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Benchmarking Cancer Quality Indicators by State in Australia: A Comparison of Cancer Care and Outcomes Between Queensland and Victoria

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ABSTRACT

Aims: Benchmarking quality indicators between jurisdictions provides an opportunity to identify unwarranted variations. This study compared statewide treatment and survival information for cancer between Queensland and Victoria.

Methods: Population-based data were obtained separately for residents of the two states diagnosed with selected cancers between 2017 and 2021. Eleven indicators are reported involving treatments received, timeliness of treatment, and outcomes. Individual-level data were analyzed within each state to preserve governance requirements. Aggregated results were then assessed using univariate Poisson models and reported as incidence or mortality rate ratios (IRRs/MRRs) for Queensland in reference to Victoria.

Results: The study cohort comprised 189,689 people. Around three-quarters (79% Queensland, 77% Victoria) received treatment. Variations in specific treatments were observed by type of cancer and state; for example, Queensland patients were more likely to receive intravenous systemic therapy for liver cancer (IRR = 1.62, 95% confidence interval [95% CI] 1.46–1.80), whereas brain cancer patients in Queensland were less likely to receive surgery compared with Victoria (IRR = 0.85, 95% CI 0.81–0.90; both $p < 0.001$). Treatment tended to be timelier in Victoria (overall IRR = 0.87 for Queensland, 95% CI 0.86–0.88; $p < 0.001$). Surgical mortality was low in both states, although brain cancer carried a higher risk. One-year survival was generally similar across both states, apart from upper gastrointestinal cancer (65% in Queensland compared to 61% in Victoria, IRR = 1.07, 95% CI 1.03–1.10; $p < 0.001$).

Conclusion: This project demonstrates the mutual benefit of identifying areas of improvement and serves as a blueprint for other Australian states to join nationwide reporting to drive best practice in healthcare performance for people with cancer.

1 | Introduction

Cancer continues to be the leading cause of burden of disease in Australia [1], resulting in severe health, social, and economic impacts on individuals, families, and society as a whole. The Australian Institute of Health and Welfare estimates that in 2024 there were 169,500 cases of cancer diagnosed within Australia (excluding keratinocytic skin cancers) [2]. This number is set to surpass 200,000 by 2034 [2].

Abbreviations: 95% CI, 95% confidence interval; ICBP, International Cancer Benchmarking Partnership; ICD10-AM, International Classification of Diseases, version 10, Australian Modification; IRR, incidence rate ratio; MRR, mortality rate ratio.

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Despite improving survival rates for many cancers over recent decades stemming from treatment innovations [3, 4], combined with advances in early detection [5, 6], cancer still causes nearly 30% of deaths in Australia, with an estimated 52,700 deaths in 2024 [2]. Disparities in outcomes also persist within certain segments of the population. Specifically, First Nations people, residents of rural and remote regions, and those from socioeconomically disadvantaged areas experience higher incidence and/or mortality rates for some types of cancer [7].

Capturing consistent and complete data at the population level is crucial for interpreting the performance of the health system and working toward equity in cancer care [8, 9]. Furthermore, benchmarking of comparable information is well established as a process that can lead to quality improvement in healthcare [10–13]. Although methodological challenges exist for cross-jurisdictional benchmarking, collaboration is a key factor for success [10, 11, 13].

To that end, we report here on an initiative between two states in Australia (Queensland and Victoria) to compare information on a range of quality indicators. This interstate benchmarking project aims to identify areas of variation and highlight opportunities for improvement that may be overlooked when investigating data from a single jurisdiction, with the ultimate goal of enhancing cancer care nationwide.

2 | Materials and Methods

2.1 | Data

Data were obtained from the Queensland Oncology Repository compiled by Cancer Alliance Queensland and the Integrated Data Resource produced by the Centre for Victorian Data Linkage. In each jurisdiction, individual-level records for people with cancer were combined with multiple other sources to produce a cleaned and uniform dataset. The linkage process integrated information from the population-based state cancer registry, hospital admissions (supplying surgical and intravenous systemic therapy data), radiation therapy providers, and the Registry of Births, Deaths and Marriages. Available details included demographic characteristics, cancer diagnoses, treatments delivered in either public or private facilities, and mortality.

Section 82 of the Hospital and Health Boards Act (2011) allows staff of Cancer Alliance Queensland to analyze cancer information for the purpose of clinical research and quality assurance. The Cancer Council Victoria Human Research Ethics Committee provided Human Ethics Approval (No.: 1312 and 1412) for this study in Victoria. Note that the final datasets for Queensland and Victoria were not merged; therefore, approval for the study by a Human Research Ethics Committee to allow sharing of individual-level data was not required for either state.

The two study cohorts included residents of Queensland or Victoria who were diagnosed with cancer between 2017 and 2021. Twelve individual types or combinations of solid cancer were included in the study: brain (ICD10-AM site codes C70-C71), breast (C50), colon (C18), liver (C22), non-small cell lung (C33–C34 with morphology codes as shown in Table S1), ovarian (C56–C57), pancreatic (C25), prostate (C61), rectal (C19–C20, C21.8), upper gastrointestinal (C15–C16), uterine (C54–C55), and vulvar/vaginal (C51–C52). People diagnosed with cancer on the basis of death certificate only were excluded. Information on treatments received and mortality status was available through December 31, 2022, allowing a minimum of 1 year of follow-up for all people in the study cohort.

A total of 11 quality indicators are reported here, involving the type of treatment received, timeliness from diagnosis to commencement of treatment, surgical mortality, and survival. These indicators are a subset of those which were initially developed for reporting in Queensland in partnership with clinicians and patient advocates [14] and subsequently agreed to be suitable for use in both states. Definitions for each of the indicators, a list of procedure codes by type of cancer for indicators related to surgery, and the procedure codes for intravenous systemic therapy are available in Tables S2–S4, respectively.

