Sax Institute

Evidence Snapshot

Evidence relevant to early detection of breast cancer in Aboriginal and Torres Strait Islander women

NSW GOVERNMENT

Cancer Institute NSW

An Evidence Snapshot brokered by the Sax Institute for the Cancer Institute New South Wales.
August 2021.

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Suggested Citation:

Li T, Mathieu E, Dickson M, Houssami N. Evidence relevant to early detection of breast cancer in Aboriginal and Torres Strait Islander women. Evidence Snapshot brokered by the Sax Institute (www.saxinstitute.org.au) for the Cancer Institute New South Wales, 2021.

doi:10.57022/plnx1508

Acknowledgment of Country:

In the spirit of reconciliation, we acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present and extend that respect to all Aboriginal and Torres Strait Islander peoples today.

Disclaimer:

This Evidence Snapshot was produced using the Evidence Snapshot methodology in response to specific questions from the commissioning agency.

It is not necessarily a comprehensive review of all literature relating to the topic area. It was current at the time of production (but not necessarily at the time of publication). It is reproduced for general information and third parties rely upon it at their own risk.

Introduction

This rapid Evidence Snapshot was commissioned by the Cancer Institute NSW.

An Evidence Snapshot is a rapid review of existing evidence tailored to the needs of an agency. An Evidence Snapshot answers one specific policy or program question and is presented as a short brief of 3-4 pages summarising existing evidence. This Evidence Snapshot reviews up to 20 peer reviewed and up to 20 websites or grey literature reports, focusing on literature published in English in last 5 years identified using limited search terms and databases. A detailed analysis, synthesis and quality assessment of the included studies are not provided in this rapid review (some of the sourced reviews may have included quality assessment).

The Cancer Institute NSW is guided by the development of the new NSW Cancer Plan where equity is emerging as a central theme, ensuring that groups with poorer outcomes have the same access to cancer services and outcomes as the rest of the population.

Aboriginal and Torres Strait Islander people and communities will be a priority population in this focus on equity. Breast cancer is the most common cancer among Aboriginal and Torres Strait Islander women.(1) The BreastScreen NSW participation rate for Aboriginal and Torres Strait Islander women aged 50 - 74 years is 43% compared to 48.9% for all women and has been consistently lower over time than the participation rate for all women aged 50 – 74 years.(2)

Aboriginal and Torres Strait Islander women tend to get breast cancer when they are younger, have more advanced tumours when they get diagnosed, and are less likely to participate in breast screening programs than non-Indigenous women.(3-5)

Evidence to support the effectiveness of screening women aged 40-49 years is limited. Aboriginal and Torres Strait Islander women have, on average, lower mammographic density than non-Aboriginal women but the factors associated with mammographic density are similar for both sample populations.(6, 7) Since reduced mammographic density is associated with improved sensitivity of mammography, this suggests that mammographic screening could be a particularly good test for Aboriginal and Torres Strait Islander women.

Review question

What is the current and emerging evidence in relation to the early detection of breast cancer in Aboriginal[1] women, and the impact this has on cancer stage at diagnosis and mortality?

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[1] The Review question refers to Aboriginal women, however this Review will use the full term Aboriginal and Torres Strait Islander, to be inclusive of all Aboriginal and Torres Strait Islander women who form parts of the studies comprising this review.

Methods

A search of the peer reviewed literature was executed on 19 July 2021. The search was conducted across three databases (Medline, Embase and Global Health) and limited to literature published in English from 01 January 2016 – 19 July 2021, returning 109 records. Records were screened against eligibility criteria to identify publications eligible for inclusion. We also searched for reports from screening programs or department of health (or equivalent) reports from Australia, New Zealand and Canada. Grey literature was sourced by 31 July 2021. We report an overview of the peer reviewed literature in Table 1 and supplement this with additional results in Appendices 1- 4.

Summary of findings

Findings

We identified twelve peer-reviewed papers of which 9 were cohort studies, 1 was a systematic review, and 2 were narrative reviews. We also identified 8 grey literature reports published by jurisdictions from Australia, New Zealand and Canada. Please refer to the Glossary for certain terminologies used in this review.

There was limited *direct* evidence on the effect of early detection in First Nations women (and none by specific age-groups); there was observational evidence regarding the epidemiology, stage distribution, treatment, and outcomes of breast cancer in First Nations women.

Through title and abstract screening of the peer-reviewed literature, we also identified 8 publications focused on mammographic density, 2 publications on strategies to improve breast cancer outcomes and eleven publications (including conference abstracts) focused on First Nations women from other regions (including Asia, Africa, Middle and South America, and US) outside the regions pre-specified in the snapshot review brief. These publications are listed in Appendix 5.

Key messages

Peer reviewed literature

There were three areas or themes of evidence relevant to population screening for, or early detection of, breast cancer, each summarised below:

Epidemiology of breast cancer

- Age-standardised incidence rate of breast cancer was slightly to moderately lower in Aboriginal and Torres Strait Islander (82 to 99 per 100,000) than non-Indigenous (105 to 115 per 100,000) women, with a rate ratio in the range of 0.7-0.9 (when considering all age-groups) (8, 1, 9)[2]. However, there was substantial heterogeneity in this outcome across age groups. Emerging data indicate that Aboriginal and Torres Strait Islander women have lower or similar age-specific breast cancer incidence rates than non-Indigenous women aged < 60 years but higher age-specific breast cancer incidence rates in older age groups (≥ 60 years) (10), a finding also partially supported by evidence from data reports (grey literature) (11).

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[2] Sourced from various states from various cohorts and timeframes, representing data from all states and territories in Australia except Australian Capital Territory and Tasmania.

- The age-standardised mortality rate for breast cancer (2011-2015; and 2008-2012) was slightly higher for Aboriginal and Torres Strait Islander women than non-Indigenous women (24 vs 20 per 100,000, rate ratio 1.2; and 24.1 vs 21.7 per 100,000, rate ratio 1.1) (1, 9).

Screening participation and outcomes, stage at diagnosis and age at diagnosis

- No evidence was found that reported outcomes (such as detected cancers, cancer detection rate) among screened vs non-screened Aboriginal and Torres Strait Islander women, highlighting this important gap in evidence on potential screening benefit in all eligible age-groups; one exception is noted in the grey literature (BreastScreen Aotearoa in New Zealand). One study reported that the proportion of recalled cases in screening was slightly higher for Aboriginal and Torres Strait Islander than non-Indigenous women (7.6% vs 6.1%) (5).
- For those who ever screened, Aboriginal and Torres Strait Islander women had lower screening participation rates (30%-37%) or less number of visits (median of 2 visits) to screening versus non-Indigenous women (53%-58%, median of 3 visits) (12, 9, 4), and Aboriginal and Torres Strait Islander women were less likely to be rescreened when compared to non-Indigenous women (12).
- There were no data reporting breast cancer-specific stage at diagnosis *by screening status* in Aboriginal and Torres Strait Islander women, representing an important gap in evidence. There was evidence that Aboriginal and Torres Strait Islander (vs non-Indigenous) women were less likely to present with early-stage (localised) breast cancer and more likely (odds ratio: 1.2-2.9) to present with advanced stage (regional or distant metastatic) breast cancer (12, 4, 13, 14).
- No data reported breast cancer-specific age at diagnosis distribution *by screening status* in Aboriginal and Torres Strait Islander women, representing another gap in evidence. There was also heterogeneous evidence about age at diagnosis for invasive breast cancer. Majority of the studies reported that, compared with non-Indigenous women, Aboriginal and Torres Strait Islander women tended to be diagnosed at younger age (15, 12, 10, 14) with higher proportions of breast cancer diagnosed before the screening target age range (i.e. < 50 years, also <40 years) (12, 10). However other studies found no differences in the age distribution at diagnosis of breast cancer between indigenous Aboriginal and Torres Strait Islander and non-Indigenous women (4, 13).

Breast cancer treatment and survival

- Evidence on treatment pattern was heterogeneous. Some studies showed no difference in treatment use for breast cancer, showing no significant differences in surgery (13), chemotherapy (13, 14), lumpectomy (3) or mastectomy (3) in First Nations vs non-Indigenous women. Other studies suggested that Aboriginal and Torres Strait Islander women were less likely to have systemic therapy (4), surgical intervention (12, 4) and radiotherapy (13) compared with non-Indigenous women. Where surgery occurred, mastectomy was more common among Aboriginal and Torres Strait Islander women (12, 4).
- First Nations women had considerably lower 5-year relative survival rate (75% - 80%) than non-Indigenous women (87% - 90%) (12, 16, 9) and were more likely to die from breast cancer (adjusted hazard ratio: 1.4-3.1) (8, 3, 12, 16). There was some evidence from a cohort that had participated in screening (participated in at least one screening mammogram through BreastScreen, period ending 2006) that after adjustment for several confounders (including

tumour characteristics). Aboriginal and Torres Strait Islander women were approximately twice as likely to die from breast cancer (relative risk of death from breast cancer 1.96) than non-Indigenous (12).
- There was no difference in proportion of First Nations, Métis and Inuit and non-Indigenous women who had a recurrence of their breast cancer recorded (3).

