



## **Simulated impacts of COVID-19 scenarios on cancer screening – summary report**

June 2020

### **Background and situational analysis**

On 27 March 2020, the Australian Department of Health commissioned Cancer Council NSW to undertake urgent, preliminary modelling and analysis of potential COVID-19 impacts on cancer screening, by simulating, comparing and reporting on multiple scenarios. Modelling reports specific to the cervical, bowel and breast cancer screening programs were finalised and submitted in the first week of May 2020. This summary report was submitted on 26 May with revisions submitted on 26 June as an attachment to the detailed, program specific modelling and analyses.

The WHO had declared COVID-19 a pandemic on 11 March 2020.<sup>i</sup> It was only the fifth time since 1900 that a global pandemic had been declared. It was also the first pandemic called since the establishment of Australia's cancer screening programs, over the past 29 years, apart from the H1N1 influenza virus in 2009, which did not involve disruption on the scale of COVID-19.<sup>ii</sup>

The Australian and state/territory governments set up a national crisis response group and introduced strict infection control measures, while closely monitoring COVID-19 infection and mortality rates.<sup>iii</sup> Early indications in comparable countries such as the UK and Italy showed that, unless strong and decisive action was taken to control the pandemic, large numbers of preventable deaths would occur, and the health system might be overwhelmed.<sup>iv</sup> Restrictions on business, transport, public gatherings and social interactions were implemented. The potential flow-on consequences in relation to cancer screening evolved rapidly.

BreastScreen Australia, administered by the eight state and territory governments under a national agreement, paused the delivery of services at varying times from late March to early April, based on separate jurisdictional decisions.<sup>v</sup> Separate discussions were ongoing about impacts on the National Bowel Cancer Screening Program (NBCSP) and the National Cervical Screening Program (NSCP).

BreastScreen Australia under business-as-usual was likely to pose higher risk of COVID-19 infection, given the interactions required for clients and staff. This is compared to the NBCSP, which requires a home-based screening test, and the NSCP, which is five-yearly and primarily involves a GP and includes a self-testing option for eligible under-screened women.<sup>vi</sup>

Clinical services essential to screening follow-up also experienced significant disruption, along with most workplaces and transport services.<sup>vii</sup> It was an unprecedented situation for Australia's health system.<sup>viii</sup>

Essential to government decision-making and considerations was recognition that, for most people, a short-term delay in screening for breast, bowel or cervical cancer should not lead to an adverse health outcome;<sup>ix</sup> communications to that effect were put in place.<sup>x</sup>

However, there were concerns that, should the pause in BreastScreen Australia services continue indefinitely, along with pauses to the NBCSP and the NSCP if implemented, delayed diagnoses and unnecessary cancer deaths would occur – in view of the significant life-saving benefits of the three programs during business-as-usual.<sup>xi</sup>

The scale of adverse health outcomes would depend on the extent of service disruption, in a period of unprecedented uncertainty and daily flux. The Department of Health therefore commissioned Cancer Council NSW to rapidly model critical disruption scenarios.

This was made possible by adapting microsimulation analytical tools used in prior government-funded work for clinical practice guidelines, economic analysis and evidence review in optimising cervix, bowel and breast cancer screening.

### **Scope of modelling**

In view of the rapidly changing situation, the Department requested that the Cancer Council NSW research team prioritise analyses of high-level impacts of hypothetical future situations, delivering reports within 6-8 weeks.

Given both the urgency and uncertainty, it was agreed that the models would estimate impacts on cancer outcomes of a range of potential pauses (up to 12 months) to the three programs, as well as “catch-up” scenarios to prioritise recovery from possible disruptions.

### **Key findings**

While established and delivered on the same evidence-based principles, the three national cancer screening programs vary significantly in how they are administered and the populations that benefit from them.<sup>xii</sup> This is due primarily to the different target groups, the biological differences in the three cancer types, the different screening tools to assess risk at a population level and follow-up clinical pathways for individuals at increased risk.