All indicators were thoroughly reviewed within each state to ensure that the definitions of data elements were applied consistently. This process included checking the site, morphology, and procedure codes used within each cancer stream, along with the allocation of relevant treatments for a specific diagnosis. A mutual hierarchy of procedure codes was used where more than one procedure was recorded per person. Where a treatment modality was not recorded for a patient, it was jointly assumed that they did not receive that treatment. Both jurisdictions were also aligned in how to define and record key milestone dates in the patient journey, including (but not limited to) diagnosis date, surgery date (where multiple procedures occurred), therapy dates, death dates, and censor dates for any survival analysis.

Key demographic characteristics of interest that were mutually available included First Nations status, remoteness of residence, and area-based socioeconomic status. First Nations status was determined by whether the person self-identified as an Aboriginal and/or Torres Strait Islander. Remoteness of residence was classified according to the Australian Statistical Geography Standard (Edition 3) [15]. Area-based socioeconomic status was determined from the Index of Relative Socio-economic Advantage and Disadvantage [16], grouped as disadvantaged (deciles 1 and 2), middle (deciles 3–8), and advantaged (deciles 9 and 10).

2.2 | Analyses

Unit record data for each state were analyzed separately using a standard protocol. For each quality indicator, the percentage of people by type of cancer and state was calculated. Indicators on timeliness of treatment were further stratified by facility type (public or private). Aggregated data for the indicators were then shared and assessed using an unadjusted Poisson model weighted by the counts, using state as an independent variable. Results from the models were expressed as an incidence rate ratio (IRR) or mortality rate ratio (MRR) as relevant, along with the corresponding 95% confidence interval (95% CI). Victoria was used as the reference category for all comparisons. An IRR > 1 for indicators relating to treatment or survival designates a more favorable result for Queensland, while an IRR < 1 designates a more favorable result for Victoria. MRRs relating to surgical

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mortality indicators are interpreted inversely, with an MRR > 1 specifying a more favorable outcome for Victoria and an MRR < 1 specifying a more favorable outcome for Queensland. Note that all comparisons in Section 3 have a p-value of < 0.001 unless otherwise specified.

3 | Results

3.1 | Study Cohort

A total of 189,969 people were diagnosed with one of the selected cancers in Victoria (n = 104,616, 55%) or Queensland (n = 85,353, 45%) between 2017 and 2021. The distribution of cancers was similar in both states, with prostate, breast, non-small cell lung, and colon cancers accounting for a combined 74% of diagnoses in Victoria and 75% in Queensland (Table S5). Sex and age group distributions were also similar by state, with a small majority of males (53% overall) and 46% of people aged 70 years or older at diagnosis. There were, however, differences in the other key characteristics. The proportion of Aboriginal and/or Torres Strait Islander people was higher in Queensland (3%) than Victoria (< 1%). More than twice as many Queensland residents with a selected cancer resided in outer regional or remote areas (13%) compared with Victoria (6%). Members of the Queensland cohort were also more likely to live in a socioeconomically disadvantaged area (25%) than those from Victoria (16%).

3.2 | Type of Treatment

Most people in the overall study cohort were treated with either surgery, intravenous systemic therapy, and/or radiation therapy between 30 days prior to 365 days after their cancer diagnosis (Queensland 79% and Victoria 77%; Table 1). The relationship between treatment and key characteristics of interest was generally similar in both states. Females with cancer were more likely to receive treatment than males, with this gap more pronounced in Victoria (85% vs. 71%, respectively). There was a strong inverse relationship between increasing age and the percentage of people who received cancer treatment, ranging from around 90% for those aged under 50 at diagnosis to under 60% in the 80 and above age group. Smaller differences were observed for remoteness of residence (79% combined in major cities compared with 77% for outer regional, remote and very remote areas), area-based socioeconomic status (80% in affluent areas compared with 76% in disadvantaged areas), and First Nations status (78% for other Australians compared with 76% for Aboriginal and Torres Strait Islanders).

The percentage of people who received any of the nominated treatments varied widely by type of cancer, from 94% for breast cancer to 42% for liver cancer in both states combined. Liver (IRR = 1.30, 95% CI 1.22–1.38) and prostate cancer (IRR = 1.14, 95% CI 1.13–1.16) were more likely to be treated in Queensland than Victoria, whereas the opposite was observed for upper gastrointestinal (IRR = 0.90, 95% CI 0.87–0.92) and brain cancers (IRR = 0.93, 95% CI 0.90–0.96) (Figure 1a).

Although 58% of the study cohort in both states had surgery, people living in Victoria were considerably more likely to receive surgery for brain cancer (IRR = 0.85, 95% CI 0.81–0.90) or any of the gynacological cancers collectively (IRR = 0.93, 95% CI 0.92–0.95) (Figure 1b). The overall rates of people receiving intravenous systemic therapy within 365 days of diagnosis were similar across both states (30% in Queensland and 28% in Victoria). However, there were notable differences by type of cancer, with people in Queensland more likely to receive intravenous systemic therapy for liver cancer (IRR = 1.62, 95% CI 1.46–1.80) or non-small cell lung cancer (IRR = 1.20, 95% CI 1.16–1.24) compared to Victorians (Figure 1c). Approximately one-third of the study cohort received radiotherapy within 365 days of diagnosis (34% in both states). Radiotherapy was more commonly used for vaginal and vulvar cancers in Queensland than in Victoria (IRR = 1.44, 95% CI 1.23–1.69), whereas the reverse was observed for uterine cancer (IRR = 0.82, 95% CI 0.76–0.89), upper gastrointestinal cancers (IRR = 0.85, 95% CI 0.80–0.89), and rectal cancer (IRR = 0.87, 95% CI 0.83–0.92) (see Figure 1d).

