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Research

Renewal of the National Cervical Screening Program: health professionals' knowledge about screening of specific populations in NSW, Australia

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Key points

- We surveyed health professionals conducting cervical screening in NSW, Australia, to better understand their knowledge of the renewed National Cervical Screening Program
- Our study identified gaps in knowledge regarding screening for specific populations of women, including immune-deficient women, women who have had a hysterectomy, and those who have an indication for sample self-collection
- Ongoing support is needed for health professionals to ensure translation of guidelines into practice

Abstract

Objectives: The National Cervical Screening Program was renewed in Australia from 1 December 2017, with the introduction of 5-yearly human papilloma virus (HPV) screening from age 25, and the release of updated national screening guidelines. This study aimed to determine health professional knowledge of the renewed screening program following implementation.

Methods: We invited health professionals providing cervical screening in New South Wales (NSW), Australia, to complete an online survey in late 2018, to better understand their knowledge of the renewed screening guidelines, in particular regarding screening of specific populations, and to ascertain whether they had undertaken any educational activities relevant to the renewal.

Results: A total of 241 responses were included in the data analysis. Health professionals demonstrated good knowledge of some aspects of the renewed program, including 64–85% correctly identifying limited indications for testing people younger than 25 years, 87% correctly identifying the need for completion of the Test of Cure protocol following treatment of high-grade lesions, and 71–80% correctly identifying management of symptomatic women. However several key knowledge gaps were identified including management of immune-deficient women (only 37% of respondents were aware of the need for 3-yearly screening), screening after total hysterectomy (56% were aware of guidance) and approximately 66% of health professionals correctly identifying indications for self-collected screening. One in ten health professionals had not undertaken any education specific to the renewal of the program. We found significant associations between knowledge levels and practitioner characteristics, including practitioners' frequency of access to the guidelines, specific educational activities undertaken and geographic location.

Conclusion: Health professionals demonstrated strong knowledge of key aspects of the renewed National Cervical Screening program. However, our findings highlight some important gaps that may impact successful delivery of the program in Australia, and some significant associations between practitioner characteristics and knowledge levels, which will be important for education providers to note. Targeted educational interventions informed by these findings could support health professionals to better translate guidelines into practice and ensure successful delivery of this important public health program, particularly in regard to management of immune-deficient women, screening after hysterectomy and indications for self-collected screening.

Introduction

The renewed National Cervical Screening Program (NCSP) was introduced in Australia from 1 December 2017, and included replacing 2-yearly cervical cytology testing via Pap smears with 5-yearly human papilloma virus (HPV) testing with partial genotyping and reflex liquid-based cytology (LBC).[1] The screening age range changed to women aged 25–74 years. The option for self-collection of a vaginal swab for HPV testing under medical supervision was also made available for under- or never-screened women, defined as women aged 30–74 years who have never been screened or are overdue for screening by 2 or more years.[2] It was anticipated that these changes would lead to a 24–36% reduction in cervical cancer incidence and mortality in Australia compared with the previous screening program.[3]

Updated accompanying screening guidelines were commissioned by the Australian Government Department of Health[3] and released online in February 2017. Accredited educational activities have been delivered by various stakeholders and were available to cervical screening providers both in the lead up to, and following the program renewal, to assist with delivery of the new screening recommendations.

Correct implementation of the renewed NCSP is required for the success of the program.[4-6] Improving consumer and health professional confidence and participation in the renewed program is a key element in the elimination of cervical cancer in Australia.[7] It is imperative that health professionals delivering cervical screening are familiar with and confident in following the current evidence-based guidelines, which will in turn ensure that women receive appropriate screening and follow-up. Elimination of cervical cancer in Australia is highly dependent on HPV-screening behaviour, particularly in the older non-HPV-vaccinated cohort.[8] General practice is the primary setting for delivery of cervical screening, and has the capacity to provide both routine screening and opportunistic screening for under- and never-screened women, thus impacting significantly on screening and mortality rates. It is important to capture behaviours of screening providers in order to assess delivery of the program, and modify future educational interventions in response to any identified gaps to ensure ongoing success of the program.