It is therefore unfeasible to group the findings from our analysis in relation to all three screening programs on comparable criteria. The key findings in summary common to all three programs are:

- Australia’s national cancer screening programs save lives, therefore disruptions to their delivery would cause significant adverse impacts
- Adverse impacts are in step with the duration and severity of disruption

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- Any disruption would require a well-informed, evidence-based systematic approach to optimal recovery and adaptation, prioritising available services to participants most likely to benefit
- The extant and modelled impacts of COVID-19 health system responses and screening behaviour have highlighted and magnified critical opportunities to optimise the programs during recovery, adaptation and beyond.

The rapid timeline for reporting ensured that none of the modelled scenarios would occur in real time. There was, however, uncertainty about the length and severity of the response, screening behaviour and the potential impacts on all three programs.

At the time of writing (June 2020), some infection control measures are being slowly lifted. BreastScreen Australia has resumed services to various degrees and there is no current expectation that any of the programs will pause in the short-term future, provided COVID-19 infection and death rates are sufficiently contained. Only BreastScreen Australia officially paused.<sup>xiii</sup>

In general, the greater the disruption to the programs, the greater the risk of undiagnosed cancers and adverse health impacts and outcomes. Disruptions would also be expected to cause increased health system costs and inefficiencies, although economic analysis was not in the scope of the modelling.

As expected, the greatest impact would be caused by disruption to the NBCSP, as it detects pre- and early bowel cancer, the second-leading cause of cancer death in Australia.<sup>xiv</sup> For example, a worst-case scenario for the NBCSP (12-month pause and low participation in recovery) was estimated to cause approximately 6,500 additional bowel cancer deaths up to 2060.

Avoidable deaths in the NCSP would be lower (20 additional deaths attributable to additional or upstaged cancers from a 12-month disruption over a circa 10-13-year period). Up to 97 women would be affected over 2020-2022 by either a precancer progressing to cancer or being diagnosed at a later stage.

For BreastScreen Australia potential adverse impacts have been measured in survival and staging. For example, a 12-month pause of BreastScreen Australia is estimated to reduce five-year survival from 90.2% to 88.8% (up to 2023) for women due for a screen within two years of the start of the pause and who are diagnosed with an invasive cancer. These findings are reported in detail in the program-specific reports.

## Mitigation strategies

### BreastScreen Australia

As at 19 May 2020, BreastScreen Australia was the only program to have officially paused and since resumed – from pauses at around the end of March to a staggered return to screening from around 29 April (with noted variation between jurisdictions).<sup>xv</sup> In this sense, mitigation strategies for the impact of the pause and recovery are based on known circumstances relating to service delivery, unlike the other two programs, which continued throughout the pandemic response, albeit through some likely disruptions to participation.

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We predicted that widespread pauses of 3, 6 or 12 months would lead to tangible changes in population-level cancer rates and a shift in tumour staging, leading to variations in the rates and case-mix of breast cancers requiring treatment. Routine indicators for breast screening such as screen-detected cancer rates, interval cancer rates and tumour size would be expected to fluctuate, so that usual quality assurance measures would need adjustment.

We needed to select an approach to prioritising available screens to women due for screening. We reasoned that, dependent on the scale and extent of available services, a logical approach would be to prioritise participants according to screening round, age, usual screening interval (biennial or annual), and whether their screen is due or overdue. This follows the principle that prioritisation should maximise the benefits and minimise the harms of available screens, while being feasible to implement.

This principle would require a risk-based approach, consistent with the theme of longer-term optimising of BreastScreen being explored in a separate Commonwealth-funded evidence review and stakeholder consultation undertaken by Cancer Council.<sup>xvi</sup> In that sense, optimal recovery from a pause, and adaptation throughout the unpredictable, extensive COVID pandemic response, becomes an opportunity to optimise the program.

A gradual return to capacity, maximising benefits and minimising harms, may depend on multiple short- and longer-term factors. Depending on the state of pandemic control measures, these could include the availability of personal protective equipment, specialist personnel and usual screening equipment, additional time to conduct screening to minimise risk of virus transmission and access to communities with heightened social distancing measures. Optimal resumption strategies are also likely to vary between jurisdictions, geographical areas within jurisdictions and within subpopulations.