3.3 | Timeliness of Treatment

A higher percentage of people diagnosed with cancer received their first treatment within 30 days of diagnosis in Victoria compared with Queensland (55% vs. 48%, respectively; IRR = 0.87, 95% CI 0.86–0.88). People receiving treatment in private facilities were far more likely to receive treatment within 30 days compared with public facilities for both states (63% vs. 47% in Victoria and 58% vs. 37% in Queensland) (Figure 2a). Examples of some of the larger interstate differences in timeliness of treatment were for breast cancer in public facilities (IRR = 0.62, 95% CI 0.60–0.64), liver cancer in public facilities (IRR = 0.72, 95% CI 0.64–0.80), and non-small cell lung cancer in either public (IRR = 0.66, 95% CI 0.63–0.69) or private facilities (IRR = 0.86, 95% CI 0.83–0.89).

Similar patterns were observed when looking at surgery within 30 days of cancer diagnosis by type of facility and type of cancer, with a higher percentage of patients in Victoria than in Queensland receiving timely surgery for several cancers, mostly in public facilities (Figure 2b). In particular, there were very large differences in timeliness of surgery between the two states for non-small lung cancer for both private (IRR = 0.82, 95% CI 0.78–0.86) and public facilities (IRR = 0.54, 95% CI 0.50–0.58). Surgery within 30 days in public facilities was also much more common in Victoria for breast cancer (IRR = 0.59, 95% CI 0.57–0.61), colorectal cancer (IRR = 0.80, 95% CI 0.77–0.82), and pancreatic cancer (IRR = 0.82, 95% CI 0.73–0.92).

3.4 | Surgical Mortality

Very few people died either in-hospital or within 30 days of surgery, irrespective of type of cancer or state (Figure 3a,b). Overall, 30-day mortality following surgery for all the selected cancers combined was slightly lower in Queensland (0.5%) compared with Victoria (0.6%), producing an MRR of 0.81 (95% CI 0.69–0.96; p = 0.01). One exception was surgery for brain cancer, where 30-day mortality was higher in Queensland than Victoria, although the result was not statistically significant (MRR = 1.57, 95% CI 0.92–2.66; p = 0.09). Similar patterns were observed for 90-day surgical mortality (Figure 3c), which was much higher for brain cancer (8% in Victoria and 9% in Queensland) than for the other

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TABLE 1 | Key demographic characteristics of people with selected cancers by state of residence and whether they received any treatment[a] within 12 months of diagnosis, 2017–2021.

Characteristic	Victoria				Queensland			
	Received treatment		No treatment		Received treatment		No treatment	
	Count	Column %	Count	Column %	Count	Column %	Count	Column %
Total	81,006	77.4	23,610	22.6	67,562	79.2	17,791	20.8
Sex								
Female	42,376	84.9	7538	15.1	33,304	84.8	5984	15.2
Male	38,629	70.6	16,071	29.4	34,258	74.4	11,807	25.6
Age group at diagnosis								
< 50 years	8818	90.4	932	9.6	7110	90.6	734	9.4
50–59 years	13,860	83.1	2821	16.9	11,720	85.0	2067	15.0
60–69 years	23,921	80.1	5945	19.9	21,175	83.3	4231	16.7
70–79 years	23,607	78.6	6433	21.4	20,053	79.7	5110	20.3
80+ years	10,800	59.1	7479	40.9	7504	57.1	5649	42.9
Remoteness of residence at diagnosis								
Major city	57,531	77.8	16,426	22.2	43,758	79.7	11,153	20.3
Inner regional	19,031	77.0	5681	23.0	15,366	78.6	4195	21.4
Outer regional	4391	74.9	1468	25.1	7196	77.6	2082	22.4
Remote and very remote	53	60.2	35	39.8	1242	77.5	361	22.5
Area-based socioeconomic status[b]								
Affluent	19,597	79.0	5220	21.0	7606	81.7	1702	18.3
Middle	50,335	77.4	14,734	22.6	43,594	79.6	11,200	20.4
Disadvantaged	11,074	75.2	3656	24.8	16,359	77.0	4889	23.0
First Nations status								
Aboriginal and/or Torres Strait Islander	484	78.2	135	21.8	1630	75.1	541	24.9
Other Australian	80,522	77.4	23,475	22.6	65,932	79.3	17,250	20.7

[a]Treatment includes surgery, intravenous systemic therapy, and/or radiotherapy within 30 before to 365 days after cancer diagnosis.
[b]Details of area-based socioeconomic status were unknown for three people from Queensland who received treatment.

cancers. Conversely, 90-day surgical mortality for non-small cell lung cancer was only around one-third as high in Queensland as it was in Victoria (MRR = 0.38, 95% CI 0.24–0.61).

One-year surgical survival varied from 66% for brain cancer to 99% for breast cancer in both states, and was higher in Queensland than Victoria for some cancers (Figure 3d). The largest differences in one-year surgical survival were for ovarian cancer (IRR = 1.05, 95% CI 1.04–1.07), pancreatic cancer (IRR = 1.06, 95% CI 1.02–1.10; $p = 0.002$), and upper gastrointestinal cancer (IRR = 1.06, 95% CI 1.03–1.09).

3.5 | Observed Survival

One-year observed survival by type of cancer and state is shown in Figure 4. Pancreatic cancer had the lowest 1-year survival rate (42% in both Victoria and Queensland), whereas survival was highest for prostate cancer (both 99%) and breast cancer (98% in Victoria and 99% in Queensland). Observed survival was similar for most of the selected cancers across the two states, except for upper gastrointestinal cancer (65% in Queensland compared with 61% in Victoria; IRR = 1.07, 95% CI 1.03–1.10).