Grey literature and agency reports:

Breast screening participation and detection rate

- Mammography screening participation rates are lower in Aboriginal and Torres Strait Islander Australians compared to non-Indigenous Australians (11). Age-standardised screening rate (2014-2018) for Aboriginal and Torres Strait Islander women aged 50-74 years was 37.3%-37.6% compared to 53.2%-54.4% for non-Indigenous women (17-19, 11).
- Despite higher screening rates both overall and in Māori and Pacific women in New Zealand compared to Aboriginal and Torres Strait Islander women in Australia, Māori women participate in screening at lower rates than all other women. With 64.8% of 50-69 years old Māori women participating in screening (2014-2016) compared to participation rates of 72.7% in Pacific women, 72.2% in Non-Māori women and 72.2% in Non-Māori Non-Pacific women (20). The participation rates were further lower in Māori and Pacific women in the age group of 45-49 (62.9% and 69.8%, respectively).
- Rescreening rates were also lower in Māori and Pacific women aged 50-49 compared to other women with Māori/Non-Māori ratio of 0.86-0.93 and Pacific/Non-Māori Non-Pacific ratio of 0.73-0.88 after initial screen and subsequent screens (20). This pattern was also found in Māori and Pacific women aged 45-49 years (0.88-0.93; 080-0.90).
- Evidence on breast cancer detection rates were only reported by BreastScreen Aotearoa (New Zealand) (20). In women aged 50-69 years who attended BreastScreen Aotearoa (2014-2016), the detection rate of breast cancer was higher amongst Māori and Pacific women compared to Non-Māori and Non-Māori Non-Pacific women at both initial screens (13.0 & 15.6 (Māori & Pacific) vs 9.4 & 8.9 per 1,000 screens) and subsequent screens (6.7 & 5.2 vs 4.8 & 4.7 per 1,000 screens). A similar pattern was observed in women aged 45-49 years (initial screens: 4.5 & 5.7 vs 3.3 & 3.2 per 1,000 screens; subsequent screens: 3.3 & 4.2 vs 2.4 & 2.3 per 1,000 screens).
- Age-standardised rates of cancer registration in all women (screened and unscreened in 2017) were higher in Māori women than Non-Māori women (130.0 vs 90.0 per 100,000) (21).

Breast cancer incidence

- Overall, the age-standardised *incidence* rate of invasive breast cancer (2011-15) was lower for Aboriginal and Torres Strait Islander vs non-Indigenous Australian women (97.1 vs 118.9 per 100,000, rate ratio 0.82), however there was substantial heterogeneity in rates across age groups (11). Emerging data indicate that Aboriginal and Torres Strait Islander women have lower age-specific breast cancer incidence rates than non-Indigenous people in women aged < 65 years but similar or higher age-specific breast cancer incidence rates in older age groups (≥ 65 years) (11). Even though the report did not discuss possible reasons for this pattern (11), the peer-reviewed literature suggested that the age-specific incidence rates could be affected by current screening practices, including lower breast cancer screening rates in Aboriginal and Torres Strait Islander women (10).

- The age-standardised incidence of breast cancer in First Nations, Métis and Inuit women in Ontario, Canada (1991-2010) was lower than that of other women in Ontario (69.6 v 81.0 per 100,000, rate ratio of 0.86) (22). Age-specific rates indicate that this trend is generally persistent across all age groups, with a smaller difference observed in the younger age groups than in the older age groups (22).

Breast cancer mortality

- The age-standardised breast cancer mortality rate was marginally higher for Aboriginal and Torres Strait Islander than non-Indigenous women (21.5 vs 19.9 per 100,000) (2014-18) (11). Age-specific breast cancer mortality rates show the higher mortality rate in Aboriginal and Torres Strait Islander women to be more consistent in women aged 55 and older.
- In New Zealand (2010-2012), Māori females were around 1.5 times as likely to die from breast cancer as Non-Māori females (Rate ratio: 1.59, 95% CI: 1.37–1.83) (23).
- The age-standardised mortality rate (1991-2010) was lower for First Nations, Métis and Inuit women compared to other women in Ontario, Canada (15.7 vs 18.9 per 100,000, rate ratio of 0.83). Age-specific breast cancer mortality rates indicate that the difference in mortality rates increases as women age, with older First Nations, Métis and Inuit women being substantially less likely to die from breast cancer compared to other women (but not statistically significant) (22).

Breast cancer treatment

- Evidence on breast cancer treatment was only reported from New Zealand (20). Māori and Pacific women tended to have more breast conserving surgery compared to other women in both 45-49 (rate ratios: 1.07, 1.19) and 50-69 (1.06, 1.13) year age-groups. Whilst Māori women had a similar rate of having radiotherapy as Non-Māori women, Pacific women had a lower rate than Non-Māori Non-Pacific women (45-49 years: 0.76; 50-69: 0.91).

Table 1 — Summary overview of included papers (peer reviewed literature)

			Reported Outcome						
Author, Year	**Country**	**Study design**	**Incidence rate**	**Mortality rate**	**Screening rate**	**Age at diagnosis**	**Stage at diagnosis**	**Treatment rate**	**Survival rate**
Baade 2016	Queensland, Australia	Cohort study				x			x
Banham 2019	South Australia, Australia	Cohort study			x	x	x	x	
Condon 2016	Northern Territory, Australia	Cohort study	x						x
Dasgupta 2017	Australia	Systematic review			x	x	x	x	x
Fitzadam 2021	New South Wales, Australia	Cohort study				x	x	x	
Haigh 2018	Australia	Review	x	x	x				x
Moore 2016	Queensland, Australia	Cohort study					x	x	x
Read 2020	Northern Territory, Australia	Cohort study				x	x	x	

Author, Year	Country	Study design	Reported Outcome						
			Incidence rate	Mortality rate	Screening rate	Age at diagnosis	Stage at diagnosis	Treatment rate	Survival rate
Tapia 2017	Australia	Narrative review	x	x	x				
Tapia 2019	Northern Territory, Australia	Cohort study			x				
Tervonen 2019	New South Wales, Australia	Cohort study	x			x			
Withrow 2017	Canada	Cohort study							x

Appendices

Appendix 1: Included publications

Published literature

1. Baade, P.D., et al., Quantifying the changes in survival inequality for Indigenous people diagnosed with cancer in Queensland, Australia. Cancer Epidemiology, 2016. 43: p. 1-8.

2. Banham, D., et al., Disparities in breast screening, stage at diagnosis, cancer treatment and the subsequent risk of cancer death: a retrospective, matched cohort of aboriginal and non-aboriginal women with breast cancer. BMC Health Services Research, 2019. 19(1): p. 387.

3. Condon, J.R., et al., Trends in cancer incidence and survival for indigenous and non-indigenous people in the northern territory. Medical Journal of Australia, 2016. 205(10): p. 454-458.

4. Dasgupta, P., et al., Variations in outcomes for Indigenous women with breast cancer in Australia: A systematic review. European Journal of Cancer Care, 2017. 26(6).

5. Fitzadam, S., et al., Lung, breast and bowel cancer treatment for Aboriginal people in New South Wales: a population-based cohort study. Internal Medicine Journal, 2021. 51(6): p. 879-890.

6. Haigh, M., et al., Review of cancer among Aboriginal and Torres Strait Islander people. Australian Indigenous Health Bulletin, 2018. 18(3).

7. Moore, S.P., et al., Breast cancer diagnosis, patterns of care and burden of disease in Queensland, Australia (1998-2004): does being Indigenous make a difference? International Journal of Public Health, 2016. 61(4): p. 435-42.

8. Read, D.J., et al., Do histopathological features of breast cancer in Australian Indigenous women explain the survival disparity? A two decade long study in the Northern Territory. Asia-Pacific Journal of Clinical Oncology, 2020. 16(6): p. 348-355.

9. Tapia, K.A., et al., Breast cancer in Australian Indigenous women: incidence, mortality, and risk factors. Asian Pacific Journal of Cancer Prevention, 2017. 18(4): p. 873-884.

10. Tapia, K.A., et al., Breast screening attendance of Aboriginal and Torres Strait Islander women in the Northern Territory of Australia. Australian and New Zealand Journal of Public Health, 2019. 43(4): p. 334-339.

11. Tervonen, H.E., et al., Differences in cancer incidence by age at diagnosis between Aboriginal and non-Aboriginal people for cancer types included in Australian national screening programs. Cancer Epidemiology, 2019. 60: p. 102-105.

12. Withrow, D.R., et al., Cancer survival disparities between first nation and non-Aboriginal adults in Canada: Follow-up of the 1991 census mortality cohort. Cancer Epidemiology Biomarkers and Prevention, 2017. 26(1): p. 145-151.

Grey literature and agency reports

1. Australian Institute of Health and Welfare, 2017. BreastScreen Australia monitoring report 2014–2015. Cancer series no.101. Cat. no. CAN 100. Canberra, Australia. Available from: https://www.aihw.gov.au/getmedia/3da1f3c2-30f0-4475-8aed-1f19f8e16d48/20066-cancer-2017.pdf.aspx?inline=true#page=81&zoom=100,92,601.

2. Australian Institute of Health and Welfare, 2018. BreastScreen Australia monitoring report 2018. Cancer series no. 112. Cat. no. CAN 116. Canberra, Australia. Available from: https://www.aihw.gov.au/getmedia/c28cd408-de89-454f-9dd0-ee99e9163567/aihw-can-116.pdf.aspx?inline=true.

