised support and results follow-up model (see Additional file 1 Interview Questions).

Written consent was obtained from clinicians. Interviews took place in GP clinic rooms and, with permission, were audio recorded and transcribed verbatim. One participant declined audio recording and detailed notes were taken during the interview. Analysis was undertaken using Braun and Clarke's six-phase framework for thematic analysis (15). Following repeated reading to gain an in depth understanding (Step 1), the interview transcripts were coded line by line, using a tabular format in Microsoft Word by one of the research team (AM) (Step

2). Codes were examined for common meanings or ideas and grouped (Step 3). Draft themes were developed from the grouped codes, reviewed by discussion with a small group of team members, to understand meanings in relation to the interview schedule and overall research questions (Step 4). Following this process the themes were checked back with the codes and original data set to confirm the final themes (and subthemes), and names and descriptions of the themes (Step 5). Illustrative quotes were assigned to each theme (and subtheme) and are described in the results section (Step 6).

Self-testing participant surveys

Two cross-sectional online surveys were created in the Qualtrics^{XM} platform, one for participants with HPV not detected (90% of participants), and one for participants with HPV detected test results. Study participants with HPV not detected results were sent a link to the online survey as part of their negative test result text message (from November 2021 – September 2023). Participants with an HPV detected result were sent a survey link one day after a phone call from the study nurse discussing HPV management recommendations and support, to capture understanding and concerns soon after the conversation (from November 2021 – January 2024). Survey questions were further developed from surveys used in our previous HPV studies and pre-tested with the eligible demographic group (16, 17). Both surveys included questions on the information participants were given about the HPV self-test, how comfortable they felt with their decision to have the self-test, and their test preferences when next due for cervical screening. Those who received an HPV detected result were also asked about their understanding of the test result, how worried they felt about their test result and their main concern, how comfortable they felt about attending a follow-up, and what would help them to attend a follow-up smear or colposcopy (see Additional file 2 Survey Questions). Both surveys contained demographic

questions on self-identified ethnicity and age group in four categories. Results were extracted into Excel for analysis (18). Descriptive analysis was performed on quantitative survey responses to present numbers and percentages for individual subgroups and overall. Chi-squared tests were used to determine the statistical significance of the differences. A p-value of <0.05 was considered statistically significant. The analyses were conducted using Excel (18) and Stata 18 (19). A research question-led inductive thematic approach to analysis of the free text responses was undertaken by LYa (20). After repeated reading and familiarisation with the transcripts, data was coded inductively using a tabular format in Word and codes of similar meaning were grouped into themes of relevance to providing answers to the research question. Codes and themes were discussed and finalised with a small group of team members. The findings were summarised descriptively with illustrative quotes.

Ethics and approvals

Ethical approval was obtained as part of approval for the wider research project from the New Zealand Health and Disability Ethics Committee, reference number 21/STH/141. Approval for data access was obtained from the NCSP and from the National Kaitiaki Group, which oversees the use of data from wāhine Māori (Māori women) from the NCSP Register. This study adhered to the Declaration of Helsinki.

Results

Clinician interviews

Twelve clinicians completed post-study interviews (30% response rate, n=40), which lasted 30-60 minutes. All six participating clinics were represented among interviewees. Eleven interviewees were practice nurses, ten of whom were trained smear takers, and one was a GP. While age and ethnicity were not uniformly collected, the participating clinicians were predominantly female and of Asian ethnicity.

Themes are discussed using sample quotes under each of the domains of receptiveness, challenges and enablers as covered in the interview schedule and linked to the research question.

Receptiveness to the offer

Three main themes were identified from clinicians' accounts of the response to the opportunistic HPV self-test offer: 'positive reception', 'hesitancy' and 'hefer or decline'.

'*Positive reception*' was a dominant theme. Clinicians reported that overwhelmingly, those attending the clinic were receptive to being offered the HPV self-test opportunistically if they were due screening and were generally 'happy to do it.' There were two subthemes in relation to this receptivity.

'Autonomy and convenience': clinicians reported that participants appeared to value the sense of autonomy provided by the self-test and the convenience of being able to complete cervical screening when attending the clinic for any reason:

> *When they find out that they can do this test by themselves, they're quite delighted.* [Practice Nurse 0023]

> *They can do it within two minutes… while they're waiting for the doctor… and just do it in our bathroom.* [Practice Nurse 0012]

'Different to the smear': many of the clinicians described how offering the self-test contrasted with their previous experience approaching people about a clinician-taken smear test, which had often encountered resistance. Several commented on the participation of those who had repeatedly declined cervical screening:

> *Before when we offered the smear, mostly they said, 'Uh, no, I don't want to… I didn't have a shower, I didn't…', you know, there's a lot of excuses, but now…* [Practice Nurse 0026]

'Hesitancy': While less common than positive reception, clinicians also described reluctance from some to doing a self-test, with two subthemes related to the test and testing environment.

'Comfort with time and place' reflects concerns and preferences for when, where and how the test was done, particularly about 'feeling safe' to do it in the clinic facilities. There were often limited spaces available to do the test, and some participants were uncomfortable with using the clinic bathroom due to hygiene concerns, lack of privacy or a sense of safety from a cultural perspective.