4 | Discussion

This study marks the first collaborative effort to develop datasets and methods to routinely track the performance of cancer care across multiple states in Australia. Our results demonstrate to other jurisdictions that it is possible to build on work from individual states and introduce population-level reporting about cancer-specific indicators for treatment and outcomes based on best practice guidelines using an agreed common methodology while each state retains its individual-level data. This pragmatic approach thus avoids issues around cross-jurisdictional sharing of unit record information for people with cancer. Detailed discussions and documentation were necessary to ensure the consistency of definitions for type of cancer, procedures, patient characteristics, and counting/analysis rules.

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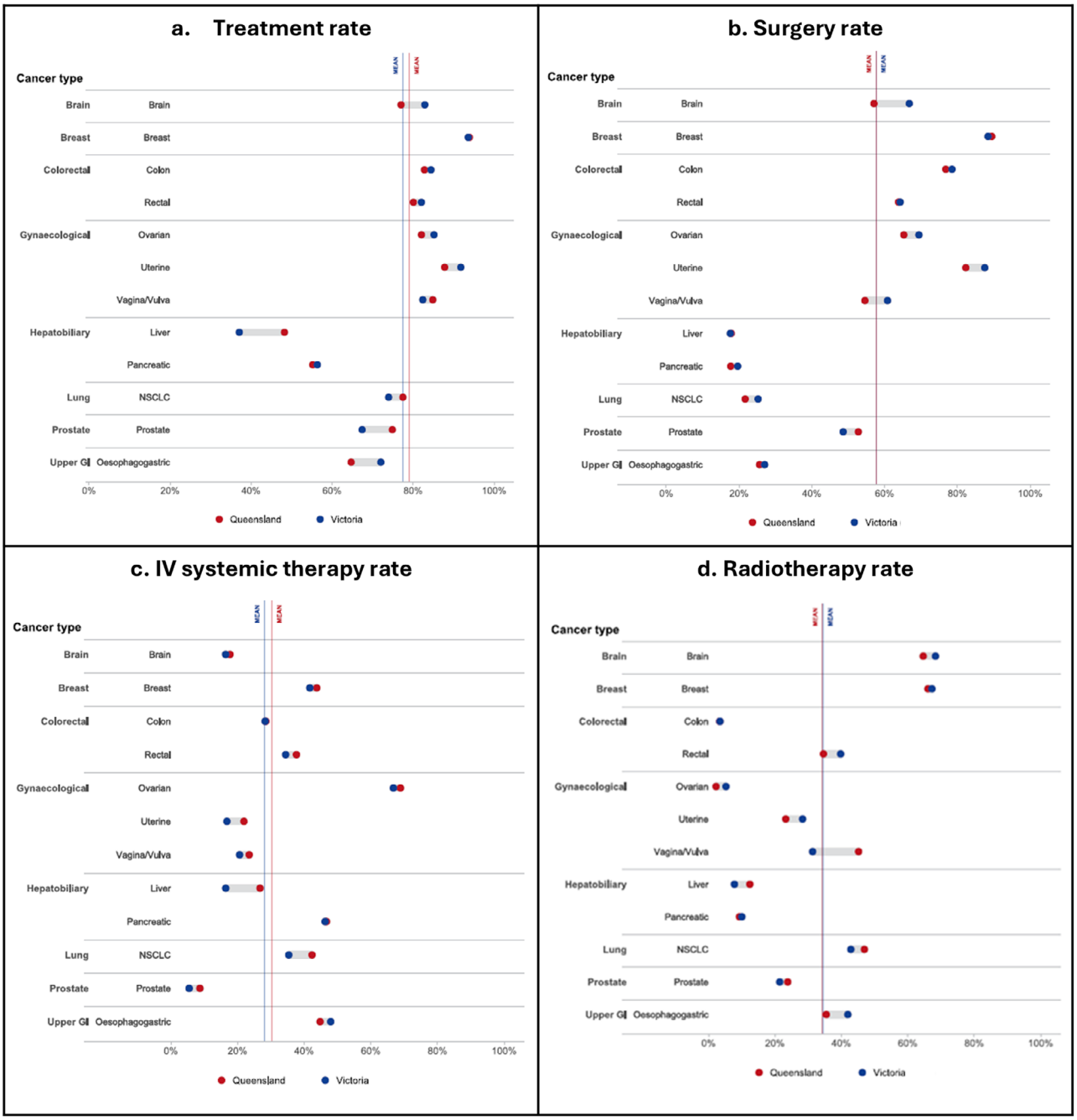


FIGURE 1 | Type of treatment by type of cancer and state, 2017–2021. Treatments were within 30 before to 365 days after cancer diagnosis.

The Australian Cancer Plan [17] advocates for the creation of a nationally agreed cancer data framework to enhance the accessibility, consistency, and comprehensiveness of integrated data assets. Key priorities are outlined in the accompanying National Cancer Data Framework [18], including establishing a robust system for cancer control monitoring and benchmarking to support optimal care delivery, forming a technical and clinical working group to define core indicators and data requirements, implementing cross-jurisdictional benchmarking and developing a pathway for transitioning from confidential to public reporting, and standardizing data definitions and reporting indicators, with a particular emphasis on priority populations. Our study directly aligns with these roadmap objectives, allowing system performance to be assessed against another jurisdiction to identify specific measures and types of cancer for which service delivery requires improvement, thereby fostering best practice in both states.