3. Australian Institute of Health and Welfare, 2019. BreastScreen Australia monitoring report 2019. Cancer series no. 127. Cat. no. CAN 128. Canberra, Australia. Available from: https://www.aihw.gov.au/getmedia/dab466c6-1e5c-425d-bd1f-c5d5bce8b5a9/aihw-can-128.pdf.aspx?inline=true.

4. Australian Institute of Health and Welfare, 2020. BreastScreen Australia monitoring report 2020. Cancer series no. 129, Cat. no. CAN 135. Canberra, Australia. Available from: https://www.aihw.gov.au/getmedia/e414a344-ab3d-4a35-a79b-a29723f22939/aihw-can-135.pdf.aspx?inline=true.

5. University of Otago Wellington, 2017. BreastScreen Aotearoa Programme Monitoring Report for Maori, Pacific and Total women screened during the two or four years to June 2016. National Screening Unit, Ministry of Health New Zealand. Available from: https://www.nsu.govt.nz/system/files/page/bsa_monitoring_report_for_women_screened_to_june_2016.pdf.

   Associated tables and charts: BreastScreen Aotearoa 2017 Monitoring Report Data Tables and Charts: https://www.nsu.govt.nz/system/files/page/2017_bsa_mr_report_v1.00.pdf

6. Ministry of Health New Zealand, 2019. Selected Cancers 2015, 2016, 2017. New Zealand. Available from: https://www.health.govt.nz/publication/selected-cancers-2015-2016-2017.

7. Ministry of Health New Zealand. 2018. Cancer. [Accessed 30 July 2021], Available from: https://www.health.govt.nz/our-work/populations/maori-health/tatau-kahukura-maori-health-statistics/nga-mana-hauora-tutohu-health-status-indicators/cancer#3.

8. Jamal, S., et al., Cancer in First Nations people in Ontario, Canada: Incidence and mortality, 1991 to 2010. Health reports, 2021. 32(6): p. 14-28.

Appendix 2: Search strategy

Key concepts

Concept 1	Concept 2	Concept 3
Breast cancer	Mammography	Aboriginal and Torres Strait Islander
Breast neoplasm	Mammogram	Indigenous
		First Nations

Timeframe

This review includes peer reviewed and grey literature published in last 5 years to 19 July 2021 (peer reviewed) and 31 July 2021 (grey literature).

Inclusion and exclusion criteria of peer-reviewed literature

PICO	Include	Exclude
Population	Aboriginal and Torres Strait Islander; Women aged 40 years and older	Studies not reporting specifically on Aboriginal and Torres Strait Islander women
Intervention	Screening mammography (specific recruitment intervention if described)	Imaging other than mammography; Non-breast cancer indictors
Comparisons	Aboriginal and Torres Strait Islander vs not indigenous (if comparative)	
Outcomes (by Indigenous status & age-group if reported)	Primary: ○ Screening participation rate ○ Routine screening metrics: cancer detection rate; recall rate; interval cancer rate ○ Cancer stage at diagnosis; incidence of advanced breast cancer ○ Age at diagnosis; ○ Breast cancer incidence ○ Breast cancer (or all cause) mortality Secondary: ○ Breast cancer treatment rate ○ Breast cancer survival rate, ○ Breast cancer recurrence rate	Studies focusing on pathological, genetic, prognostic, psychosocial and sociological characteristics

	○ *Qualitative research (key themes)*	
Setting	○ Population screening for breast cancer in Australia, New Zealand and Canada ○ Other population settings may be considered if relevant to First Nations communities similar to those in the focused countries	Settings and populations not applicable to Australian Program, or not applicable to Aboriginal and Torres Strait Islander women
Study Design	Any	Abstracts only; Case reports; Non-research study (e.g. letter, protocol, etc)
Language	English	
Publication dates	2016-current	

Sources of peer-reviewed literature

- Medline
  1. breast cancer.mp. or exp Breast Neoplasms/ (394993)
  2. mammogra$.m_titl. (15696)
  3. aboriginal.m_titl. (4689)
  4. indigenous.m_titl. (10484)
  5. 1 or 2 (398404)
  6. 3 or 4 (15110)
  7. 5 and 6 (60)
  8. limit 7 to yr="2016 -Current" (28)
- Embase
  1. breast cancer.mp. or exp Breast Neoplasms/ (639835)
  2. mammogra$.m_titl. (19120)
  3. aboriginal.m_titl. (5479)
  4. indigenous.m_titl. (12169)
  5. 1 or 2 (644509)
  6. 3 or 4 (17566)
  7. 5 and 6 (137)
  8. limit 7 to yr="2016 -Current" (64)

- Global Health
  1 breast cancer.mp. or exp Breast Neoplasms/ (35098)
  2 mammogra$.m_titl. (2095)
  3 aboriginal.m_titl. (2430)
  4 indigenous.m_titl. (6450)
  5 1 or 2 (35276)
  6 3 or 4 (8797)
  7 5 and 6 (45)
  8 limit 7 to yr="2016 -Current" (17)

Appendix 3: Search results of peer-reviewed results

A Database	**B** Results	**C** Remove duplicates	**D** Excluded after title & abstract screening	**E** Full text review	**F** Excluded after full text review	**G** FINAL INCLUDED
	n=	n=	n=	n=	n=	n=
1 Medline	28					
2 Embase	64					
3 Global Health	17					
TOTAL	109	44	43	22	10	***12***

Appendix 4: Data extraction tables

Table 4.1 Peer reviewed literature

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Baade 2016, Australia (QLD)	Cohort study using population-based data	Queensland Cancer Registry	Participants aged 20-89 years and diagnosed with cancer during 1997-2012 - 1997-2006: 211 vs 16,534 - 2007-2012: 208 vs 13,768	Five years or death or at 31st December 2013	1-year age-adjusted cause-specific survival rate (1 year refers to follow-up interval post cancer diagnosis)	1997-2006: ○ 93.4% (95% CI: 90.9%-96.0%) vs 97.1% (96.9%-97.3%) ○ Comparative survival ratio = 0.95 (95% CI: 0.93-0.99) 2007-2012: ○ 94.2% (95% CI: 91.8%-96.7%) vs 97.8% (97.6%-98.0%) ○ Comparative survival ratio = 0.95 (95% CI: 0.93-0.99)	For breast cancer, the survival inequality continued to widen across the follow-up interval. For breast cancer, the survival differential increased as the follow up interval increased.
					5-year age-adjusted cause-specific survival rate	1997-2006: ○ 74.2% (95% CI: 68.4%-80.6%) vs 86.4% (85.9%-86.9%) ○ Comparative survival ratio = 0.86 (95% CI: 0.79-0.93) 2007-2012: ○ 77.7% (95% CI: 70.8%-85.1%) vs 90.2% (89.6%-90.8%)	

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author's interpretation**
						○ Comparative survival ratio = 0.86 (95% CI: 0.77-0.93)	
					Median age at diagnosis	1997-2006: 52 vs 58 ($p < 0.05$) 2007-2012: 53 vs 59 ($p < 0.05$)	
Banham 2019, Australia (SA)	Cohort study using population-based data	South Australian Cancer Registry	All Aboriginal and Torres Strait Islander women diagnosed with breast cancer during 1990-2010: 77 vs 77 (randomly matched non-Indigenous sample)	From cancer diagnosis to death from breast cancer or to 31st December 2011	Screening rate	BreastScreen SA (BSSA) screened: ○ 23 (29.9%) vs 41 (53.2%) ○ Odds ratio (unadjusted) = 0.37 (95%CI: 0.19-0.73) Listed with BSSA but not screened ○ 23 (29.9%) vs 16 (20.8%) ○ Odds ratio (unadjusted) = 0.52 (95%CI: 0.26-1.03) Not listed with BreastScreen SA ○ 31 (40.3%) vs 20 (26.0%) ○ Odds ratio (unadjusted) = 1.00 (ref)	Aboriginal and Torres Strait Islander women were less likely to have breast screening.
					Stage at diagnosis	Localised ○ 36 (46.8%) vs 47 (61.0%) ○ Odds ratio (unadjusted) = 1.00 (ref) Regional	

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author's interpretation**
						○ 24 (31.2%) vs 24 (31.2%) ○ Odds ratio (unadjusted) = 1.31 (95%CI: 0.64-2.66) Distant/Unknown ○ 17 (22.1%) vs 6 (7.8%) ○ Odds ratio (unadjusted) = 2.87 (95% CI: 0.92-9.01)	
					Treatment	Hospitalisation with cancer diagnosis ○ 62 (80.5%) vs 71 (92.2%) ○ Odds ratio (unadjusted) = 0.35 (95% CI: 0.13-0.96) Systemic therapy ○ 46 (59.7%) vs 58 (75.3%) ○ Odds ratio (unadjusted) = 0.49 (95% CI: 0.24-0.97) Surgery ○ 56 (72.7%) vs 68 (88.3%) ○ Odds ratio (unadjusted) = 0.35 (95% CI:0.15-0.83) (Cancer treatment: Up to 2 months before and 13 months after month of diagnosis; categories are not mutually exclusive. Surgery includes a small	Aboriginal and Torres Strait Islander women were less likely to have systemic therapies, and surgical intervention. Where surgery occurred, mastectomy was more common among Aboriginal and Torres Strait Islander women.