A retrospective cross-sectional review of the first 6 months of the program showed some evidence of problems with clinician application of guidelines, specifically that requesting of a co-test (HPV test plus liquid based cytology outside of routine 5-yearly screening) for symptomatic women varied among clinicians, with anecdotal reports of over-ordering.[9] This led to revision of the definition of signs and symptoms requiring a co-test.[10] This highlights the need to continue to identify strengths and gaps in program delivery, so that an appropriate response can be undertaken.

Methods

We invited health professionals delivering cervical screening in New South Wales (NSW) to complete an online survey on the SurveyMonkey platform (San Mateo, CA: SurveyMonkey Inc). Recruitment was via email and social media platforms. Invitations to participate included an email invitation to Family Planning NSW (FPNSW) internal and external mailing lists, advertisements in electronic newsletters (Primary Health Networks and NSW Rural Doctors Network), social media postings on medical professional Facebook groups and Twitter, and postings on the Royal Australian College of General Practitioners ShareGP platform. All invitations and advertisements included a link to the online survey which was open for 3 months from September to November 2018.

Survey questions were developed based on previous research[6], and pilot tested by the research team before implementation. Questions focused on health professional demographic characteristics, knowledge of management of symptomatic women and screening of specific populations as defined in the renewed NCSP guidelines, which include screening after total hysterectomy, screening in women who experience early sexual intercourse or victims of sexual abuse, screening in lesbian women, screening in immune-deficient women and screening in DES (diethylstilboestrol)–exposed women. The survey also asked about respondents'

cervical screening experience, and whether they had undertaken any educational activities relevant to the renewal. The questions discussed in this paper are presented in the results tables.

Once the survey was closed, survey data was exported to Microsoft Excel (Redmond, WA: Microsoft Corporation; 2010) and converted and analysed in Stata (College Station, TX: StataCorp LP; version 14.2). Inclusion criteria were: health professionals living in NSW who provided cervical screening and who completed demographic questions in the survey. Data cleaning and logic check was conducted prior to the analysis. Descriptive statistics of frequency and percentages were used to describe responses regarding uptake of the new cervical screening guidelines, and clinicians' understanding of the updated guidelines. Chi-square testing was applied to detect differences in the category variables, e.g., by clinician type, gender, years of practice and location of practice. The significance level was set at 0.05.

Ethics approval for the study was received from the Family Planning NSW Ethics Committee (approval R2018–06).

Results

In total, 261 clinicians started the survey. Of these, 241 were included in the final data analysis. Nearly half of respondents were FPNSW staff, or recuited via external FPNSW mailing lists. Surveys were excluded if the participant lived outside NSW, did not perform cervical screening or did not complete any demographic questions. Due to the nature of social media posting, we were unable to estimate how many potential participants saw the survey invitation. Respondent demographic characteristics are outlined in Table 1: just under half (46%) were general practitioners (GPs) and just over one-third were nurses or midwives. The majority were female practitioners (96%), and from a metropolitan area (55%).

Most health professionals reported performing cervical screening at least weekly (87%) and accessing a range of educational activities as outlined in Table 2; the most common of these activities were provided by FPNSW (49%) and the Royal Australian College of General Practitioners (RACGP) (22%). One in ten clinicians had not undertaken any educational activities relating to the screening program renewal.

Knowledge of when to test women younger than 25 years

The majority of practitioners demonstrated good knowledge of indications for testing women younger than 25 years, with 64–85% correctly identifying situations for testing women in this age group (Table 3). However, between one in five and one in three health professionals identified incorrect indications for testing women aged under 25. Knowledge of correct indications for testing under 25 was lower for clinicians from a regional centre at around 70% compared with 80% of those from a rural town/remote area and 90% from a capital city/metropolitan city area in relation to the following two statements: "If a woman has post coital bleeding and/or unexplained intermenstrual bleeding" (χ^2 = 10.88, p = 0.004) and "If a woman has had an abnormality under the previous screening program and next follow up test is due" (χ^2 = 10.26, p = 0.006) (see Supplementary Table 1, available from: doi.org/10.6084/m9.figshare.14298737).