> *Some patients they say 'Oh, this means I just go into your toilet and do it?' and you can see their face and they're thinking… 'Oh my goodness… it's not really comfortable'.* [Practice Nurse 0012]

*'Uncertainty about the test'***:** A few clinicians encountered hesitancy about the new self-test for cervical screening, particularly among older participants, both confidence in its accuracy and 'fear of doing it wrong':

> *Some of them are maybe a bit sceptic[al] in terms of how it will change the smear in comparison to just doing the swab. What will it test?* [Practice Nurse 0014]

'Defer or decline': Clinicians also encountered a few who were not at all receptive to the invitation to do a self-test. Two subthemes indicated the range among these responses:

'Personal readiness': some participants appeared not ready or willing to engage in decision making about cervical screening at the time, due either to personal factors, such as feeling unwell, tired or menstruating, or situational factors that made the opportunistic offer impractical, such as 'being in a rush' or having children with them:

> *Some of them will want to think about it. They say, no, we're gonna come back*. [Practice Nurse 0022]

> *Sometimes they come with the kids, so it's hard to do them.* [Practice Nurse 0022]

'Not for me': While interviewees generally reported that few strongly declined the self-test offer (perception of the proportion of declines was variable), some described instances where participants believed they didn't need the test because of their age or not being sexually active or had a previous negative experience with screening.

> *There were one or two quite strong ones - said they didn't need the test.* [Practice Nurse 0016]

Challenges

Clinicians encountered some challenges in implementing opportunistic self-testing. Two themes were identified: 'competing demands' and 'communicating what it's all about'.

'Competing demands' of other clinical priorities was a strong theme. Many of the clinicians described having to prioritise clinical tasks, some highlighting cervical screening in the context of 'so much screening' required or described how 'being rushed' worked against taking time to present the screening in a way that would be receptive to participants. Time constraints were greatly exacerbated by the COVID-19 restrictions in the early part of the study period.

> *So this is one of the five or six other screening activities that I have to tick off. Okay, that doesn't always happen... especially on the weekends when we're short staffed... and occasionally, I might miss offering that option.* [GP 0027]

'Communicating what it's all about': Patients were not expecting to discuss cervical screening at their appointment and clinicians described challenges explaining the new HPV self-test 'so they know what it's all about'. This was made more challenging by the linguistic diversity among clinic patients and by varying levels of health literacy.

> *Most of the patients know about smear tests... the word itself, they know it's related to cancer. We say we are now testing the virus itself that's causing cancer, then they have lots of questions, or sometimes they were just staring at you.* [Practice Nurse 0012]

> *Some patients maybe don't have the medical background to understand what we mean by the virus, to understand the difference.* [Practice Nurse 0012]

Enablers

Four themes were evident in relation to what facilitated the self-test offer and readiness to participate: 'supportive practice systems', 'importance of good discussion', 'options for testing' and 'specialised support and consistency'.

Clinicians identified a range of ‘supportive practice systems’, including both technological aids and staff management factors, that assisted them with opportunities to offer the HPV self-test.

The PMS dashboard highlighting patients due for screening was seen as a successful initiative that facilitated quick identification of potentially eligible patients:

> *That dashboard really helped - the red sign will show if they were overdue, we just didn't have to do so much opening of files to see when the last test was.* [Practice Nurse 0013]

In clinics where a PMS-generated text message was sent to those due for screening while they were in the waiting room, clinicians reported that they found it a useful opener that prompted a conversation about cervical screening:

> *So women will just come in, they will say ‘I've got a text message’. And then we'll talk about it. So that's when we will offer it.* [Practice Nurse 0026]

Other interviewees highlighted clinic process and management factors – such as the patient triage system and supportive teamwork – that increased opportunities for offering the self-test:

> *The doctors were really supportive… we tailed* [the offer of the self-test] *onto the end of the doctor's consultation.* [Practice Nurse 0020]

‘Importance of the discussion’: Many of the clinicians talked about the value of face-to-face discussion for explaining the self-test, and taking time to achieve a good understanding:

> *I find that if you take time, and explain clearly, women are more receptive of it.* [GP 0027]

Placing the cervical screening discussion in the context of other screening and prevention discussions was helpful. One interviewee elaborated on this:

> *So preventative screening is something I try to do with every consultation... that includes the smoking status update as well as the alcohol intake kind of thing: 'Hey, do you mind if I take a few minutes to talk about screening?' And I haven't come across a woman that says no.* [GP 0027]

Reassurance and support were key components of a good discussion, relating both to accuracy of the test and providing reassurance that a self-test could be done correctly. Written information about the self-test played a more supportive role to discussion, although a few clinicians described how the pictorial instructions, and demonstration with a swab, were helpful to support understanding of how to do the test:

> *I actually opened the swab and showed them where the line is and, once they saw the line, they realised that, you know, that long swab didn't have to go up forever.* [Practice Nurse 0020]

Being able to offer ' options for testing' was clearly a facilitator of uptake, both the offer of nurse-supported testing and particularly the option of home testing.

> *We did have a few ladies that we had to do it for them... or we guide them through it, we stay in the room with them, and then we let them know how to do it.* [Practice Nurse 0014]

> *When they say they don't have time, we will say, 'Oh, you can actually take this kit home'.* [Practice Nurse 0023]

Clinicians reported that the most common reason for taking a kit home test was discomfort with testing in the clinic. Taking the sample in their own space at

home provided a greater sense of comfort, safety or hygiene: ‘they feel safer to do it at home’. The option of taking a kit home was also helpful to mitigate the time constraints where patients were ‘rushing in and rushing out’, had children with them, or wanted more time to read through the information.