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author's interpretation**
						number of excisions not categorised as mastectomy.)	
					Mastectomy	Partial ○ 20 (26.0%) vs 38 (49.4%) ○ Odds ratio (unadjusted) = 1.00 (ref) Simple ○ 34 (44.2%) vs 25 (32.5%) ○ Odds ratio (unadjusted) = 2.58 (95% CI: 1.22-5.46) Radiotherapy ○ 41 (53.2%) vs 51 (66.2%) ○ Odds ratio (unadjusted) = 0.58 (95% CI: 0.30-1.11)	
			For women listed by BSSA (including both screened and not screened): 46 vs 57	From cancer diagnosis to death or to 31st December 2011	Age	< 50 years: 4 (8.7%) vs 11 (19.3%) 50-69 years: 34 (73.9%) vs 36 (63.2%) ≥ 70 years: 8 (17.4%) vs 10 (17.5%) p = 0.30	
					Stage at diagnosis	Localised: 20 (37.0%) vs 41 (71.9%)	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						Regional/distant/unknown: 26 (63.0%) vs 16 (28.1%) P < 0.01	
Condon 2016, Australia (NT)	Cohort study using population-based data	Northern Territory Cancer Registry	New cancer cases diagnosed during 1991-2012: 196 vs 1087	Not reported	Age-adjusted incidence rate	1991-1996: 24.2 vs 96.3 per 100 000 2007-2012: 90.5 vs 104.5 per 100 000 Percentage change between 1991-1996 and 2007-2012: 274% (95% CI: 111% to 563%) vs 9% (-11% to 33%)	The incidence of breast cancer more than tripled, from a very low level in the early 1990s to an incidence only moderately lower than that for non-Indigenous Australians during 2007-2012.
					Survival	Mortality during the 5 years after diagnosis ○ Excess hazard ratio (adjusted for follow-up time, period of diagnosis, age at diagnosis) = 3.1 (95% CI: 2.1-4.6)	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Dasgupta 2017, Australia	Systematic review*	Australian Institute of Health and Welfare, BreastScreen Australia (24)	BreastScreen Australia participants, aged 50-69 during 1996-2005: 36204 vs 5330779 (cohort 1) BreastScreen data for 1991-2006 with linked invasive breast cancer data from Australian cancer registries: 446 vs 61636 (cohort 2)	To 31st December 2006	Screening rate (cohort 1)	Screening rate: ○ 36.3% vs 57.5% ○ Odds ratio (unadjusted) = 0.55 (95%CI: 0.54-0.56) ○ Odds ratio (adjusted for age, remoteness, level of socio-economic disadvantage, and screening period) = 0.73 Rescreening rate: ○ 60.1% vs 70.4% ○ Odds ratio (adjusted for age, remoteness, level of socio-economic disadvantage, and screening period) = 0.60 (95% CI: 0.53-0.69) (Screening participation is defined as having had at least one screening mammography through BreastScreen Australia over a 2-year period; rescreening is having returned for another screening mammography within recommended interval of 2 years from	Aboriginal and Torres Strait Islander women had lower participation rates (36% vs 58%) and were less likely to be rescreened (60% versus 70%) than non-Indigenous women. Aboriginal and Torres Strait Islander women were 27% more likely to not participate in screening and 40% more likely to not be rescreened.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						the initial screening. Screening interval of 27 months used of recommended 24 months to allow for potential delays in screening availability and data transfer.)	
					Survival rate (cohort 2)	Crude 5-year survival rate: 80.8% vs 89.6% Relative Risk of death from Breast Cancer (adjusted for age at diagnosis, remoteness of residence, socio-economic status and diagnostic period) = 1.68 (95%CI: 1.37-1.99) Relative Risk of death from Breast Cancer (adjusted for age at diagnosis, remoteness of residence, socio-economic status, diagnostic period, tumour size, nodal status, and duration from last screen to diagnosis) = 1.96 (95%CI: 1.20-3.21)	Poorer unadjusted overall survival (81% versus 90%) for Aboriginal and Torres Strait Islander women. After adjustment, Aboriginal and Torres Strait Islander women had a 68% higher risk of breast cancer death than other women. After further adjustment, Aboriginal and Torres Strait Islander women almost twice as

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
							likely to die from breast cancer.
					Treatment rate (cohort 1)	Mastectomy vs complete local excision: ○ 34.8% vs 28.2% ○ Odds ratio (adjusted for age, residential remoteness, area-disadvantage, screening time period and screening round.) = 1.55 (95% CI: 1.05-2.36)	Aboriginal and Torres Strait Islander women more likely to have a mastectomy (35% versus 28% non-Indigenous); they were 1.6 times more likely

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author’s interpretation
							to have a mastectomy rather than complete local excision after adjustment.
					Age at diagnosis (cohort 2)	< 50 years: 20.6% vs 11.7% 50-59 years: 38.1% vs 35.5% 60-69 years: 28.3% vs 32.8% ≥ 70 years: 13.0% vs 20.1% P < 0.001	Aboriginal and Torres Strait Islander women had a significantly (p < 0.001) lower age distribution at breast cancer diagnosis.
		BreastScreen WA (25)	Women aged 50–69 years attending BreastScreen WA during 1995-2007: 6053 vs 576673	Not reported	Rescreening rate	No significant (p = 0.83) differences in rescreening rates for Aboriginal and Torres Strait Islander women when comparing initial false-positive and true-negative mammograms (61.6% vs 60.8% rescreens respectively). But women overall (including Aboriginal and Torres Strait Islander) were	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						significantly (p < 0.001) less likely to return for rescreening following a false-positive result (67.6% vs 70.7% rescreens if true-negative mammogram).	
		NSW Central Cancer Registry, NSW Department of Health Admitted Patient Data Collection, NSW Registry of Births, Deaths and Marriages, Australian	All invasive breast cancers diagnosed during 2001-2007 in women aged ≥ 18 years: 288 vs 27562	To 30 June 2009	Treatment rate	Mastectomy as first surgery: ○ 46% vs 34% Breast cancer surgical treatment within 12 months of diagnosis: ○ No surgical treatment: 43 (15%) vs 3061 (11%) ○ Local excision/Lumpectomy only: 106 (37%) vs 13650 (49%) ○ Mastectomy: 139 (48%) vs 10851 (39%) ○ P < 0.01 Mastectomy within 12 months of diagnosis: ○ Major cities: 45% vs 39% ○ Inner regional: 51% vs 42%	More Aboriginal and Torres Strait Islander women had a mastectomy as their first surgery (46%) compared with non-Indigenous women (34%). One year after diagnosis almost half of the Aboriginal and Torres Strait Islander women (48%) had undergone a mastectomy, compared with

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
		Bureau of Statistics (26)				○ Rural areas: 52% vs 42% Surgical treatment odds ratio (adjusted for age and year at diagnosis, comorbidities, spread of disease, residential remoteness and area-disadvantage) ○ 0.60 (95% CI = 0.39-0.95) ○ P = 0.031	39% of the non-Indigenous women. This pattern was common for Aboriginal and Torres Strait Islander women from major cities (45% versus 39%), inner regional (51% versus 42%) and rural areas (52% versus 42%). Aboriginal and Torres Strait Islander women 40% were less likely to have any surgery than non-Indigenous women after adjustment.
					Survival rate	Hazard ratio of dying from breast cancer: ○ Unadjusted: 1.69 (95%CI: 1.22-2.25) (P = 0.002)	Aboriginal and Torres Strait Islander women had significantly poorer survival

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						○ Adjusted for age at diagnosis, year of diagnosis, spread of disease:1.67 (95%CI: 1.21-2.23) (P = 0.002) ○ Adjusted for age at diagnosis, year of diagnosis and spread of disease, surgical treatment, comorbidities, socioeconomic disadvantage and place of residence: 1.30 (95%CI: 0.94-1.75) (P = 0.105)	(67% more likely to die from breast cancer than non-Indigenous women) after adjustment, but after further adjustment, the still inflated difference in risk of death by Indigenous status (Aboriginal and Torres Strait Islander women 30% more likely to die from breast cancer than non-Indigenous women) was no longer statistically significant.
					Age at diagnosis	20-49 years: 89 (31%) vs 6621 (24%) 50-59 years: 75 (26%) vs 7209 (26%)	Aboriginal and Torres Strait