The rapid turnaround for our priority reports restricted the number of BreastScreen Australia scenarios evaluated and the range of outcomes reported. Additional scenarios to inform mitigation strategies could include reduced average national capacity over a 12-month period (e.g. 40%, 70% or 100%) caused by new COVID-19 outbreaks or limited access to resources or populations. For such scenarios, specified approaches to prioritise women to available screens within constrained services would become more important.

Future reports could include outcomes according to age and screening round, a focus on cancers arising in women with delayed screens, and the flow-on impact of treatment requirements (e.g. surgery and adjuvant therapy rates).

It may also be valuable to investigate the time required to achieve full recovery under different pause-and-recovery assumptions, including assumptions on when screening should be made available to women outside the target age range.

### **National Bowel Cancer Screening Program**

Evidence shows that the NBCSP has the potential to save 83,800 Australian lives by 2040, if participation rates are increased to and sustained at 60%.<sup>xvii</sup> (The

Government's participation target is 57%.<sup>xviii</sup> Participation rates based on 2017-18 data are around 42%.<sup>xix</sup>) Therefore, the most important mitigation strategy for the NBCSP is to encourage program participation.<sup>xx</sup>

As a home-based test performed by the individual, with a dedicated national pathology service unaffected by COVID-19 testing, first-line screening in the NBCSP can be promoted irrespective of the impacts of a the pandemic response, so long as a national mail service is in operation and people are permitted to leave their homes to post the samples to the pathology labs. The key challenge would be managing referrals for investigation and diagnosis, primarily colonoscopy.

Key to these considerations is that only around 10% of colonoscopies performed in Australia are referred through the NBCSP at any time.<sup>xxi</sup> Our analysis, as detailed in the separate NBCSP-specific report, shows that prioritisation and rationalisation of available services is important in a pause-and-recovery scenario – again, highlighting program performance issues also important during business as usual.

The experience of the COVID-19 pandemic highlights the need to promote clinical practice guidelines to address ongoing challenges in colonoscopy prioritisation which would also be supported by implementation of existing colonoscopy quality and safety standards.<sup>xxii</sup>

Based on the evidence, the key mitigation strategy for minimising COVID-19 impacts on the NBCSP is to invest in increasing program participation and work with health services on efficient prioritisation of colonoscopy services.

Interim evaluation of Cancer Council's Australian Government-funded national media campaign in 2019<sup>xxiii</sup> indicates the strong health and economic benefits of investing in communications to promote participation; additional investment is required, supported by promotion of best-practice in diagnostic services.<sup>xxiv</sup>

### **National Cervical Screening Program**

The NCSP did not experience any official pausing of services. Some disruption would, however, be expected, given the impact of COVID-19 on the requirement for participants to attend a primary care appointment for their human papillomavirus screening test.

As detailed in the NCSP-specific report, the impacts on cancer mortality, incidence and staging caused by all modelled scenarios are lower compared with bowel and breast cancer, as overall cancer burden during business-as-usual is lower.

It should, however, be noted that the comparatively low cervical cancer burden is the direct result of cancer prevention by Australia's effective national screening program.<sup>xxv</sup> In many countries without an effective screening program, cervical cancer is the top one or two causes of cancer death in women.<sup>xxvi</sup>

The COVID-19 response did, however, highlight:

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- The benefits of the program's Renewal (from December 2017), with its shift to a five-yearly screening regimen supported by a more accurate test,<sup>xxvii</sup> which further protected the program from the impacts of lockdown
- Any woman who misses primary screening because of COVID-19-related disruption was overdue or never previously screened. Since they have already proven harder to engage in screening, the need for targeted approaches within the program, such as self-collection and targeted program communications, are magnified by the impacts of COVID-19
- Flow-on effects in related health services, such as colposcopy, which would need to be prioritised to ensure catch-up approaches balanced need with capacity.

Unique and critical to the NCSP is its relevance to the cervical cancer elimination agenda, both in Australia and globally. Cervical cancer is the only cancer for which there is published evidence underpinning a plan for elimination of the disease as a major public health issue.<sup>xxviii,xxix</sup>

The unpredictable impacts of a pandemic further highlight the benefits of “eliminating” a disease, as health services are finite and their limitations for managing all conditions are exposed in a crisis. In the case of cervical cancer, elimination is within reach.