Finally, the ‘specialised support and consistency’ provided by the centralised specialist nurse team was an enabling theme. While a few clinicians commented on role change confusion, because as a smear taker, you deal with the results as they come to you’, in general, they saw the support of the specialised team as advantageous. Perceived benefits were not only from a resource perspective – result notification (to participants by the central team) was one less task for clinicians – but they also valued the team’s clinical and communication expertise, particularly where clinic staff felt ‘confused about clinical guidelines’ or ‘not very good with explaining’ results. One interviewee expressed a strong preference for an ongoing centralised model to ensure consistent and reliable screening practices, and consistent management of screening results.

> *I think it's a great advantage to have because, if you take all smear takers, everyone's ability to read results in time and knowledge of where to do what when, there's a huge variation. And we can mitigate that by having a centralised trained team that knows who to screen and how to screen, then we can manage results a lot more safely and more proactively...* [GP 0027]

Participant survey

Overall, 11.2% (n=394) of all participants with an HPV self-test result (n=3524) responded to the online survey (December 2011 - September 2023). The response rate was higher in those with an HPV detected result (33.4%; n=112 of 335) than in those with an HPV not detected result (8.9%; n=282 of 3159)

($p<0.001$). The respondents were reasonably diverse in terms of self-reported ethnicity: Māori (15%), Pacific (28%), Asian (38%), European/Other (13%) and not answered (7%). There was a similar number of respondents across each of three age bands from 30-59 years (24% to 28% each), with fewer (16%) aged ≥60 years (see Additional file 3). Compared to the self-tested participants, there was a lower proportion of Pacific and a higher proportion of European/Other ethnicity groups and lower proportion of the 30–39-year age group in the survey respondents' sample ($p<0.05$). Additionally, there was a lower proportion of HPV not detected, and a higher proportion of HPV detected participants in the survey sample compared to the self-tested participants ($p<0.05$) (see Additional file 3).

Amount of information on self-testing

Most (93%, n=365) respondents stated that the amount of information they received about the HPV self-test was 'about right'. A key theme from the free text responses was 'appreciation of the explanation':

> *I was well informed of my choices.* [Pacific participant, 60-69 years]

A small proportion of respondents wanted to know more, with a theme 'Specifics about the test', such as the accuracy or benefits of the HPV self-test.

Comfort level with decision to self-test

The majority (86%, n=337) of survey respondents were comfortable with their decision to do the HPV self-test. Of the survey respondents who provided free text comments most were highly favourable regarding their experience of the opportunistic self-test, with the main theme 'ease and autonomy':

> *It was easy, quick and private.* [Pacific participant, 50-59 years]
>
> *I was surprised with this such an easy self-test.* [European/Other participant, 40-49 years]

Didn't hesitate when the nurse told me about this self-test because I get to do it myself whereas before I don't go to my cervical appointments. [Pacific participant, 50-59 years]

Themes from the more ambivalent comments were 'uncertainties about the test', such as concern about whether they had performed it correctly and the longer testing interval, and 'location of testing', several respondents expressed discomfort with testing in the clinic bathroom:

As an obese woman I did have a little trouble getting in a position to do the test, I couldn't do it sitting as directed in the instructions. [Māori participant, 50-59 years]

Please provide a stretcher or bed while doing the self-test in the clinic. [Pacific participant, 60-69 years]

Didn't feel very confident. I hope I did it correctly as next is due in 5 years. [Asian participant, 60-69 years].

Furthermore, free text response from participants who tested at home (n=30) were universally positive with dominant themes of 'relief and dignity' and 'convenience':

I sincerely appreciated the option to 'self-test' in the comfort and privacy of my own home... I didn't have to go through the emotions of discomfort and feeling whakama of exposing my tinana (body), but rather proud that I was in control... Mihi maioha (thank you) for restoring my dignity and mana (power/spiritual power). [Māori 50-59 years]

Simple to do at home... no time off work to go into a clinic and just drop off at the local lab on the way to work. [Māori participant, 50-59 years]

It's in my own comfort space. [Pacific participant, 40-49 years]

Next test preference

When asked about their next cervical screening, most survey respondents (84%, n=329) stated a preference for the HPV self-test. Overall, 37% (n=147) of respondents to this question specified a preference to do the self-test at a clinic, 32% (n=124) a mailed test kit to do at home, and 15% (n=58) to pick up a test kit from a clinic or pharmacy to do at home (see Additional file 4).

When restricted to participants' preferences for self-test at a clinic or home-based self-testing for their next test, a slightly higher proportion of Māori participants (51%, n=25 of 49) preferred a self-test at a clinic, while more European/Other participants (67%, n=30 of 45) preferred home-based self-testing; however, this difference was not significant (p=0.515). While more participants with HPV not detected results (58%, n=141 of 243) showed a preference for home-based self-testing, a larger proportion of HPV detected participants (52%, n=45 of 86) preferred a self-test at a clinic (Figure 1); these results were not statistically different (p=0.097).