Similar efforts are also underway at a wider level through the International Cancer Benchmarking Partnership (ICBP) [19], of which both Victoria and Queensland are participants. Phase 3 of the ICBP is due to commence shortly and will gather evidence regarding cancer patient pathways, treatment, models of care, and the cancer workforce with the goal of working toward global equity in cancer control and outcomes.

Results from both states were generally similar for many of the indicators. It was, however, observed that brain cancer patients

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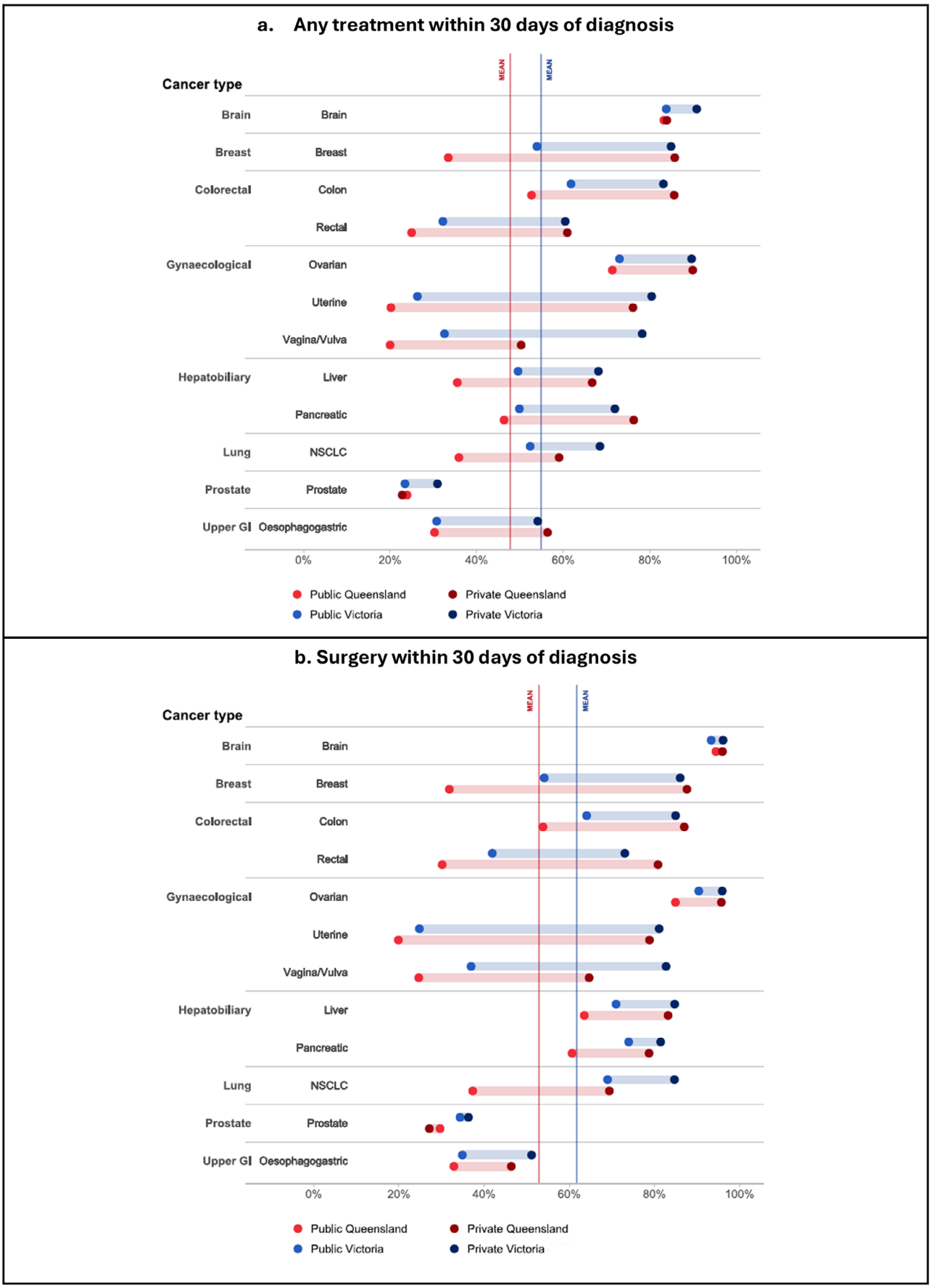


FIGURE 2 | Treatment within 30 days of cancer diagnosis by public versus private facilities, type of cancer and state, 2017–2021.