Table 1. Survey respondent demographic characteristics (N = 241)

Characteristic	*n*[a]	%
Gender		
Male	10	4. 1
Female	231	95.9
Age group		
≤35 years	54	22.5
36–45 years	63	26.3
45–55 years[b]	59	24.6
>55 years	64	26.7
Obtained primary medical degree in Australia		
Yes	201	85.2
No	35	14.8
Health professional type		
Nurse, midwife	89	36.9
GP (with FRACGP or FACRRM/VR)	93	38.6
GP registrar	24	10.0
GP with DRANZCOG or equivalent	18	7.5
Obstetrician, gynaecologist, RANZCOG trainee, sexual health physician, sexual health registrar	8	3.3
Other[c]	9	3.7
Location of practice		
Capital city/metropolitan city (population >200,000	132	54.8
Regional centre	55	22.8
Rural town/remote area	54	22.4

FACRRM = Fellow of Australian College of Rural and Remote Medicine; FRACGP = Fellow of Royal Australian College of General Practitioners; VR = vocationally registered; DRANZCOG = Diploma Royal Australian and New Zealand College of Obstetricians and Gynaecologists; RANZCOG = Royal Australian and New Zealand College of Obstetricians and Gynaecologists

[a] The sum of each variable is not the same due to missing values

[b] This category covered 45–55 years (rather than 46–55 years) due to an oversight in the survey design

[c] Other included non-vocationally registered medical doctor, social worker, clinical nurse consultant or specialist

Table 2. Cervical screening experience and related education (*N* = 241)

Variable	*n*[a]	Percentage of respondents, %
Frequency of performing cervical screening		
Daily/weekly	210	87.1
Monthly or less	31	12.9
Experience performing cervical screening		
Less than 12 months	29	12.1
1–5 years	63	26.3
5–10 years	58	24.2
10–20 years	39	16.3
More than 20 years	51	21.3
Undertaken educational activities specific to the renewal of the cervical screening program		
National Prescriber Service activity	42	17.4
Family Planning NSW activity	119	49.4
Primary Health Network activity	45	18.7
Cancer Council online education modules found on the guideline website	37	15.4
RACGP activity	53	22.0
Other	54	22.4
None	24	10.0

RACGP = Royal Australian College of General Practitioners
[a] The sum of each variable is not the same due to missing values

Knowledge of screening after hysterectomy

Approximately half (56%) of health professionals were aware of advice within the new guidelines[11] on screening requirements following hysterectomy (see Table 3). Knowledge of screening after hysterectomy was higher for respondents who had completed Cancer Council online education modules found on the guideline website (75.8%, $\chi^2 = 6.78$, $p = 0.03$) or educational activities from FPNSW (63.3%, $\chi^2 = 7.01$, $p = 0.03$) than for those who had not. A significant difference in knowledge was also observed across different health professional types ($\chi^2 = 19.96$, $p = 0.03$), with lower awareness among GPs with DRANZCOG or equivalent (23.5%) than among other health professional groups (see Supplementary Table 2, available from: doi.org/10.6084/m9.figshare.14298737).

Knowledge of management of symptomatic women

Approximately three-quarters of health professionals (71–78%) identified correct management of women with abnormal vaginal bleeding, including indications for co-testing and indications for referral (Table 3). Knowledge on the indication for "referral for specialist gynaecological assessment regardless of test results" was significantly lower among clinicians from a regional centre (63.6%) or rural/remote area (63%) ($\chi^2 = 6.34$, $p = 0.04$) compared to those from metropolitan/capital city areas (see Supplementary Table 3, available from: doi.org/10.6084/m9.figshare.14298737).

Knowledge of screening needs of other specific populations of women

Just over one-third of practitioners (37%) correctly identified that: "Immune-deficient women require 3-yearly screening" (Table 4). Knowledge of management of immune-deficient women was significantly higher among those who accessed the guidelines weekly or more frequently (50%) ($\chi^2 = 9.99$, $p = 0.04$) compared with those who accessed the guidelines less frequently. Most health professionals (81%) correctly identified that: "Unvaccinated women have the same screening requirements as vaccinated women". Knowledge of screening requirements of HPV-unvaccinated women was significantly lower among respondents from a rural town or remote area (77.1%) ($\chi^2 = 11.13$, $p = 0.03$) compared to major city/regional area (see Supplementary Table 4, available from: doi.org/10.6084/m9.figshare.14298737).