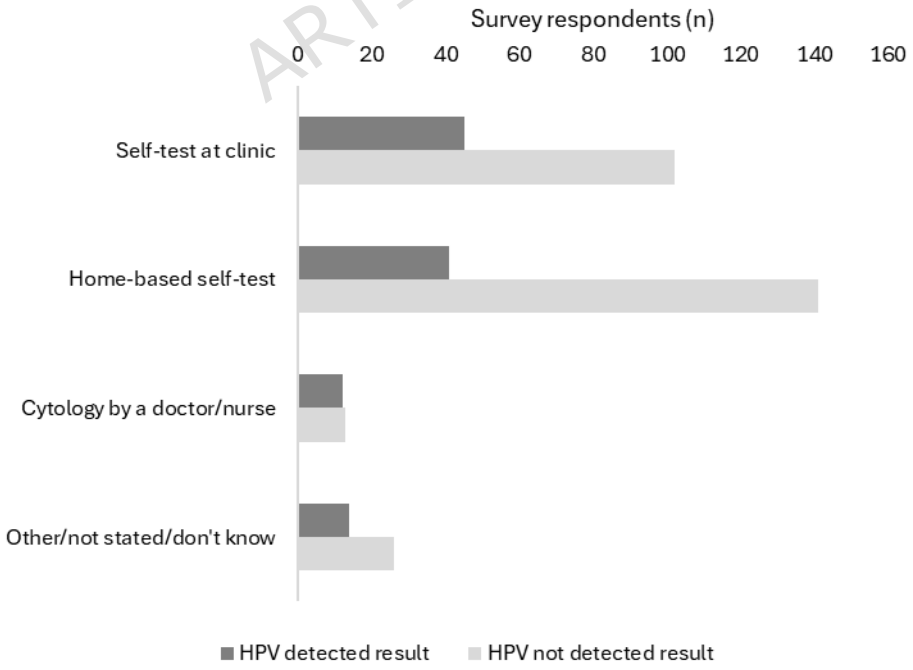

Figure 1. Comparison of the number of next test preferences of HPV detected (n=112) and HPV not detected respondents (n=282).

Understanding of HPV result

Of the respondents to the survey with HPV detected results, 78% (n=87) reported having good understanding of their test result after a cervical screening nurse had discussed it with them, and 21% (n=23) were neutral (Figure 2).