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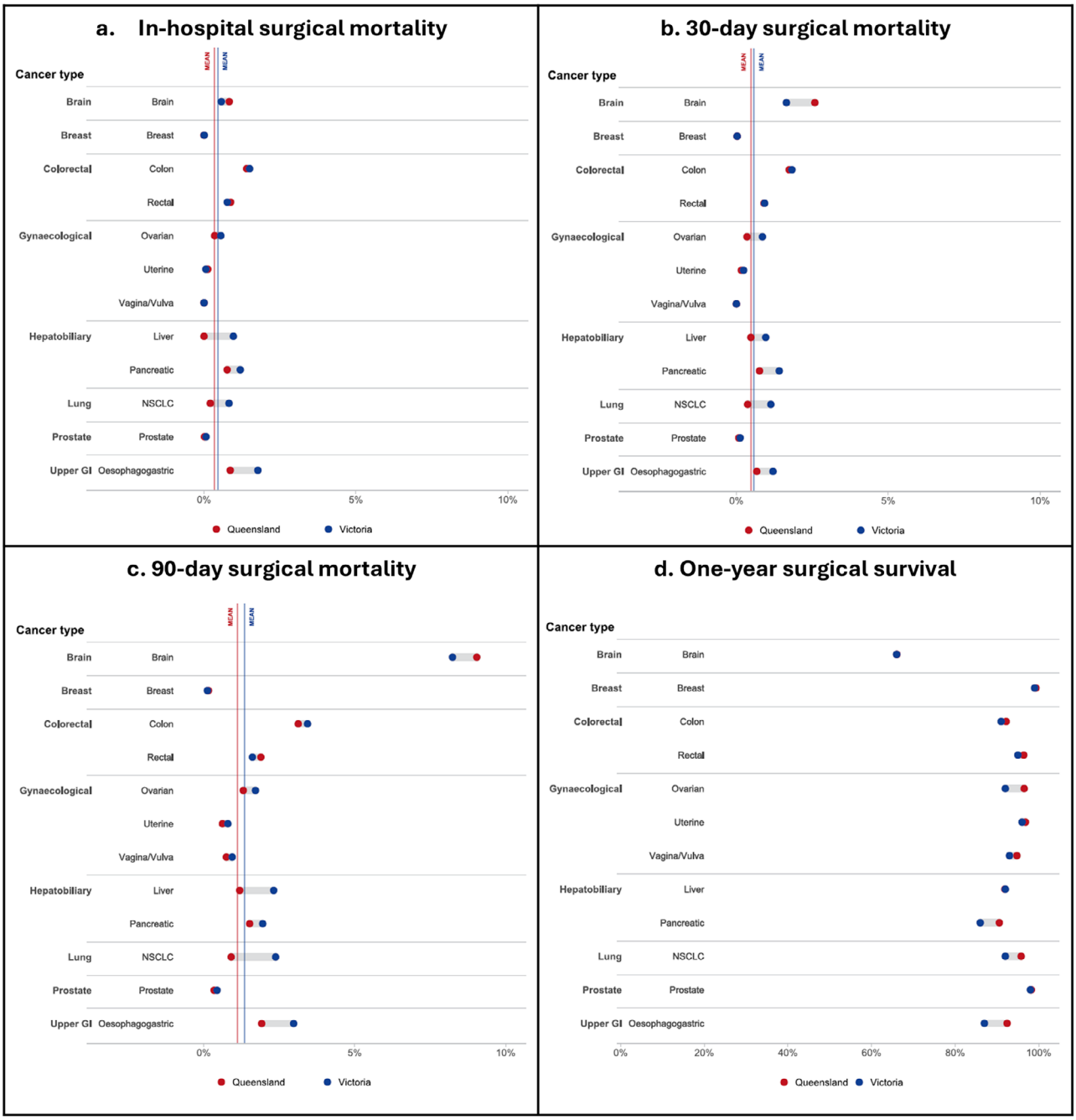


FIGURE 3 | Outcomes following surgery by type of cancer and state, 2017–2021. Follow-up on mortality was available to December 31, 2022.

in Victoria were more likely to receive surgery than those in Queensland. This difference requires further investigation but may represent both variation in clinical practice and differences in patient and clinical characteristics that were not captured in the study, such as patient preference, performance status, histological subtypes and stage, as well as differences in public and private hospital activity, referral patterns, and funding models. Disparities in practice for brain cancer patients have been a key driver in the development of the Australian Brain Cancer Registry, a national collaborative to monitor and improve brain cancer care. Once it is established and incorporated into routine monitoring of clinical practice, this registry will contribute to the understanding of variation in key processes and outcomes, identify gaps in care and provide evidence on the use of appropriate and effective treatment [20].

Delays in time to treatment, particularly in public hospitals, are well-documented challenge affecting Queensland cancer services and patients [14, 21]. This was also reflected in our results, showing that cancer patients in Queensland were less likely to receive treatment within 30 days of diagnosis when compared with Victoria. Service capacity, patient preference, and geographical location may all affect delays in treatment [22, 23]. In regard to geography, Queensland is approximately seven and a half times the size of Victoria. The decentralization of the Queensland population over such a vast area (1.2 million km^2) poses

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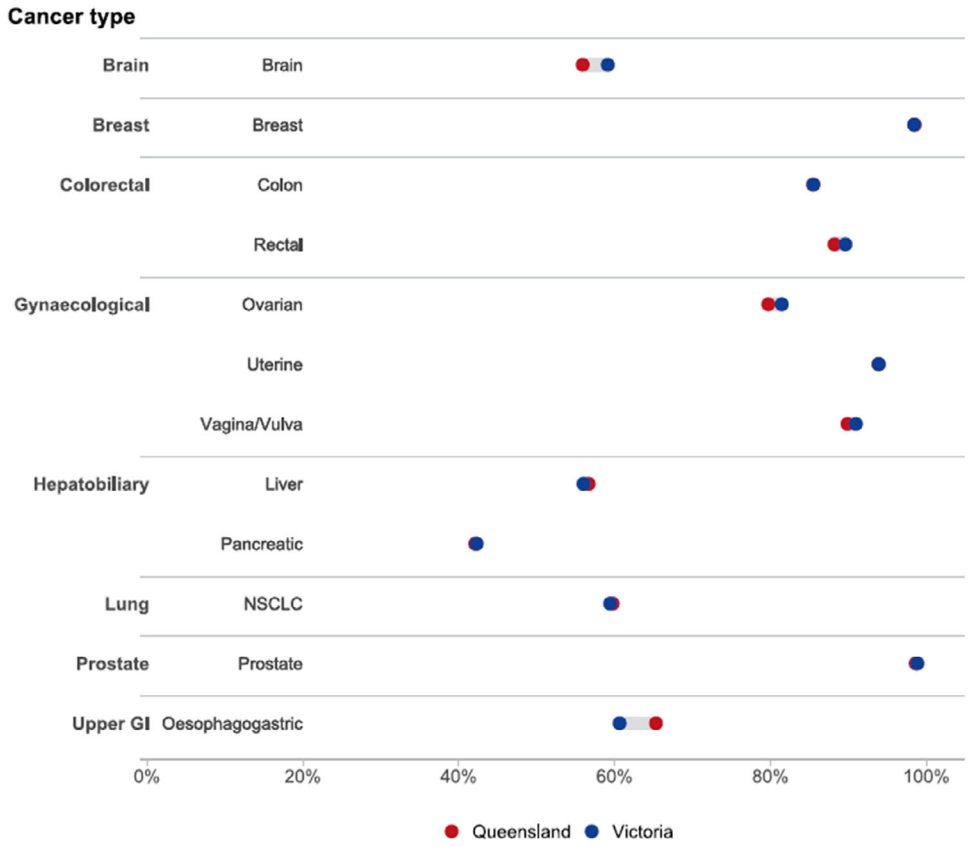