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						60-69 years: 66 (23%) vs 6446 (23%) 70-79 years: 45 (16%) vs 4426 (16) ≥ 80 years: 13 (5%) vs 2860 (10%) P < 0.01 Median (IQR): 57 (47-66) vs 59 (50-70) years	Islander women were diagnosed at younger age than non-Indigenous women.
					Stage at diagnosis	Localised: 133 (46%) vs 14374 (52%) Regional: 112 (39%) vs 9652 (35%) Distant: 24 (8%) vs 1470 (5%) Unknown: 19 (7%) vs 2066 (7%) P = 0.04	Aboriginal and Torres Strait Islander women significantly (p = 0.04) more likely to present with advanced disease than non-Indigenous women.
		South Australian Cancer Registry, National	Breast cancer cases diagnosed during 1977-	Not reported	Survival rate	5-year survival rate (unadjusted): 60.8% vs 79.6% (p = 0.005)	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
		Death Index at the Australian Institute of Health and Welfare (27)	2007: 58 vs 1850				
		National Cancer Statistics Clearing House (28)	Australians diagnosed with cancer during 2001-2005: 420 vs 59640	Death or to 31st December 2007	Survival rate	1-year relative survival rate (age-adjusted) ○ 94.1% (95% CI: 91.0%-96.4%) vs 97.9% (97.7%-98.0%) 5-year relative survival rate (age-adjusted) ○ 80.1% (74.3%-85.2%) vs 89.5% (89.1%-89.8%) Cause-specific mortality in two years after diagnosis (adjusted for age and year at diagnosis and interaction terms of Indigenous status with each of these two terms) ○ Hazard ratio = 1.66 (95% CI: 1.06-2.61)	Aboriginal and Torres Strait Islander women had poorer breast cancer specific survival (66% higher breast cancer mortality 2 years post-diagnosis than non-Indigenous women after adjustment.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
		Queensland Cancer Registry (29)	Women aged 30-79 years diagnosed with invasive breast cancer during 1997-2006: 202 vs 15705	Death or to 31st December 2007	Survival rate	2-year survival rate: ○ 91.5% (95%CI: 86%-95%) vs 95.9% (95%-96%) ○ P < 0.001 5-year survival rate: ○ 77.6% (95% CI: 69%-84%) vs 89.0% (88%-90%) ○ P < 0.001 Odds ratio of mortality due to breast cancer (adjusted for age at diagnosis, socio-demographic factors, spread of disease, and area-disadvantage): 1.68 (95% CI: 1.14-2.39) (P <0.001)	Aboriginal and Torres Strait Islander women had significantly (p < 0.001) poorer survival (68% more likely to die from BC than non-Indigenous women) after adjustment.
		NSW Central Cancer Registry (30)	Invasive cancers diagnosed during 1999-2007	Not reported	Survival rate	5-year survival rate: ○ 79.1% (95% CI: 74.0%-84.2%) vs 87.8% (87.4%-88.2%) ○ P < 0.0001 Hazard ratio (adjusted for age and year of diagnosis and cancer degree of spread): ○ 1.83 (95%CI: 1.40%-2.40%) ○ P < 0.0001	Poorer unadjusted survival (79% versus 88% non-Indigenous) for Aboriginal and Torres Strait Islander women. Aboriginal and Torres Strait Islander women

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
							also had significantly (p < 0.001) poorer survival (83% more likely to die from BC than non-Indigenous women) after adjustment.
		NSW Central Cancer Registry, NSW Admitted Patient Data Collection, Australian Bureau of Statistics death records (31)	Primary invasive cancers diagnosed during 2001-2007: 288 vs 27545	To 30th June 2009	Stage at diagnosis	Relative risk ratio (adjusted for age group, year of diagnosis, socioeconomic disadvantage and place of residence): ○ Localised: reference ○ Regional: 1.22 (95%CI: 0.95-158) ○ Distant: 1.79 (1.13-2.73) ○ P = 0.03	Aboriginal and Torres Strait Islander women were more likely to have regional (22%) or distant (79%) disease than non-Indigenous women.

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author's interpretation**
Fitzadam 2021, Australia (NSW)	Cohort study using population-based data	NSW Cancer Registry, NSW Admitted Patient Data Collection, Medicare Benefits Schedule, Pharmaceutical Benefits Scheme, and NSW Outpatient Radiation Oncology Dataset	Women aged ≥17 and diagnosed with breast cancer during 2009-2012: 191 vs 13255	6 months from diagnosis	Age at diagnosis	<60 years: 121 (63.4%) vs 6428 (48.5%) 60-69 years: 47 (24.6%) vs 3531 (26.6%) 70-79 years: 14 (7.3%) vs 1876 (14.2%) ≥ 80 years: 9 (4.7%) vs 1420 (10.7%) Median (IQR): 54 (47-63) vs 60 (50-69) years P < 0.001	Aboriginal and Torres Strait Islander people tended to be diagnosed younger and had greater disease spread.
					Stage at diagnosis	Localised: 80 (41.9%) vs 6555 (49.5%) Regional: 79 (41.4%) vs 5106 (38.5%) Distant: 23 (12.0%) vs 986 (7.4%) Unknown: 9 (4.7%) vs 608 (4.6%) P = 0.05	
					Treatment rate	Chemotherapy ○ 113 (59.2%) vs 6214 (46.9%) ○ Odds Ratio (unadjusted) = 1.64 (95% CI: 1.23-2.19) (P < 0.001) ○ Odds Ratio (adjusted for age, disease extent and comorbidity) = 1.23 (95% CI: 0.89-1.72) (P = 0.22)	There were no differences found in treatment use for breast cancer after adjusting for age, disease extent and comorbidities.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Haigh 2018, Australia	Review**	Journal publications, government reports, national data collections and national surveys,	Not appliable	Not appliable	Incidence rate	Age-standardised incidence rate (NSW, VIC, QLD, WA and NT during 2009–2013): ○ 99 vs 112 per 100,000 ○ Rate ratio = 0.9	
					Survival rate	5-year relative survival rate (2007-2014): 81% vs 90% The five-year relative survival was lowest for the 25–44 years age group for Aboriginal and Torres Strait Islander women and increased with age. For non-Indigenous women, five-year relative survival was similar for 15–24 and 45–64 years and decreased for 65 years and older.	
					Mortality rate	Age-standardised mortality rate (2011-2015): ○ 24 vs 20 per 100,000 ○ Rate ratio = 1.2	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
					Screening rate	BreastScreen 2014-2015: 37% vs 53 %	This level of participation for Aboriginal and Torres Strait Islander women has been consistent for a number of years.
Moore 2016, Australia (QLD)	Cohort study using population-based data	Queensland Cancer Registry, 23 Queensland public hospitals, and secondary hospitals	Women diagnosed with breast cancer during1998-2004: 110 vs 105 (randomly matched sample of non-Indigenous)	Death or to 31st December 2006	Stage at diagnosis	Localised: 45 (45%) vs 57 (61%) Regional and metastatic: 56 (55%) vs 37 (39%) P = 0.02	Aboriginal and Torres Strait Islander women were more likely to and have regional spread or distant metastasis than non-Indigenous women.
					Treatment	Any treatment given: ○ Treatment:106 (96%) vs 103 (98%) ○ No treatment/unknown: 4 (4%) vs 0 (0%)	There was no difference in treatment patterns.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						○ P = 0.12 Curative treatment given (Metastatic cases excluded): ○ Curative treatment given: 88 (96%) vs 85 (96%) ○ No curative treatment given: 4 (4%) vs 4 (4%) ○ P = 1.0 Mode of treatment (Includes women with non-metastatic disease and those who had treatment): ○ Lumpectomy only, or concomitant with chemotherapy and/or radiotherapy: 49 (56%) vs 56 (66%) ○ Mastectomy only, or concomitant with chemotherapy and/or radiotherapy: 39 (44%) vs 29 (34%) ○ P = 0.17	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author’s interpretation
					Survival rate	Recurrence - Recurrence recorded: 27 (25%) vs 22 (21%) - No recurrence recorded: 76 (69%) vs 73 (69%) - Not enough information: 7 (6%) vs 10 (10%) - P = 0.61 Breast cancer death - Hazard ratios (unadjusted) = 1.88 (95% CI: 1.00-3.56) - Hazard ratios (adjusted for stage, comorbidities and any treatment) = 1.39 (95% CI: 0.31-2.76)	There was no difference in the percentage of Aboriginal and Torres Strait Islander and non-Indigenous women who had a recurrence of their breast cancer recorded. The crude risk of dying from breast cancer was marginally higher for Aboriginal and Torres Strait Islander women (HR 1.88) but after adjustment, there was no significant survival difference (HR 1.39, 95 % CI 0.71, 2.76).

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Read 2020, Australia (NT)	Cohort study using population-based data	Northern Territory Cancer Registry	Women diagnosed with invasive breast cancer during 1991-2000: 44 vs 315	Not reported	Stage at diagnosis	Localised: 20 (45%) vs 194 (62%) Regional: 17 (39%) vs 108 (34%) Metastatic: 7 (16%) vs 13 (4%) P = 0.007	Aboriginal and Torres Strait Islander women were more likely to present with more advanced stages of disease.
					Treatment	Surgery ○ 35 (95%) vs 300 (99%) ○ p = 0.130 Chemotherapy ○ 12 (63%) vs 107 (83%) ○ P = 0.060 Radiotherapy ○ 18 (78%) vs 153 (92%) ○ P = 0.049	Aboriginal and Torres Strait Islander women had a similar rate of completion of surgery (94.6% vs 98.7%), but were less likely to complete radiotherapy (78.3% vs 93.2%) and chemotherapy (63.2% vs 83.0%) if recommended, but only the

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
							radiotherapy met statistical significance ($p < 0.05$).
					Age at diagnosis	< 50 years: 22 (50%) vs 159 (51%) 60-69 years: 15 (34%) vs 133 (42%) ≥ 70 years: 7 (16%) vs 23 (7%) P = 0.136	There was no difference in age groups between Aboriginal and Torres Strait Islander and Non-Indigenous women.
Tapia 2017, Australia	Narrative review**	PubMed, the University of Sydney library catalogue, and grey literature available on the internet	Not applicable	Not applicable	Age-standardised incidence rate	2000-2004 (NSW, VIC, NT, QLD and WA, all ages): ○ 84.7 vs 115 per 100,000 ○ Rate ratio = 0.7 2003-2007: (QLD, WA, SA and NT, aged 50-69 years): ○ 171.4 vs 259.3 per 100,000 ○ Rate ratio = 0.6 2004-2008 (NSW, QLD, WA and NT, all ages):	Previous findings were confirmed in that the overall incidence of breast cancer was slightly lower in Aboriginal and Torres Strait Islander compared with non-Indigenous women

