



Accelerating Alignment with Optimal Care Pathways: A Standardised Approach to Monitoring & Reporting

Defining and implementing a standardised monitoring and reporting process to monitor and communicate alignment with the Optimal Care Pathways

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WCMICS is a cancer services improvement network. WCMICS works collaboratively with our partner health services to promote coordinated service planning, system integration, and improvement of cancer services. For more information, www.vics.org.au/wcmics.

Contents

Abbreviations	5
Main Messages	6
1. Summary	7
2. Background	10
i. Context	10
ii. Implications	10
3. Methods	12
i. Aim	12
ii. Objectives	12
iii. Expected Outcomes	12
iv. Scope	12
v. Environmental scan	13
vi. Indicator selection and development	14
vii. Quality indicator framework	15
4. Results	20
i. Indicator selection	20
ii. Indicator development	22
iii. Pilot for health record-based indicators	24
iv. Implementation design	25
v. Reporting schedule	26
5. Discussion	26
i. Insights and challenges	26
ii. Lessons learned	27
6. Conclusion	28
7. Future Directions	29
i. Planned Implementation	29
ii. Sustainability	29
8. Overview of Project Impact	30
i. Impact of Project	30
ii. Summary of Key Learnings	30
iii. Recommendations	30
9. Appendices	31
References	32

Abbreviations

Abbreviation	Term
ALIC	Analysis of linked information in cancer
ALL	Acute lymphoblastic leukaemia
AML	Acute myeloid leukaemia
CLL	Chronic lymphocytic leukaemia
CML	Chronic myeloid leukaemia
CUP	Cancer of unknown primary
HCC	Hepatocellular carcinoma
Hodgkin DLBCL	Hodgkin and diffuse large B cell lymphoma
MDS	Myelodysplastic syndrome
MDM	Multi-disciplinary meeting
NETs	Neuroendocrine tumours
OCP	Optimal Care Pathway
SCIP	Statewide Cancer Indicator Platform
VAED	Victorian Admitted Episodes Dataset
VCR	Victorian Cancer Registry
VEMD	Victorian Emergency Minimum Dataset
VICS	Victorian Integrated Cancer Services
VDI	Victorian Death Index
VINAH	Victorian Integrated Non-admitted Health Minimum Dataset
VRMDS	Victorian Radiotherapy Minimum Dataset

Main Messages

- OCP indicators provide a consistent and evidence-based framework for monitoring cancer care quality across Victoria, enabling services to align with the Optimal Care Pathways and meet the goals of the Victorian Cancer Plan 2024–2028.
- A standardised monitoring approach enables VICS to:
 - Drive data-informed decisions by improving service delivery based on timely, real-world insights.
 - Enhance accountability through consistent reporting, supporting transparency and benchmarking across Integrated Cancer Services (ICS).
 - Identify and act on unwarranted variation, allowing for proactive, targeted quality improvement.
 - Foster collaboration and system alignment by offering a shared language and structure for stakeholders across regions and service types.
- The program supports statewide consistency while allowing local adaptability, through a co-designed implementation toolkit, tailored ICS facilitation, and structured peer learning.
- VICS will continue to embed this approach by:
 1. Defining a standardised monitoring process that sets expectations and supports continuous improvement.
 2. Using a core set of 21 OCP indicators to reflect key elements across the cancer care continuum.
 3. Implementing consistent reporting mechanisms that provide actionable insights to health services and decision-makers.
- Embedding the OCP indicators into routine service reporting, planning, and performance systems is essential for sustainability, alongside ongoing investment in data infrastructure and capability.
- The approach demonstrates that OCP indicators are both feasible and valuable as a tool to support equity, identify gaps, and improve outcomes for all people affected by cancer in Victoria.

1. Summary

Background

Improving cancer care quality, equity, and outcomes is a key priority of the Victorian Cancer Plan 2024–2028. The Optimal Care Pathways (OCPs) outline nationally endorsed, evidence-based steps in cancer care to promote best practice and consistency across the system. To support the implementation of the OCPs, a suite of indicators was developed by the Victorian Integrated Cancer Services (VICS) with guidance from the Department of Health and in consultation with cancer stakeholders. These indicators provide a means of monitoring alignment to best practice, identifying unwarranted variation, and informing local improvement.

The VICS, in collaboration with member health services and the Department of Health, led a structured, statewide initiative to test the implementation of these OCP indicators in routine health service settings. The program’s goal was to evaluate how the indicators could be integrated into existing governance and quality systems, and to assess their feasibility, utility, and sustainability as a tool for service-level improvement.