Almost all health professionals (87%) correctly identified that: "Women still needing to complete Test of Cure after previous abnormalities on the old program should continue with Test of Cure under the new program". Knowledge of completing the Test of Cure under the new program was significantly higher among those who performed cervical screening daily or weekly (89.2%) ($\chi^2 = 8.04$, $p = 0.02$) compared to those who performed screening less frequently (see Supplementary Table 4, available from doi.org/10.6084/m9.figshare.14298737). Approximately nine in 10 respondents (89%) correctly identified that: "Lesbian women who have never had heterosexual intercourse have the same screening requirements as heterosexual women". Knowledge of screening requirements of lesbian women was high overall, however it differed significantly across health professional types, with lower knowledge among GPs with DRANZCOG or equivalent (68.8%), GPs (with FRACGP or FACRRM/vocationally registered) (87.2%) and GP registrars (89.5%), compared to other groups, where knowledge ranged between 96–100% ($\chi^2 = 24.06$, $p = 0.01$) (see Supplementary Table 4, available from: doi.org/10.6084/m9.figshare.14298737). Just under half of health professionals (46%) correctly identified that: "DES (diethylstilboestrol) exposed women require annual screening and specialist review".

Table 3. Participant's knowledge of renewal guidelines[a] regarding screening under age 25, post-hysterectomy, women with previous abnormalities and management of symptomatic women (*N* = 241)

Knowledge	*n*[b]	Percentage of respondents, %[c]
Young women under 25 have very high rates of HPV infection, but for the most part it is transient and regresses with time		
Yes (Correct)	175	81.4
No (Incorrect)	20	9.3
Unsure	20	9.3
Testing may be indicated in a woman aged under 25 in the following situations:		
Immune-deficient for more than 5 years and sexually active (Correct)	155	64.3
If a woman has a strong family history (first degree relative) of cervical cancer (Incorrect)	42	17.4
If a woman has not received HPV vaccination (Incorrect)	71	29.5
If a woman has post coital bleeding and/or unexplained intermenstrual bleeding (Correct)	202	83.8
If a woman has had an abnormality under the previous screening program and next follow up test is due (Correct)	205	85.1
If a woman commenced screening under the previous program with normal previous results and it has now been 2 years since her last screening test (Incorrect)	50	20.8
If a woman experienced first sexual activity at a young age (<14 years) and had not received the HPV vaccine before sexual debut (Correct)	187	77.6
I am aware of guidance within the new guidelines on screening requirements following hysterectomy		
Yes	121	56.0
No	32	14.8
Unsure	63	29.2
A woman presenting with abnormal vaginal bleeding (unexplained intermenstrual bleeding, persistent postcoital bleeding or postmenopausal bleeding) requires:		
Advice to return for examination and 'Cervical Screening Test' at a time when she is not bleeding (Incorrect)	9	3.7
Investigation including a 'Co-Test' which should not be delayed due to the presence of blood (Correct)	188	78.0
Referral for specialist gynaecological assessment regardless of test results (Correct)	172	71.4
Referral for specialist gynaecological assessment only if there are abnormal test results (Incorrect)	15	6.2

[a] Cancer Council Australia Cervical Cancer Screening Guidelines[3]
[b] The sum of each variable is not the same due to missing values
[c] For questions with multiple choice answers, percentages are calculated from total cohort (*N* = 241)

Knowledge regarding self-collected screening

Approximately two-thirds of practitioners correctly identified the indications for self-collected screening (see Table 4). Knowledge that self-collected screening is indicated for: "Women who have never participated in the National Cervical Screening Program and are aged 30 or over, and decline a clinician collected sample" was significantly higher among those who accessed the guidelines weekly or more (88.9%, $\chi^2 = 6.37$, $p = 0.04$) compared to those who accessed the guidelines less frequently. This knowledge was also significantly higher among those who had undertaken educational activities from FPNSW (73.1%, $\chi^2 = 5.93$, $p = 0.02$) compared with those who had not. Knowledge that self-collected screening is indicated for "Women who are overdue for cervical screening by 2 years or longer and are aged 30 or over, and decline a clinician collected sample" was significantly lower among participants from a regional centre (47.3% compared to 55.6% from rural town/ remote area and 68.9% from capital city/metropolitan city, $\chi^2 = 8.53$, $p = 0.01$) (see Supplementary Table 5, available from: doi.org/10.6084/m9.figshare.14298737). Almost one in five respondents (17.8%) incorrectly identified that self-collected screening should be offered to any woman who requests it.