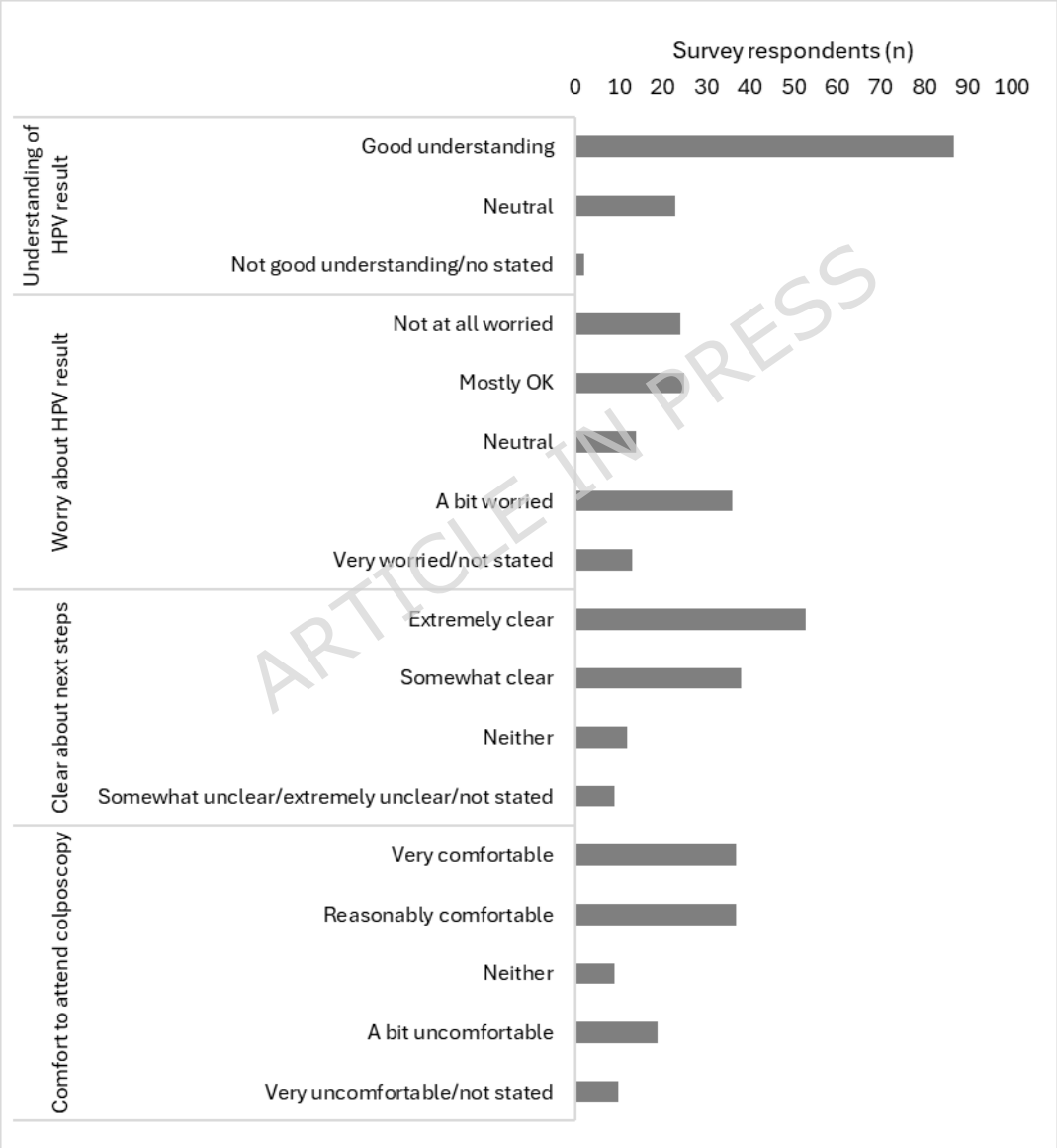

Figure 2. Number of HPV detected survey participants responding to questions on 'understanding of HPV result', 'worry about HPV results', 'clarity about next steps' and 'comfort level to attend colposcopy' (Māori n=15, Pacific n=36, Asian n=33, European/Other n=14, not stated n=14, total n=112). To protect participant confidentiality and privacy, values of less than 6 are combined with at least one other value.

Worry about HPV detected result

Regarding their level of concern about the HPV detected result, of the 110 respondents to this question, 10% (n=11) reported being very worried, 33% (n=36) a bit worried, 13% (n=14) were neutral, 23% (n=25) were mostly OK, and 22% (n=24) were not at all worried (Figure 2). The dominant theme from the reasons for worry about HPV detected results was 'anxiety about cancer', with a sub-theme relating to the additional burden of uncertainty and 'having something else to worry about':

> *I'm also glad that I have done the test and the outcome did get me worried a bit. As long as I follow through with all my tests, I can feel better about myself and choices I make.* [Māori participant, 40-49 yrs]
>
> *I'm thinking of my children.* [Pacific participant, 50-59 years]
>
> *Not knowing how long I had the virus, how I got it and when will it go away.* [Asian participant, 50-59 years]

Clarity and comfort with follow-up testing

Most respondents with HPV detected (81%, n=91 of 112) felt clear about 'what happens next' (Figure 2). Most (66%, n=74) felt comfortable about attending a colposcopy, with those who were less comfortable most commonly selecting 'more information about what to expect' (n=19).

Discussion

Our study explored both clinician and participant perspectives of implementing opportunistic offer of HPV self-testing in a primary care setting serving a diverse and under-screened population, with a centralised follow-up team. The study was conducted prior to the New Zealand implementation of primary HPV screening with offer of self-testing and helped inform the decision to support this policy change. COVID-19 restrictions took place during the study timeframe.

Receptivity

According to clinicians, most participants were very receptive to being offered the HPV self-test when they attended the GP clinic for any reason. This finding, together with positive reports about the offer from most survey respondents, supported quantitative findings from the main study indicating that HPV self-testing offered opportunistically was broadly acceptable (13). Recent international reviews and meta-analyses have reported on the relative success of HPV self-test invitation strategies involving a face-to-face invitation (21-24). Compared to other approaches, direct offer of the HPV self-test in primary care clinics has the benefit of an in-person explanation in a generally trusted setting that can support uptake of the offer. However, receptivity must be considered within the overall context of known systemic access barriers to primary care that disproportionately impact Māori wāhine (25).

Patient-centred barriers and enablers

The clinicians reported that clear, unhurried, kanohi ki te kanohi (face-to-face) discussion was a key factor supporting understanding and participation in the HPV self-test, and that putting the self-test offer in the context of other screening

and prevention discussions was helpful. Survey participants reported a good understanding of self-testing, including clear follow-up steps from nurse communication, which likely supported their comfort level with self-testing (16). The importance of the clinician-patient relationship, good communication and adequate information are similar themes found in other qualitative studies of HPV self-testing in Australian and New Zealand primary care settings (5, 26). Clinicians in our study attended in-depth training on offering the HPV self-test, including scenarios of difficult or uncertain situations. Communication challenges reported by the clinicians often related to the diversity of levels of health literacy among the patient population, suggesting that 'layered' communications in a range of formats and level of detail are needed. Clinician cultural safety and competence[a] have been identified as significant barriers in primary health care (27, 28). A previous study on the acceptability of self-testing among never or under-screened Māori wāhine found culturally competent engagement was an important factor influencing uptake (29). Continuing to strive for alignment with *tikanga* (cultural protocols and processes) in mainstream primary health services as well as workforce diversity, representing the population being served, and culturally safe health interactions to reduce trauma are key ways of addressing inequity (30-32).

Clinicians reported that some participants were not comfortable with the time and place for self-testing at the clinic or with the clinic facilities for comfort or accessibility. Participants in this and similar studies have commented on clinic

[a]We utilise the Curtis et al (28) definitions of cultural safety and cultural competence in use in New Zealand. Cultural safety refers to the ongoing responsibility that healthcare professionals and organisations have to critically examine and address the influence of their own culture - including power, privileges, biases, attitudes and prejudices - and the potential impact these may have on patient interactions and delivery of health services with the goal of developing culturally safe care as defined by patients and the community. Cultural competence describes the cultural knowledge, skills and ways of working that health professionals need to provide high quality healthcare that is equitable for all populations.