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author’s interpretation**
						○ 82.1 vs 103.6 per 100,000 ○ Rate ratio = 0.8 2005-2009 (NSW, QLD, WA and NT, aged 50-69 years): ○ 202.9 vs 270.6 per 100,000 ○ Rate ratio = 0.7 2006-2010 (NSW, QLD, WA and NT, aged 50-69 years): ○ 213.8 vs 278.3 per 100,000 ○ Rate ratio = 0.7	with a rate ratio of 0.8.
					Age-standardised mortality rate for all ages	1997-2001 (QLD, WA, NT, SA): ○ 27.8 vs 27.7 per 100,000 ○ Rate ratio = 1 2002-2006 (QLD, WA, NT, SA): ○ 24.8 vs 23.1 per 100,000 ○ Rate ratio = 1 2003-2007 (NSW, NT, QLD, WA, SA): ○ 23.4 vs 23.1 per 100,000 ○ Rate ratio = 1 2006-2010 (NSW, NT, QLD, WA, SA): ○ 27.4 vs 21.6 per 100,000 ○ Rate ratio = 1.2	In the last 20 years, reports from five states and territories where the majority of the Aboriginal and Torres Strait Islander populations reside indicate that while overall mortality for the disease is decreasing in

Author, Year, Country	**Study design**	**Data sources**	**Study participants (First Nations N vs non-Indigenous N)**	**Follow up time**	**Reported metrics**	**Findings (First nations vs non-Indigenous)**	**Study author's interpretation**
						2007-2010 (NSW, NT, QLD, WA, SA): ○ 27.6 vs 21.9 per 100,000 ○ Rate ratio = 1.2 2008-2012 (NSW, NT, QLD, WA, SA): ○ 24.1 vs 21.7 per 100,000 ○ Rate ratio = 1.1	Australia, the rate for Aboriginal and Torres Strait Islander women increased and surpassed that of non-Indigenous women. This finding was particularly pronounced in the 50-69 year age group (48 per 100,000 for Aboriginal and Torres Strait Islander and 44 per 100,000 for non-Indigenous women) but was consistent across all ages (24 per 100,000 and 22 per 100,000 respectively).
					Age-standardised mortality rate for women aged 50-69 years	1997-2001 (QLD, WA, NT, SA): ○ 45.8 vs 58.2 per 100,000 ○ Rate ratio = 0.8 2002-2006 (QLD, WA, NT, SA): ○ 53.2 vs 51.1 per 100,000 ○ Rate ratio = 1 2003-2007 (NSW, NT, QLD, WA, SA): ○ 61.2 vs 49.9 per 100,000 ○ Rate ratio = 1.2 2006-2010 (NSW, NT, QLD, WA, SA): ○ 54.5 vs 45.5 per 100,000 ○ Rate ratio = 1.1 2007-2010 (NSW, NT, QLD, WA, SA): ○ 52.3 vs 44.4 per 100,000 ○ Rate ratio = 1.1	

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						2008-2012 (NSW, NT, QLD, WA, SA): ○ 48.1 vs 43.9 per 100,000 ○ Rate ratio = 1	
					Screening rate	BreastScreen rate: 35.5% vs 54.4%	Only 35.5% of eligible Aboriginal and Torres Strait Islander women participated which is 19% lower than the rate for non-Indigenous women (54.5%).
Tapia 2019, Australia (NT)	Cohort study using population-based data	BreastScreen Northern Territory	Women aged 50-74 and screened during March-November 2015: 857 vs 3236	Not appliable	Screening rate	Median number of visits: ○ 2 vs 3 visits ○ IQR:1-3 vs 2-7 Median age at screening: ○ 54 vs 57 years ○ IQR: 48-60 vs 52-63 years Recalled cases: 65 (7.6%) vs 197 (6.1%) Cut off ages:	Aboriginal and Torres Strait Islander women were younger and had fewer visits to screening compared with non-Indigenous women.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
						○ < 55 years: 458 (53.4%) vs 1269 (39.2%) ○ ≥ 55 years: 399 (46.6%) vs 1967 (60.8%) ○ Odds ratio = 1.8 (95% CI: 1.5-2.0) ○ P <0.0001 Number of visits: ○ < 3 visits: 607 (70.8%) vs 1360 (42%) ○ ≥ 3 visits: 250 (29.2%) vs 1876 (58%) ○ Odds ratio = 3.3 (95% CI: 2.8-3.9) ○ P < 0.0001 Multiple logistic regression analysis reported that significant predictors for low screening attendance for Aboriginal and Torres Strait Islander women were younger age (OR 12.3, 95%CI 8.1 – 18.8; p<0.001), being recalled to assessment during this screening round (OR 5.4, 95%CI 1.8 – 13; p <0.001).	Aboriginal and Torres Strait Islander women were 1.8 times as likely to be under 55 years of age and more than 3 times as likely to have fewer than 3 visits to screening than non-Indigenous women.

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Tervonen 2019, Australia (NSW)	Cohort study using population-based data	New South Wales Cancer Registry	Participants aged ≥ 15 years diagnosed with invasive breast cancer during 2001–2014: 962 vs 61763	Not reported	Age at diagnosis	15-29 years: <5 (<1%) vs 324 (0.5%) 30-39 years: 71 (7.4%) vs 2990 (4.8%) 40-49 years: 220 (22.9%) vs 10771 (17.4%) 50-59 years: 281 (29.2%) vs 15456 (25.0%) 60-69 years: 244 (25.4%) vs 15469 (25.1%) 70-79 years: 104 (10.8%) vs 9936 (16.1%) ≥ 80 years: 39 (4.1 %) vs 6817 (11.0%) P < 0.0001	Aboriginal and Torres Strait Islander people were younger at diagnosis with higher proportions of breast cancer diagnosed before the screening target age range (< 50 years) compared with non-Indigenous people (30.6% vs. 22.8%).
					Age-specific incidence rate	15-29 years ○ 0.87 vs 3.43 per 100,000 ○ Incidence rate ratio = 0.25 (95%CI: 0.05-0.75) 30-39 years ○ 39.56 vs 43.54 per 100,000 ○ Incidence rate ratio = 0.91 (95%CI: 0.71-1.15)	Aboriginal and Torres Strait Islander women had lower or similar age-specific breast cancer incidence rates than non-Indigenous people

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author’s interpretation
						40-49 years ○ 140.08 vs 158.59 per 100,000 ○ Incidence rate ratio = 0.88 (95%CI: 0.77-1.01) 50-59 years ○ 278.12 vs 257.64 per 100,000 ○ Incidence rate ratio = 1.08 (95%CI: 0.96-1.21) 60-69 years ○ 468.12 vs 350.17 per 100,000 ○ Incidence rate ratio = 1.34 (95%CI: 1.17-1.52) 70-79 years ○ 439.76 vs 319.11 per 100,000 ○ Incidence rate ratio = 1.38 (95%CI: 1.12-1.67) ≥ 80 years ○ 519.52 vs 297.57 per 100,000 ○ Incidence rate ratio = 1.75 (95%CI: 1.24-2.39) P < 0.001	in women aged <60 years and higher age-specific cancer incidence in older age groups (⩾60 years).

Author, Year, Country	Study design	Data sources	Study participants (First Nations N vs non-Indigenous N)	Follow up time	Reported metrics	Findings (First nations vs non-Indigenous)	Study author's interpretation
Withrow 2017, Canada	Cohort study using population-based cohort	The 1991 Census Mortality Cohort, Canadian Cancer Registry (1992-2009), Canadian Mortality Database (1992–2009), Tax summary files	Invasive cancers diagnosed during 1992-2009: 580 vs 29265	Death or at 31st December, 2009	Survival rate	Age-standardised 5-year relative survival rate: 75.3% (95% CI: 68.8%-82.4%) vs 87.0% (86.0%-88.0%) Excess mortality rate ratio: ○ Adjusted for age and time period: 1.90 (95% CI: 1.52-2.39) ○ Adjusted for age, time period, area-level income quintile, rurality: 1.55 (95% CI: 1.25-1.95)	The absolute differences in survival rates between First Nations, Métis and Inuit and non-Indigenous was large where 5-year relative survival was 12% higher among non-Indigenous.

QLD = Queensland; SA = South Australia; NT = Northern Territory; WA = Western Australia; NSW = New South Wales,

* We extracted the data from the systematic review where the primary studies were published during 2010 or later and/or re-extracted additional information from the primary sources when specific information was unavailable in the systematic review.