FIGURE 4 | One-year survival by type of cancer and state, 2017–2021. Follow-up on mortality was available to December 31, 2022.

unique obstacles to cancer care, with patients living in remote communities having to travel very long distances and absorb the accompanying financial strain to access oncology services that are concentrated along the eastern coastline, especially in the south-east of the state [24]. First Nations people and those who are socioeconomically disadvantaged are disproportionately impacted by these distance-related barriers.

Although benchmarking is useful to guide and stimulate quality improvement, complementary interventions are also required to drive change [13]. In Queensland, an improvement process (Clinical Excellence Queensland) [25] has been adopted by the Department of Health, which oversees the findings of individual Quality Assurance Committees. This process aims to identify and escalate safety and quality risks and guide implementation of state-wide changes to minimize system level delay and improve and promote safe and effective care. Individual treating facilities in Queensland are also provided with regular statewide reports for specific types of cancer comparing individual facility outcomes with peer groups, the public and private sector, the statewide average, and guideline recommendations to assist with identifying variation in practice and to encourage facilities to investigate local issues. Similarly in Victoria, the Integrated Cancer Services, overseen by the Victorian Department of Health, access quality indicator data for comparing against statewide average and fund initiatives to identify and reduce unwarranted variations in cancer care across the state.

A defining strength of this study is the utilization of large, population-based linked datasets, which allow a relatively efficient and low-cost option for evaluating cancer care. Use of such resources produces real-world evidence that can be realized quickly and is not hampered by small numbers and/or highly selective cohorts as can sometimes be the case with clinical trials or clinical quality registries.

There are some limitations that need to be considered when interpreting the results, particularly the inability to perform multivariable analyses to investigate differences between the states after adjustment for key variables of interest, due to datasets not being combined. Demographic comparisons between the two states revealed considerably higher proportions among cancer patients in Queensland of First Nations people, residents of remote areas, and people living in socioeconomically disadvantaged areas, all of which are characteristics that tend to negatively influence treatment rates and outcomes for cancer [26, 27]. Ideally, a more detailed national cancer registry is needed to address these issues and allow for comparisons of quality indicators between jurisdictions to account for any population disparities.

We were also unable to compare stage-specific variation due to a lack of information on stage at diagnosis, which is crucial for treatment pathways and prognosis. Comparison of stage-specific incidence between the Victorian Cancer Registry and the National Cancer Control Indicators, however, suggests that state-to-state differences in the stage distribution exist for certain cancers [28, 29]. For example, 28% of bowel cancers in Victoria in 2024 were diagnosed at stage I, 23% at stage II, 21% at stage III and 21% at stage IV, with the remaining 7% unknown,

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compared to estimates of 15% for stage I, 21% stage II, 31% stage III, 20% stage IV, and 13% unknown at the national level in 2011. It is unclear to what extent such differences exist between Victoria and Queensland, or how they may impact the indicators presented here. Work is continuing to expand the scope and quality of staging data in cancer registries throughout the country.

5 | Conclusion

Our results highlight the mutual benefits of identifying areas for improvement in both Victoria and Queensland, with the aim to enhance reporting and track healthcare performance toward best practices and improved outcomes for cancer patients. The suite of indicators and reported cancers included in this study can be expanded in line with changing priorities as additional data become available. It is hoped that our findings will encourage other states and territories to join us to eventually create a national benchmarking collaboration for the benefit of all people with cancer in Australia.

Author Contributions

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The authors have nothing to report

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The datasets generated during and/or analyzed during the current study are not publicly available due to confidentiality restrictions but may be available from the corresponding author on reasonable request.

References

1. Australian Institute of Health and Welfare, *Australian Burden of Disease Study 2024 Canberra* (Australian Institute of Health and Welfare, Australian Government, 2024). https://www.aihw.gov.au/reports/burden-of-disease/australian-burden-of-disease-study-2024/contents/about.

2. Australian Institute of Health and Welfare, *Cancer Data in Australia Canberra* (Australian Institute of Health and Welfare, Australian Government, 2024). https://www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/about.

3. D. Sonkin, A. Thomas, and B. A. Teicher, "Cancer Treatments: Past, Present, and Future," *Cancer Genetics* 286–287 (2024): 18–24.

4. B. Liu, H. Zhou, L. Tan, K. T. H. Siu, and X. Y. Guan, "Exploring Treatment Options in Cancer: Tumor Treatment Strategies," *Signal Transduction and Target Therapy* 9, no. 1 (2024): 175.

5. K. A. B. Goddard, E. J. Feuer, and J. S. Mandelblatt, "Estimation of Cancer Deaths Averted from Prevention, Screening, and Treatment Efforts, 1975-2020," *JAMA Oncology* 11, no. 2 (2025): 162–167.

6. R. C. Fitzgerald, A. C. Antoniou, L. Fruk, and N. Rosenfeld, "The Future of Early Cancer Detection," *Nature Medicine* 28, no. 4 (2022): 666–677.