bathrooms being cramped, feeling ‘unhygienic’, not sufficiently private, or culturally not feeling like a safe place for self-sampling (23). For Māori, the womb (te whare tangata, the house in which human life grows), can have particular significance and sacredness (31). Research among Māori wāhine and Indigenous Australian populations has shown that self-testing increased body autonomy (26, 30). This and other cultural factors, including connections to the body and whenua (land) for Māori wāhine, together with cultural safety are likely to impact the safety and comfort of the testing environment and overall trust and willingness to participate in cervical screening (31, 33, 34). These aspects need to be considered within the wider context of structural barriers to healthcare for Māori, which include colonisation and breaches of Te Tiriti o Waitangi (the founding agreement of Aotearoa New Zealand) (25). Cultural considerations are also important for Pacific populations (35). Furthermore, personal or situational circumstances made self-testing onsite difficult for some participants. The option to take a self-test kit home was a mitigating strategy. Despite the initial offer to test in the clinic, clinicians reported that the option to take kits home supported participation, providing a greater sense of comfort, safety or convenience. While all were offered the self-test in a clinic, nearly half of our survey respondents preferred to do a home-based sample when they are next due screening. This result supported our previous study findings (13) and other studies that have found ‘home’ to be the preferred setting for cervical self-sampling, including for wāhine Māori (16, 29, 36-38). Additionally, non-speculum clinician-collected samples could be an option for those who fear incorrectly administering the self-test or have difficulty collecting a self-sample due to physical impairments or disabilities (39).

Clinician implementation barriers and enablers

From the clinician interviewee accounts, the opportunistic offer of the HPV self-test was feasible to integrate into the clinic workflow. Nevertheless, they encountered some implementation challenges. There was a strong theme of competing demands on clinicians, not least from requirements to undertake opportunistic screening for other conditions, and these time constraints in busy clinics are likely to have made the offer to all potentially eligible patients challenging. This finding aligns with other studies that reported or anticipated competing priorities within consultations as a barrier to implementing opportunistic offer of the self-test (40, 41). In contrast, other clinician implementation barriers reported were gaps in knowledge and understanding and mixed attitudes to self-testing, specifically two thirds of GPs and nurses were either neutral or preferred sample collection by clinicians, in a study among primary healthcare staff (GPs, nurses and other health care workers) in Australia (42). In our study, the self-test was mostly delivered by nurse cervical screen takers, either before or after the consultation with the doctor, countering some concern that opportunistic self-sampling might cause workflow disruptions or shorten the patient-doctor encounter time (9). The interviews in our study also indicated that well-designed technological aids and supportive staff management processes can be employed to support opportunistic offer and uptake of the test. These included a PMS dashboard identifier of those eligible for a self-test and the text message icebreakers.

Centralised support team

Clinicians appreciated the support and management of results by the central specialist nurse research team. Our survey finding that an HPV detected result is worrying for many participants is consistent with other studies finding that anxiety, shame, or fear of cancer were associated with an HPV detected test result (11, 43). Support for a centralised team as an ongoing service model was

partly based on its advantages as an experienced team of cervical screening specialists offering safe, consistent and proactive results management. Participant experience of results communication and follow-up appeared to support this perception, and a high level of results follow-up (95.7%) was achieved in our study (13).

Another key service role of the central team was follow-up of kits taken home. Follow-up of samples not returned has been anticipated as a challenging area in the new HPV self-test era and there is an identified need for robust support systems (8, 44) that could have benefits for both clinicians and patients.

Overall, next test preference was for self-testing at home in our study and a previous New Zealand study (16), however, HPV detected participants most frequently preferred self-testing at a clinic whereas self-testing at home was preferred by HPV non-detected participants in our study, although, these were not significantly different.

Strengths

This investigation into the experiences of clinicians and participants enriches the quantitative findings from our study of opportunistic HPV self-testing (13) and has been shown to be important to ensure health services meet patient needs (14). We identified real-world challenges and enablers for clinicians working in busy clinics with culturally and linguistically diverse populations. Many of those presenting to the practice were overdue for cervical screening and were a priority group for increasing participation. We were able to explore their receptiveness to opportunistic offer, some of the barriers to uptake of the test in clinic and some pragmatic enablers.

Limitations

Several factors may limit the generalisability of our study to other primary care clinics. The ethnicity and socioeconomic status of the patient population in the participating clinics does not reflect all populations in New Zealand and the response from participants and challenges faced by nurses may be different in other regions. The age and ethnic group of clinicians was not systematically collected. The PHO incorporated opportunistic interventions into their patient consultation model prior to the study, whereas this way of working may be less readily accommodated in clinics that do not operate in this way (25, 45). The study was conducted during the COVID-19 pandemic, which was likely to have exacerbated staffing shortages and pressures. Despite measures taken to support survey participation, the response rate was low (11.2% of participants with a test result), particularly for those with HPV not detected results who comprised 90% of participants invited to the survey. Finally, the study took place prior to the national roll-out of HPV self-testing, with the intent of informing programme change, along with additional studies from our research programme and other groups (46). Testing for HPV with a self-swab was a significant departure from previous experience of cervical screening, requiring in-depth first-time explanations. It was also offered as a research study. The response from patients may be different once the test is more established as usual care.

Conclusion

The insights from clinicians and participants involved in implementing opportunistic offer of the HPV self-test in GP clinics support the acceptability of this approach and its feasibility for clinic staff. Most participants were comfortable with communication about self-testing and follow-up and decision to self-test. There were some indications of preference at the next test for home-testing by HPV non-detected and clinic testing by HPV detected participants.