Table 4. Participant's knowledge of renewal guidelines[a] relating to specific populations of women, and self-collection (*N* = 241)

Knowledge	*n*[b]	%[c]
Immune-deficient women require 3-yearly screening		
Yes (Correct)	79	37.1
No (Incorrect)	30	14.1
Unsure	104	48.8
Unvaccinated women have the same screening requirements as vaccinated women		
Yes (Correct)	172	80.8
No (Incorrect)	16	7.5
Unsure	25	11.7
Women still needing to complete Test of Cure after previous abnormalities on the old program should continue with Test of Cure under the new program		
Yes (Correct)	186	87.3
No (Incorrect)	5	2.4
Unsure	22	10.3
Lesbian women who have never had heterosexual intercourse have the same screening requirements as heterosexual women		
Yes (Correct)	191	89.3
No (Incorrect)	8	3.7
Unsure	15	7.0
DES (diethylstilboestrol)-exposed women require annual screening and specialist review		
Yes (Correct)	99	46.3
No (Incorrect)	18	8.4
Unsure	97	45.3
HPV testing on self-collected vaginal samples under supervision of a health care professional who also offers cervical screening should be offered to:		
Any woman who requests it (Incorrect)	43	17.8
Women who have never participated in the National Cervical Screening Program and are aged 30 or over, and decline a clinician collected sample (Correct)	158	65.6
Women who are overdue for cervical screening by 2 years or longer and are aged 30 or over, and decline a clinician collected sample (Correct)	147	61.0
None of above (Incorrect)	16	6.6

[a] Cancer Council Australia Cervical Cancer Screening Guidelines[3]
[b] The sum of each variable is not the same due to missing values
[c] For questions with multiple choice answers, percentages are calculated from total cohort (*N* = 241)

Discussion

Findings from this survey highlight several areas where health professionals demonstrate good knowledge of the management of specific populations in the renewed cervical screening program. Strengths include knowledge of correct indications for testing women aged younger than 25 years, knowledge of completion of the Test of Cure, and management of symptomatic women. Just under 90% of respondents reported performing cervical screening at least weekly, suggesting this survey represents a health professional population that is highly engaged with cervical screening. However several knowledge gaps were identified. These include management of immune-deficient women, management of women following hysterectomy and screening with self-collection. Gaps in knowledge were also identified to a lesser extent regarding screening women aged under 25, including incorrect assertions regarding testing being indicated in unvaccinated young women, those with a family history of cervical cancer and young women already participating in screening with a normal screening history.

Only one-third of respondents correctly identified that immune-deficient women require 3-yearly screening. Current evidence suggests clearance of oncogenic HPV may differ in immune-deficient women and the renewed guidelines advise it is considered safer to perform 3-yearly screening in these women.[12] Health professionals delivering screening need to be made aware of this

shorter screening interval for immune-deficient women. Although most of the research in immunosuppression and cervical cancer has been carried out with HIV-positive women and renal transplant recipients, the definition of which patient groups are considered immune-deficient in the context of cervical screening requirements is broad. The guidelines for management of immune-deficient women apply to HIV-positive women, solid organ transplant recipients, women with congenital (primary) immune deficiency, women who are being treated with immunosuppressant therapy for autoimmune disease and allogenic bone marrow transplant recipients treated for graft versus host disease.[12]

Indications for self-collected screening represented an important knowledge gap in our study. Approximately two-thirds of health professionals correctly identified indicators for self-collection. Almost one in five participants (17.8%) incorrectly identified that self-collection could be offered to any woman who requests it. Offering HPV screening on self-collected samples has potential to improve outcomes for under- and never-screened women. Modelling of outcomes for a cohort of 100 000 never-screened women at age 30 predicted women joining the mainstream program at age 30 would have 1097 fewer cancer diagnoses compared to one round of self-collected HPV screening at age 30.[13] Currently, self-collection is reserved as a strategy specifically for under- and never-screened women, offering them an alternative option for screening. Self-collection has been shown to be as accurate as clinician-collected samples for detecting CIN 2+ lesions when validated PCR-based assays are used.[14] However, given that one in five health professionals in our survey indicated self-collection could be offered to any woman requesting it, there appears to be confusion about eligibility. A survey-based study of Australian practitioners by Sultana et al also found a gap in clinician level of comfort and confidence with recommending self-collection, more so for practitioners outside of Victoria.[15]