** We extracted the information from the review and did not re-extract data from the primary sources.

Table 4.2 Grey literature data extraction

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
Australian Institute of Health and Welfare 2017	Government report, Australia	Screening rate	BreastScreen Australia participation rate, aged 50-74, 2014-2015: ○ 50-69 years ○ Crude rate: 37.1% vs 54.6% ○ Age-standardised rate: 37.5% vs 54.0% ○ 50-74 years: ○ Crude rate: 37.1% vs 53.8% ○ Age-standardised rate: 37.3% vs 53.2%	A recent Queensland project, 'Closing the Gap in Breast Cancer Screening', reported an increase in Aboriginal and Torres Strait Islander participation from 49% to 56% in 2 years.
		Incidence rate	2008-2012, aged 50-74 years, age-standardised: 226.8 vs 283.4 per 100,000 2008-2012, all ages: 91 vs 110 per 100000	
		Mortality rate	2010-2014, aged 50-74 years, age-standardised: 52.7 vs 46.7 per 100,000	
Australian Institute of Health and Welfare 2018	Government report	Screening rate	BreastScreen Australia participation rate, aged 50-74, 2015-16: ○ 50-69 years ○ Crude rate: 39.1% vs 55.1% ○ Age-standardised rate: 39.4% vs 54.6% ○ 50-74 years:	

Author, Year	**Document type, Country**	**Reported metrics**	**Summary (First Nations vs non-Indigenous)**	**Note**
			○ Crude rate: 39.0% vs 54.8% ○ Age-standardised rate: 39.1% vs 54.3%	
		Incidence rate	2009-2013, aged 50-74 years, age-standardised: 251.0 vs 285.2 per 100,000 2009-2013, all ages: 99 vs 111 per 100000	
		Mortality rate	2011-2015, aged 50-74 years, age-standardised: 54.8 vs 45.9 per 100,000	
Australian Institute of Health and Welfare 2019	Government report, Australia	Screening rate	BreastScreen Australia participation rate, aged 50-74, 2016-2017: ○ 50-69 years ○ Crude rate: 40.5% vs 54.8% ○ Age-standardised rate: 40.8% vs 54.1% ○ 50-74 years: ○ Crude rate: 40.5 vs 54.8% ○ Age-standardised rate: 40.7% vs 54.2%	In the last quarter of 2014–15, the Australian Government ran the National BreastScreen Australia Campaign to support the expansion of the program to women aged 50–74. The campaign included additional communication activities for Aboriginal and Torres Strait Islander consumers, with materials developed in consultation

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
				with Aboriginal and Torres Strait Islander women.
		Incidence rate	2010-2014, aged 50-74 years, age-standardised: 308.0 vs 292.8 per 100,000 2009-2013, all ages: 123 vs 114 per 100000	
		Mortality rate	2013-2017, aged 50-74 years, age-standardised: 51.6 vs 42.8 per 100,000	
Australian Institute of Health and Welfare 2020	Government report, Australia	Screening rate	BreastScreen Australia participation rate, aged 50-74, 2017-2018: ○ 40+ years ○ Crude rate: 26.2% vs 36.2 ○ Age-standardised rate: 26.9% vs 34.5% ○ 50-69 years ○ Crude rate: 37.1% vs 54.8% ○ Age-standardised rate: 37.4% vs 54.2% ○ 50-74 years: ○ Crude rate: 37.3% vs 55.0% ○ Age-standardised rate: 37.6% vs 54.4% Age-standardised participation rate of women aged 50-69 years, 1996-1997 to 2017-2018 - 1996–1997: 25.0% vs 39.8%	The rates of participation in BreastScreen Australia were highest among Aboriginal and Torres Strait Islander women aged 65–69 (43.5%) and 60–64 (41.3%). Nationally, the crude participation rate for women aged 50–74 was highest for Aboriginal and Torres Strait Islander women living in Inner regional areas (41.4%).

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			- 1997–1998: 27.8% vs 42.7% - 1998–1999: 29.4% vs 43.4% - 1999–2000: 30.5% vs 43.5% - 2000–2001: 31.5% vs 44.4% - 2001–2002: 30.9% vs 44.9% - 2002–2003: 31.0% vs 50.5% - 2003–2004: 29.9% vs 56.3% - 2004–2005: 29.9% vs 56.8% - 2005–2006: 30.5% vs 57.6% - 2006–2007: 30.0% vs 56.9% - 2007–2008: 30.0% vs 55.6% - 2008–2009: 29.8% vs 56.0% - 2009–2010: 29.4% vs 55.7% - 2010–2011: 29.1% vs 54.5% - 2011–2012: 30.2% vs 54.6% - 2012–2013: 32.1% vs 54.6% - 2013–2014: 32.8% vs 53.9% - 2014–2015: 33.6% vs 54.1% - 2015–2016: 35.2% vs 54.7% - 2016–2017: 36.3% vs 54.3% - 2017–2018: 37.4% vs 54.2% Crude participation rate by age group (2017-2018) ○ 40-44 years: 10.1% vs 10.0% ○ 45-49 years: 15.5% vs 17.5% ○ 50-54 years: 32.4% vs 49.6% ○ 55-59 years: 36.4% vs 52.9%	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			○ 60-64 years: 41.3% vs 58.1% ○ 65-69 years: 43.5% vs 60.1% ○ 70-74 years: 39.2% vs 55.8% ○ ≥ 75 years: 8.5% vs 7.7%	
		Incidence rate	Crude incidence rate by age group: (2011-2015) ○ 30-34: years: 15.5 vs 25.3 per 100,000 ○ 35-39 years: 37.6 vs 60.3 per 100,000 ○ 40-44 years: 71.3 vs 128.6 per 100,000 ○ 45-49 years: 121.5 vs 203.4 per 100,000 ○ 50-54 years: 169.5 vs 245.9 per 100,000 ○ 55-59 years: 181.7 vs 256.3 per 100,000 ○ 60-64 years: 267.6 vs 327.3 per 100,000 ○ 65-69 years: 403.6 vs 377.1 per 100,000 ○ 70-74 years: 338.5 vs 379.9 per 100,000 ○ ≥ 75 years: 370.3 vs 317.3 per 100,000 2011-2015, aged 50-74, age-standardised: 250.5 vs 302.6 per 100,000 2011-2015, all ages, age-standardised: 97.1 vs 118.9 per 100,000	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
		Mortality rate	Crude mortality rate by age group (2014-2018) ○ 30-34 years: 2.6 vs 2.6 per 100,000 ○ 35-39 years: 7.1 vs 5.7 per 100,000 ○ 40-44 years: 12.7 vs 10.7 per 100,000 ○ 45-49 years: 14.9 vs 17.1 per 100,000 ○ 50-54 years: 22.0 vs 26.1 per 100,000 ○ 55-59 years: 44.2 vs 34.7 per 100,000 ○ 60-64 years: 50.3 vs 42.1 per 100,000 ○ 65-69 years: 62.3 vs 56.2 per 100,000 ○ 70-74 years: 84.4 vs 69.2 per 100,000 ○ ≥ 75 years: 136.6 vs 133.8 per 100,000 Age-standardised mortality rates: ○ 2014-2018, aged 50-74: 47.4 vs 41.8 per 100,000 ○ 2014-2018: all ages, 21.5 vs 19.9 per 100,000	
University of Otago Wellington 2017	Government report, New Zealand	Screening rate July 2014-June 2016	Māori vs Pacific vs Non-Māori vs Non-Māori Non-Pacific ○ 45-49 years: 62.9% vs 69.8% vs 72.6% vs 72.8% - Māori/Non-Māori ratio: 0.87 (95% CI: 0.86-0.88) - Pacific/Non-Māori Non-Pacific ratio: 0.96 (95%CI: 0.94-0.97) ○ 50-69 years: 64.8% vs 72.7% vs 72.2% vs 72.2% - Māori/Non-Māori ratio: 0.90 (95% CI: 0.89-0.90) - Pacific/Non-Māori Non-Pacific ratio: 1.01 (95%CI: 1.00-1.01)	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			Age specific coverage: ○ 45-49 years: 63.0% vs 70.0% vs 72.7% vs 72.9% ○ 50-54 years: 63.5% vs 71.3% vs 70.6% vs 70.6% ○ 55-59 years: 65.5% vs 74.8% vs 72.7% vs 72.6% ○ 60-64 years: 64.9% vs 73.6% vs 72.1% vs 72.1% ○ 65-69 years: 66.7% vs 71.7% vs 74.1% vs 74.2%	
		Rescreening rate July 2014-June 2016	Māori vs Pacific vs Non-Māori vs Non-Māori Non-Pacific Initial screen: ○ 45-49 years: 68.4% vs 62.8% vs 77.7% vs 78.9% - Māori/Non-Māori ratio: 0.88 (95% CI: 0.86-0.90) - Pacific/Non-Māori Non-Pacific ratio: 0.80 (95%CI: 0.78-0.82) ○ 50-69 years: 57.2% vs 49.4% vs 66.3% vs 67.7% - Māori/Non-Māori ratio: 0.86 (95% CI: 0.83-0.89) - Pacific/Non-Māori Non-Pacific ratio: 0.73 (95%CI: 0.69-0.77) Subsequent screens: ○ 45-49 years: 79.5% vs 77.7% vs 85.1% vs 85.6% - Māori/Non-Māori ratio: 0.93 (95% CI: 0.92-0.95) - Pacific/Non-Māori Non-Pacific ratio: 0.90 (95%CI: 0.88-0.92) ○ 50-69 years: 80.9% vs 76.8% vs 87.0% vs 87.4% - Māori/Non-Māori ratio: 0.93 (95% CI: 0.92-0.94)	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			- Pacific/Non-Māori Non-Pacific ratio: 0.88 (95%CI: 0.87-0.89)	
		Invasive breast cancer detection rate July 2014-June 2016	Māori vs Pacific vs Non-Māori vs Non-Māori Non-Pacific Initial screen: ○ 45-49 years: 4.5 vs 5.7 vs 3.3 vs 3.2 per 1,000 screens ○ Māori/Non-Māori ratio: 1.36 (95% CI: 0.92-2.00) ○ Pacific/Non-Māori Non-Pacific ratio: 1.79 (95%CI: 1.08-2.95) ○ 50-69 years: 13.0 vs 15.6 vs 9.4 vs 8.9 per 1,000 screens ○ Māori/Non-Māori ratio: 1.39 (95% CI: 0.94-2.05) ○ Pacific/Non-Māori Non-Pacific ratio: 1.75 (95%CI: 1.04-2.92) Subsequent screens: ○ 45-49 years: 3.3 vs 4.2 vs 2.4 vs 2.3 per 1,000 screens - Māori/Non-Māori ratio: 1.38 (95% CI: 0.90-2.13) - Pacific/Non-Māori Non-Pacific ratio: 1.75 (95%CI: 1.04-2.92) ○ 50-69 years: 6.7 vs 5.2 vs 4.8 vs 4.7 per 1,000 screens - Māori/Non-Māori ratio: 1.41 (95% CI: 1.24-1.62) - Pacific/Non-Māori Non-Pacific ratio: 1.09 (95%CI: 0.87-1.36)	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
		Detection of invasive breast cancer less than or equal to 15mm July 2014-June 2016	Māori vs Pacific vs Non-Māori vs Non-Māori Non-Pacific Initial Screen: ○ 45-49 years: 56.7% vs 31.3% vs 52.7% vs 55.3% ○ 50-69 years: 50.0% vs 40.0% vs 50.3% vs 51.6% Subsequent screens: ○ 45.49 years: 43.5% vs 60.0% vs 60.9% vs 60.1% ○ 50-69 years: 57.6% vs 55.6%vs 65.8% vs 66.3%	
		Treatment rate July 2011-June 2015	Māori vs Pacific vs Non-Māori vs Non-Māori Non-Pacific Invasive cancers having a single excisional procedure: ○ 45-49 years: 82.1% vs 85.4% vs 86.2% vs 86.3% ○ Māori/Non-Māori ratio: 0.95 (95% CI: 0.87-1.04) ○ Pacific/Non-Māori Non-Pacific ratio: 0.99 (95%CI: 0.87-1.13) ○ 50-69 years: 85.5% vs 91.1% vs 86.5% vs 86.3% ○ Māori/Non-Māori ratio: 0.99 (95% CI: 0.95-1.03) ○ Pacific/Non-Māori Non-Pacific ratio: 1.06 (95%CI: 1.00-1.11) Invasive cancers having breast conserving surgery: ○ 45-49 years: 90.9% vs 100.0% vs 85.2% vs 84.3%	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			- Māori/Non-Māori ratio: 1.07 (95% CI: 0.86-1.33) - Pacific/Non-Māori Non-Pacific ratio: 1.19 (95%CI: 1.05-1.33) ○ 50-69 years: 83.3% vs 88.0% vs 78.3% vs 77.8% - Māori/Non-Māori ratio: 1.06 (95% CI: 0.96-1.18) - Pacific/Non-Māori Non-Pacific ratio: 1.13 (95%CI: 0.97-1.32) Invasive cancers having radiotherapy: ○ 45-49 years: 93.3% vs 72.0% vs 93.1% vs 94.8% - Māori/Non-Māori ratio: 1.00 (95% CI: 0.94-1.07) - Pacific/Non-Māori Non-Pacific ratio: 0.76 (95%CI: 0.59-0.97) ○ 50-69 years: 93.9% vs 84.7% vs 93.0% vs 93.3% - Māori/Non-Māori ratio: 1.01 (95% CI: 0.98-1.04) - Pacific/Non-Māori Non-Pacific ratio: 0.91 (95%CI: 0.83-0.99)	
Ministry of Health Manatū Hauora 2019	Government report, New Zealand	Rates of cancer registrations	Māori vs Non-Māori Age-standardised rate: - 2015: 130.9 vs 94.7 per 100,000 - 2016: 128.7 vs 93.4 per 100,000 - 2017: 130.0 vs 90.0 per 1000,000 Registration rates by age group (2017):	Age-standardised rates are standardised to the World Health Organisation (WHO) Standard population.