Wider implementation of the opportunistic offer of HPV self-testing in New Zealand primary care could increase screening coverage among those not currently accessing screening. Flexibility in the choice of taking kits home for sampling is an important enabler to participation. The study highlights the importance of resources and systems to support clinicians in primary care to offer the HPV self-test opportunistically. Further investigation into a centralised specialist team model, to provide support and follow-up of those who take a kit home and potentially overseeing HPV results management, could be useful for future programme planning.

List of abbreviations

GP	General Practitioner
HPV	Human papillomavirus
NCSP	National Cervical Screening Programme
PHO	Primary healthcare organisation
PMS	Practice management system

Figures

Figure 1. Comparison of the number of next test preferences of HPV detected (n=112) and HPV non-detected respondents (n=282).

Figure 2. Number of HPV detected survey participants responding to questions on ‘understanding of HPV result’, ‘worry about HPV results’, ‘clarity about next steps’ and ‘comfort level to attend colposcopy’ (Māori n=15, Pacific n=36, Asian n=33, European/Other n=14, Not stated n=14 Total n=112). To protect

participant confidentiality and privacy, values of less than 6 are combined with at least one other value.

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Declarations

Ethics approval and consent to participate

This study was approved by the New Zealand Health and Disability Ethics Committee (HDEC), reference number 21/STH/141. Data access was approved by the NCSP programme and by the National Kaitiaki Group, which oversees the use of data from wāhine Māori (Māori women) from the NCSP Register. The study was approved through localities research office approvals in the three Auckland districts where the study was conducted. A Māori data sovereignty assessment was conducted and approved as part of ethics and localities approval. A privacy and security assessment was conducted and approved. All individuals in the

study provided informed consent. This study adhered to the Declaration of Helsinki.

Consent for publication

Not applicable.

Availability of data and materials

The data used and analysed during the current study contain identifiable individual patient information, including that of Māori. The data are not publicly available due to the data confidentiality and privacy restrictions and Māori data sovereignty considerations but are available from the corresponding author on reasonable request and corresponding approvals.

Competing interests

The authors declare that they have no competing interests.

Funding

This study was funded by Health New Zealand | Te Whatu Ora's Te Toka Tumai Auckland District, Waitematā District, and Counties Manukau District, Tamaki Health, and Health New Zealand | Te Whatu Ora's National Screening Unit (formerly the Ministry of Health, New Zealand).

Author contributions

Conceptualisation – KB, AM, CB, JG, KM

Methodology - KB, AM, CB, JG, SS

Software – AM, JG, CN, LYa

Validation – CN, LYa

Formal analysis – AM, LYa, CN, PSA

Investigation – SC, CB, GM, JK, DF, RM, JG

Resources - KB

Data curation – LYa, CN

Writing - original draft – AM, LYo, LYa, SS, KB, CN, CB

Writing - review and editing – all authors

Visualisation – CN, LYa, CB, PSA, LYo

Supervision – JG, SC, KB, PC, WB, CB, GM, RM, AM, DF, JK, KM, SS

Project administration – KB, AM, JG

Funding acquisition – KB

Acknowledgements

We thank the study participants for their contribution to informing the roll out of HPV primary screening with a primary choice of self-test in Aotearoa New Zealand. We acknowledge the leadership and dedication of the nurse-led co-ordination team (Seshnee Pillay, Fiona Gillet, Frances Kendall, Isha Gaikwad, Natacha Toledo Yanez), the HPV call centre and mail-out staff (Melissa Murray, Awhina Brockbank, Paris Fale, Eden Wharerau, Faenza Williams-Fonohema, Brooke Crawford, Louise Swann, Angelina Taungahihifo) and kaiawhina (cultural support; Marara Metekingi). We thank the Group Manager of the Māori Health Pipeline team Scott Abbot and the Māori engagement manager Erin Stirling for their ongoing support. We thank Dr Mahesh Patel (Clinical Director), Rachael Sculley (Nurse Leader), and Reshmi Lata Chand (senior nurse) at Tamaki Health for support with results management and troubleshooting in clinics, all the staff at the participating primary care clinics, and Rodney Burger for technical data support. We acknowledge the support of a range of laboratory staff at Pathlab.

We thank the National Kaitiaki Group and National Cervical Screening Programme for their feedback on the initial proposal, the project in flight and this manuscript. We thank the Procon team, Ken Leech and Arthur Mate for their support with the bespoke IT software. We thank the colposcopy teams in the Auckland region who participated in this study. We thank the Equity, Scientific and Technical team for their support with data processes, including Group Manager Wendy Bennett, analysts Michael Walsh and Jean Wignall, and technical data specialist Malcolm Fletcher.