It is critical that, rather than lose momentum in promoting the cervical cancer elimination agenda, Australian health authorities view COVID-19 as a key reason to further promote our national and international leadership, by optimising the Australian program.

## Conclusions

Evidence-based approaches to managing the effects of COVID-19 (during the pandemic or in subsequent waves) on cancer screening in Australia will be critical to minimising unnecessary, associated cancer death and disease burden.

The pandemic has also highlighted and magnified opportunities to optimise the programs in the long term. Optimal cancer screening delivery has wide-ranging benefits to the health system and can reduce pressure on acute care services during unexpected events and health system pressures.

## References

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- <sup>i</sup> WHO website (<https://www.who.int/emergencies/diseases/novel-coronavirus-2019>), accessed 21 May 2020.
- <sup>ii</sup> Australian Department of Health website (<https://www1.health.gov.au/internet/main/publishing.nsf/Content/about-pandemic-history>), accessed 21 May 2020.
- <sup>iii</sup> Australian Department of Health website (<https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert>), accessed 21 May 2020.
- <sup>iv</sup> WHO Europe website (<http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19>).
- <sup>v</sup> Program pause and resumption data available on the eight state and territory BreastScreen websites.
- <sup>vi</sup> Protocols for program implementation summarised at <http://www.cancerscreening.gov.au/>
- <sup>vii</sup> Protocols for adjusted service delivery where managed within Australia's eight state and territory government. High-level national resources were provided here: <https://www.health.gov.au/resources/collections/novel-coronavirus-2019-ncov-resources>
- <sup>viii</sup> Ibid.
- <sup>ix</sup> Clinical practice guidelines for bowel, cervical and breast cancer.
- <sup>x</sup> Summary information to consumers and professionals published here: <http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/Home>
- <sup>xi</sup> <https://www.phrp.com.au/issues/july-2019-volume-29-issue-2/benefits-harms-and-cost-effectiveness-of-cancer-screening-in-australia-an-overview-of-modelling-estimates/>
- <sup>xii</sup> Ibid.
- <sup>xiii</sup> Ibid.
- <sup>xiv</sup> <https://www.aihw.gov.au/reports/cancer/cancer-in-australia-2019/contents/table-of-contents>
- <sup>xv</sup> Ibid.
- <sup>xvi</sup> <https://www.cancer.org.au/policy-and-advocacy/early-detection-policy/breast-cancer-screening.html>
- <sup>xvii</sup> [https://www.thelancet.com/pdfs/journals/lanpub/PIIS2468-2667\(17\)30105-6.pdf](https://www.thelancet.com/pdfs/journals/lanpub/PIIS2468-2667(17)30105-6.pdf)
- <sup>xviii</sup> Australian Department of Health, Portfolio Budget Statements, 2018-19, 2019-20
- <sup>xix</sup> AIHW, Cancer Screening Monitoring Reports <https://www.aihw.gov.au/reports-data/health-welfare-services/cancer-screening/reports>
- <sup>xx</sup> Clinical practice guidelines for the prevention, detection and management of colorectal cancer: <https://www.cancer.org.au/health-professionals/clinical-guidelines/colorectal-cancer.html>
- <sup>xxi</sup> <https://www.aihw.gov.au/reports-data/health-welfare-services/cancer-screening/reports>
- <sup>xxii</sup> <https://www.safetyandquality.gov.au/standards/clinical-care-standards/colonoscopy-clinical-care-standard/clinicians-colonoscopy-clinical-care-standard>
- <sup>xxiii</sup> In development; pre-publication.
- <sup>xxiv</sup> .
- <sup>xxv</sup> [www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/summary](http://www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/summary)
- <sup>xxvi</sup> <https://www.who.int/reproductivehealth/topics/cancers/en/>
- <sup>xxvii</sup> Lew JB, Simms KT, Smith MA, Hall M, Kang YJ, Xu XM, Caruana M, et al. Primary HPV testing versus cytology-based cervical screening in women in Australia vaccinated for HPV and unvaccinated: effectiveness and economic assessment for the National Cervical Screening Program. Lancet Public Health. 2017.
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