7. Australian Institute of Health and Welfare, *Cancer in Australia 2021* (Australian Institute of Health and Welfare, Australian Government, 2021), https://www.aihw.gov.au/reports/cancer/cancer-in-australia-2021/summary.

8. D. Chaji, L. Malloy, and D. Meredyth, "Implementing Australia's First National Cancer Control Plan to Shape Australian Cancer Control Policy for the Next Decade and Beyond," *Holistic Integrative Oncology* 3, no. 1 (2024): 40.

9. A. Trentham-Dietz, D. A. Corley, and N. J. Del Vecchio, "Data Gaps and Opportunities for Modeling Cancer Health Equity," *Journal of the National Cancer Institute Monographs* 2023, no. 62 (2023): 246–254.

10. A. Ettorchi-Tardy, M. Levif, and P. Michel, "Benchmarking: A Method for Continuous Quality Improvement in Health," *Healthcare Policy* 7, no. 4 (2012): e101–119.

11. F. Thonon, J. Watson, and M. Saghatchian, "Benchmarking Facilities Providing Care: An International Overview of Initiatives," *SAGE Open Medicine* 3 (2015): 2050312115601692.

12. T. De By, R. Muslem, and K. Caliskan, "Consolidated Quality Improvements Following Benchmarking With Cardiothoracic Surgery Registries—A Systematic Review," *European Journal of Cardio-Thoracic Surgery* 57, no. 5 (2020): 817–825.

13. C. Willmington, P. Belardi, A. M. Murante, and M. Vainieri, "The Contribution of Benchmarking to Quality Improvement in Healthcare. A Systematic Literature Review," *BMC Health Services Research* 22, no. 1 (2022): 139.

14. E. T. Walpole, D. E. Theile, S. Philpot, and P. H. Youl, "Development and Implementation of a Cancer Quality Index in Queensland, Australia: A Tool for Monitoring Cancer Care," *Journal of Oncology Pharmacy Practice* 15, no. 7 (2019): e636–e643.

15. Australian Bureau of Statistics, *Australian Statistical Geography Standard (ASGS)*, 3rd ed. (Australian Bureau of Statistics, 2021).

16. Australian Bureau of Statistics, Socio-Economic Indexes for Areas (SEIFA) (Australian Bureau of Statistics, 2023), https://www.abs.gov.au/statistics/people/people-and-communities/socio-economic-indexes-areas-seifa-australia/latest-release.

17. Cancer Australia, "Australian Cancer Plan," Cancer Australia, 2025, https://www.canceraustralia.gov.au/australian-cancer-plan.

18. Cancer Australia, "National Cancer Data Framework," Cancer Australia, 2024, https://canceraus.engagementhub.com.au/national-cancer-data-framework-public-consultation.

19. Cancer Research UK, "International Cancer Benchmarking Partnership (ICBP)," https://www.cancerresearchuk.org/health-professional/data-and-statistics/international-cancer-benchmarking-partnership-icbp.

20. M. Matsuyama, M. Sachchithananthan, and R. Leonard, "What Matters for People With Brain Cancer? Selecting Clinical Quality Indicators for an Australian Brain Cancer Registry," *Neuro-Oncology Practice* 9, no. 1 (2022): 68–78.

21. Queensland Government, *Treating the 6 Most Common Cancers in Queensland: A Report for Hospital and Health Services. Indicators of Safe, Quality Cancer Care 2017-2021* (Queensland Health, 2024).

22. F. Crawford-Williams, S. March, and M. J. Ireland, "Geographical Variations in the Clinical Management of Colorectal Cancer in Australia: A Systematic Review," *Frontiers in Oncology* 8, (2018): 116.

17437563, 0, Downloaded from https://onlinelibrary.wiley.com/doi/10.1111/ajco.70141 by Danny Youlden - Queensland Health , Wiley Online Library on [14/07/2026]. See the Terms and Conditions (https://onlinelibrary.wiley.com/terms-and-conditions) on Wiley Online Library for rules of use; OA articles are governed by the applicable Creative Commons License

23. K. J. Davis, C. Campbell, and R. Costelloe, “Causes of Unwarranted Variation and Disparity in Breast Cancer Management in Regional and Rural Area,” *Breast Journal* 2024 (2024): 9354395.

24. S. K. Ayre, M. Ireland, and A. Taglieri-Sclocchi, “Time From Diagnosis to Treatment: Are Cancer Patients Who Travel for Treatment Receiving Optimal Care in Australia?,” *Supportive Care in Cancer* 34, no. 1 (2025): 18.

25. Queensland Government, "Clinical Excellence Queensland," https://www.clinicalexcellence.qld.gov.au/.

26. A. Bygrave, K. Whittaker, and S. Aranda, *Inequalities in Cancer Outcomes by Indigenous Status and Socioeconomic Quintile: An Integrative Review* (Cancer Council Australia, 2020).

27. P. Dasgupta, V. M. Harris, G. Garvey, J. F. Aitken, and P. D. Baade, “Factors Associated With Cancer Survival Disparities Among Aboriginal and Torres Strait Islander Peoples Compared With Other Australians: A Systematic Review,” *Frontiers in Oncology* 12 (2022): 968400.

28. Victorian Cancer Registry, *Cancer in Victoria 2024* (Cancer Council Victoria, 2025).

29. Cancer Australia, “"Stage at Diagnosis by Type (Breast, Prostate, Colorectal, Lung),” National Cancer Control Indicators, 2021, accessed June 8, 2026, https://ncci.canceraustralia.gov.au/stage-diagnosis/stage-diagnosis-type.

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Additional supporting information can be found online in the Supporting Information section.

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