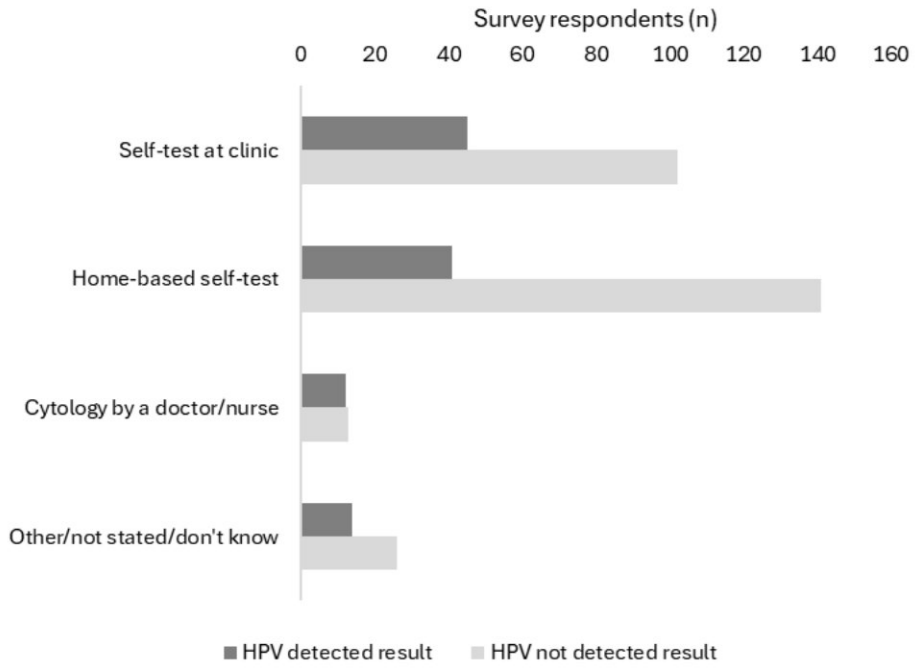
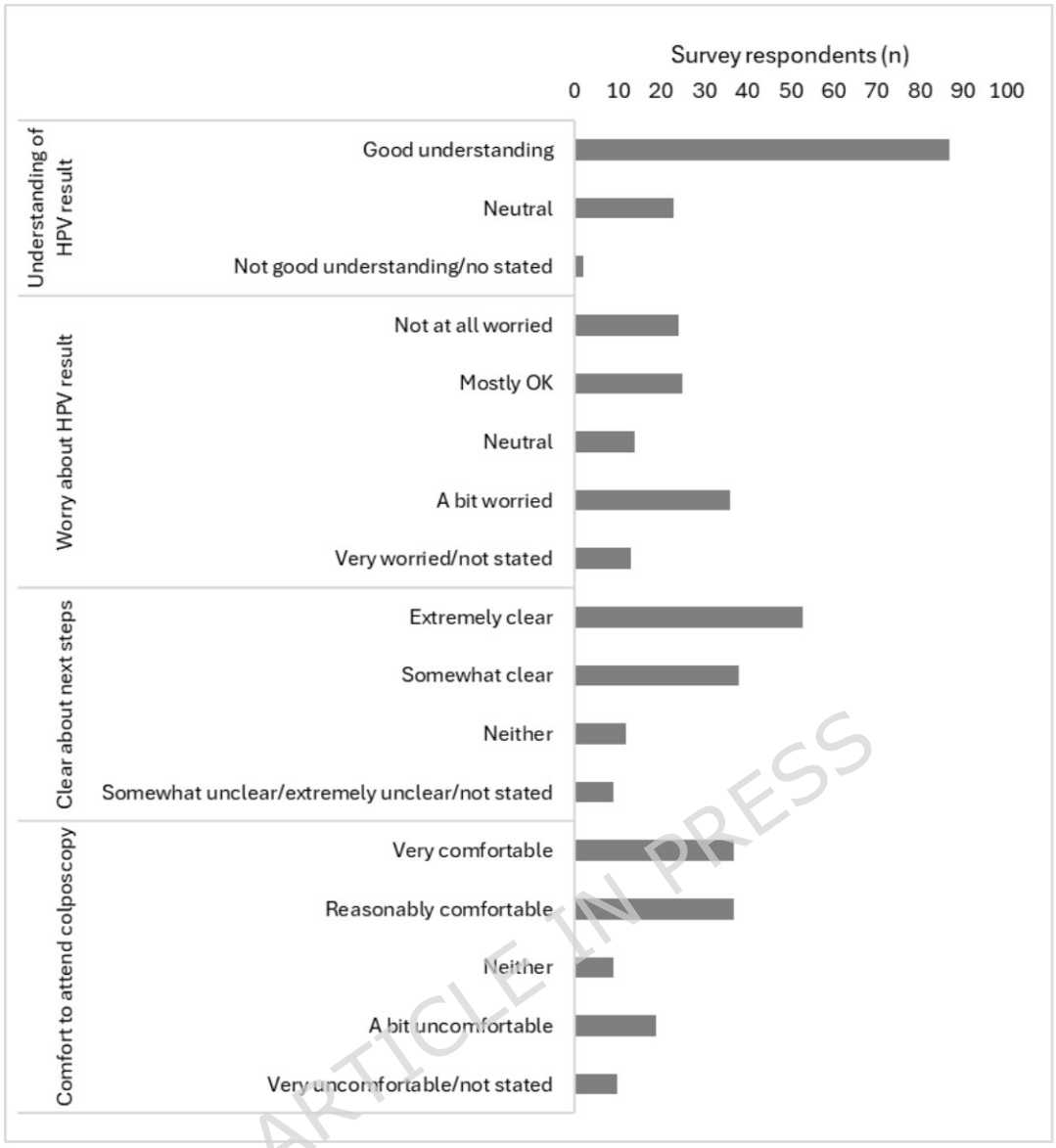


Figure 1. Comparison of the number of next test preferences of HPV detected (n=112) and HPV not detected respondents (n=282).



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