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			○ 40-44 years: 141.8 vs 122.5 per 100,000 ○ 45-49 years: 269.4 vs 227.9 per 100,000 ○ 50-54 years: 271.1 vs 230.7 per 100,000 ○ 55-59 years: 381.3 vs 240.6 per 100,000 ○ 60-64 years: 635.4 vs 296.3 per 100,000 ○ 65-69 years: 587.7 vs 351.2 per 100,000 ○ 70-74 years: 186.1 vs 260.7 per 100,000 ○ 75-79 years: 658.8 vs 367.7 per 100,000 ○ 80-84 years: 456.4 vs 330.1 per 100,000 ○ ≥ 85 years: 434.8 vs 362.3 per 100,000	
Ministry of Health Manatū Hauora 2018	Government report, New Zealand	Breast Cancer Registration (2010-2012)	Māori females had a breast cancer registration rate 1.4 times that of Non-Māori females (RR 1.40, CI 1.32–1.50).	
		Breast Cancer mortality (2010-2012)	Māori females were around 1.5 times as likely to die from breast cancer as Non-Māori females (RR 1.59, CI 1.37–1.83).	
Jamal 2021 (Statistics Canada)	Government report and journal article, Canada (Ontario)	Breast Cancer incidence rate (1991-2010)	Age-standardised incidence (aged ≥30 years): - 69.6 v 81.0 per 100,000 - Rate ratio = 0.86 (P < 0.05) Incidence by age group: - 30-49 years:	

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			○ 81.5 vs 89.7 per 100,000 ○ Rate ratio = 0.91 ($P > 0.05$) - 50-64 years: ○ 218.2 vs 261.4 per 100,000 ○ Rate ratio = 0.83 ($P < 0.05$) - 65-74 years: ○ 320.4 vs 352.6 per 100,000 ○ Rate ratio = 0.91 ($P > 0.05$) - ≥ 75 years: ○ 260.5 vs 358.5 per 100,000 ○ Rate ratio = 0.73 ($P < 0.05$)	
		Breast Cancer Mortality rate (1991-2010)	Age-standardised mortality rate (aged ≥30 years): - 15.7 vs 18.9 per 100,000 - Rate ratio = 0.83 ($P < 0.05$) Mortality by age group: - 30-49 years: ○ 12.4 vs 13.8 per 100,000 ○ Rate ratio = 0.90 ($P > 0.05$) - 50-64 years: ○ 47.0 vs 56.1 per 100,000 ○ Rate ratio = 0.84 ($P > 0.05$) - 65-74 years: ○ 80.0 vs 96.1 per 100,000 ○ Rate ratio = 0.83 ($P > 0.05$)	Age-standardised mortality rate was standardised to the WHO Standard Population and combined for all ages 30-99 years.

Author, Year	Document type, Country	Reported metrics	Summary (First Nations vs non-Indigenous)	Note
			- ≥ 75 years: ○ 131.1 vs 171.5 per 100,000 ○ Rate ratio = 0.76 (P > 0.05)	

Appendix 5 Supplementary literature

Mammography density

1. Darcey, E., et al., The association between mammographic density and breast cancer risk in Western Australian Aboriginal women. Breast Cancer Research and Treatment, 2019. 176(1): p. 235-242.

2. Mauro Secco, J., et al., Mammographic density among indigenous women in forested areas in the state of Amapa, Brazil: A cross-sectional study. Sao Paulo Medical Journal, 2017. 135(4): p. 355-362.

3. McLean, K., et al., The distribution and determinants of mammographic density measures in Western Australian aboriginal women. Breast Cancer Research, 2019. 21(1): p. 33.

4. Pape, R., et al., Mammographic parenchymal patterns and breast cancer risk in New South Wales North Coast Aboriginal and Torres Strait Islander women. Journal of Medical Radiation Sciences, 2016. 63(2): p. 81-88.

5. Tapia, K.A., et al., Mammographic densities of Aboriginal and non-Aboriginal women living in Australia's Northern Territory. International Journal of Public Health, 2019. 64(7): p. 1085-1095.

Strategies to improve breast cancer outcomes

1. Christie, V., et al., What is the evidence globally for culturally safe strategies to improve breast cancer outcomes for indigenous women in high income countries? A systematic review. International Journal of Environmental Research and Public Health, 2021. 18(11).

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Studies reporting on breast cancer in indigenous groups from other regions, outside of Australia, New Zealand and Canada

1. Abubakar, M., et al., Breast cancer risk factors, survival and recurrence, and tumor molecular subtype: analysis of 3012 women from an indigenous Asian population. Breast Cancer Research, 2018. 20(1): p. 114.

2. Adedokun, B., et al., Abstract 624: A case control study of benign breast disease and breast cancer among indigenous African women. Cancer Research. Conference: American Association for Cancer Research Annual Meeting, 2019. 79(13 Supplement).

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11. Tamayo, L.I., et al., Breast cancer characteristics and survival among Indigenous American women from Peru. Cancer Epidemiology Biomarkers and Prevention. Conference: 10th AACR Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved. Atlanta, GA United States, 2018. 27(7 Supplement).

Glossary

First Nations: referring to groups of women globally who are the First Peoples of their Nations.

Aboriginal and Torres Strait Islander: first nations women of Australia.

Māori: referring to studies specific only to Māori women in New Zealand.

Pacific: a dynamic and diverse group of people living in New Zealand who migrated from the Pacific islands or who identify with the Pacific islands because of ancestry or heritage.

First Nations, Métis and Inuit: referring to specific studies from Canada.

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