We found some areas where health professionals incorrectly identified that screening was indicated in the under 25 years population. These include 17% identifying screening was indicated in women aged under 25 with a first-degree relative with cervical cancer; 21% identifying screening was indicated if it had been 2 years since the last normal screening test; and 30% identifying screening was indicated under age 25 for unvaccinated women. This is an important knowledge gap and has potential to undermine the success of the program, considering that cervical cancer is a rare disease in the under-25 cohort, with only nine new cases in women aged 20–24 years in Australia in 2015 and zero cases in women aged under 20.[16] The benefits of screening this younger cohort do not necessarily outweigh harms (such as potential future obstetric comorbidity from treatment of detected lesions which may well regress).[17]

We identified some significant associations between practitioner characteristics and knowledge levels, specifically practitioner location. A 2012 secondary analysis of a cross-sectional survey of Australian GPs found practising in a rural area was associated with less routine use of clinical management guidelines.[18] This was reflected in our results, with health professionals from regional areas having less knowledge of indications for screening women younger than 25 years and management of symptomatic women. Those from a rural or remote area also had less knowledge of management of symptomatic women and screening requirements of unvaccinated women than those in other areas. There are implications here for future educational interventions which specifically target health professionals outside metropolitan areas.

Undertaking educational activities provided by various stakeholders was associated with health professionals having better knowledge of certain aspects of the guidelines. For example, completion of Cancer Council online learning modules was associated with better self-reported awareness of guidelines on screening after hysterectomy, and completion of a FPNSW educational activity was associated with highest knowledge of indications for self-collected screening. Significantly, accessing the guidelines weekly or more frequently was associated with improved knowledge of management of screening for immune-deficient women and knowledge of self-collected screening. All education specific to the renewed screening program should therefore encourage frequent use of the guidelines.

Limitations

Nearly half of respondents were FPNSW staff or from external FPNSW mailing list, and 87% of respondents conducted cervical screening at least weekly, meaning our study may represent a cohort of health professionals that is particularly well informed regarding cervical screening. The majority of respondents were female and from a metropolitan or capital city, and the sample of individual health professional types was relatively small. Due to the recruitment strategies used, we are unable to provide denominator data for how many health professionals received the survey invitation and therefore the survey response rate. Tables 1 and 2 have duplication of some numbers within categories which was a survey design oversight. For multiple choice questions in the survey, we were not able to ascertain if all 241 respondents answered each question, therefore the whole cohort was used to calculate outcomes. If not all respondents answered that question, this may have underestimated response percentages.

Conclusion

Health professionals in NSW demonstrated strong knowledge of key aspects of the renewed NCSP, however, our findings highlight some important knowledge gaps that may impact successful delivery of the renewed program. We also describe some significant associations

between practitioner characteristics and these knowledge gaps, which will be important for education providers and stakeholders to address. Practitioner location outside a metropolitan area was associated with some knowledge gaps, while accessing the guidelines more frequently was associated with improved knowledge. Future educational interventions relating to the cervical screening program should therefore target practitioners outside metropolitan locations and encourage more frequent access of, and improved familiarity with, the guidelines. Continued evaluation of practitioner knowledge is essential to allow ongoing tailoring of educational programs as we move further into the post-renewal period.

Peer review and provenance

Externally peer reviewed, not commissioned.

Competing interests

DB is a member of the National Cervical Screening Program (NCSP) Quality and Safety Monitoring Committee and Clinical Expert Panel; she was a co-author of sections of the NCSP Guidelines. Family Planning NSW delivers cervical screening education to health professionals.

Author contributions

SS was the chief investigator and was responsible for the study concept and design, survey development, analysis of findings and drafting the manuscript. YC was responsible for survey design, testing and statistical analysis, JB was responsible for survey design and testing. DB was responsible for survey design and testing and provided content expertise. All authors reviewed the manuscript.

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