Program Approach

All nine ICS regions participated in the program over an 18-month period. Each ICS was supported to:

- Engage local health services in selecting and applying relevant OCP indicators.
- Use a common implementation toolkit co-designed by VICS and stakeholders.
- Facilitate analysis and interpretation of indicator data in local contexts.
- Identify service-level improvement priorities and embed them into existing quality and performance structures.

The program also included regular discussion with stakeholders in key forums including peer groups, advisory groups, Managers meetings, tailored support from ICS teams, and iterative refinement of the toolkit and resources based on feedback from health services.

This approach allowed for both standardisation and flexibility — ensuring consistency in the core framework while enabling adaptation to local needs and maturity.

Key Findings

1. Feasibility and Usefulness

The implementation process demonstrated that the indicators are both feasible to apply and useful in identifying care variation and equity gaps. Most participating services were able to complete the pilot activities, particularly when supported by structured facilitation, local champions, and data support.

2. Value of Local Context and Leadership

Services reported that interpreting the indicators in the context of local data, patient populations, and service structures was critical to ensuring relevance. Engagement was strongest where there was clinical leadership, alignment to existing priorities, and visible support from executive or quality teams.

3. Data Access and Capability are Critical Enablers

A consistent theme across services was the need for timely, accessible data and appropriate analytical capability to extract, interpret, and act on indicator results. The indicators were most impactful when used in conjunction with service-specific data sets, such as MDM attendance rates, time to treatment, or tumour stream audit findings.

4. Shared Learning Accelerates Progress

Facilitated sharing of practice between services — particularly through Communities of Practice — enhanced capability, reduced duplication, and built confidence. Services valued the opportunity to compare approaches, troubleshoot barriers, and learn from peers.

5. Sustainability Requires System Support

Embedding the indicators into routine reporting and governance was identified as essential to long-term sustainability. Services noted that without integration into business-as-usual performance frameworks, the use of OCP indicators risks remaining project-based or ad hoc.

Recommendations for Future Implementation

This report recommends that the VICS:

- Integrate OCP indicators into routine planning, reporting, and quality structures at health service and ICS levels to ensure sustainability.
- Invest in data access, analytics capability, and digital infrastructure to support efficient, meaningful use of indicators.
- Maintain a common implementation toolkit and peer-learning infrastructure, such as Communities of Practice, to drive continued adoption and refinement.
- Use OCP indicators as a lens for equity, linking with other statewide data initiatives to support priority populations and reduce unwarranted variation.
- Embed the VICS role as a coordinating and capability-building entity, supporting services to use the indicators in a way that aligns with local contexts and statewide goals.

Conclusion

This program demonstrates the feasibility and value of using OCP indicators to support quality improvement in cancer care across Victoria. The collaborative, flexible approach enabled services to implement the indicators meaningfully within their unique contexts, while benefiting from a shared structure and consistent guidance.

To achieve lasting impact, further efforts should focus on system-level integration, investment in enablers such as data and capability, and a continued emphasis on collaboration and equity.

The work positions VICS and its partners to lead the next phase of implementation, supporting a high-performing, equitable cancer system that delivers better outcomes for all Victorians affected by cancer.

Project Report

2. Background

i. Context

Optimal Care Pathways (OCPs) provide structured guidelines for delivering high-quality cancer care across the continuum, from diagnosis to survivorship. They provide a national standard for the high-quality cancer care that all Australians should expect.¹ Monitoring adherence to OCPs requires the development of robust clinical indicators that reflect care quality, patient outcomes, and system performance. However, the Victorian Integrated Cancer Services (VICS) lacked an agreed-upon standard suite of performance and quality indicators, as well as a systematic process for monitoring adherence beyond the annual Cancer Services Performance Indicators (CSPI) audit, a labour-intensive medical record review. This paper details a systematic approach to identifying, refining, and implementing clinical indicators for OCPs, incorporating insights from the VICS initiative.

This project continued the iterative development of a cancer performance monitoring framework for evaluating the quality and outcomes of cancer care (VCPMF). Indicators developed in earlier iterations of the framework have been incorporated into the Statewide Cancer Indicator Platform (SCIP) and indicators identified during this project were planned to coincide with the increased accessibility and functionality of SCIP expected in the first half of 2022. The integration of new indicators has significant potential value to the cancer sector as dissemination of indicator results will inform service improvement opportunities and potentially see changes in clinical practice to improve outcomes.

Ultimately, the ‘use’ of cancer quality and performance indicator results is to identify aspects of cancer care in need of further analysis, investigation, and quality intervention. The dissemination of these results is a first step to developing the systematic reporting, analysis, and ‘use’ of cancer data on a state-wide basis. The data is intended to be routinely accessed and reported on by each of the VICS to drive improvements within their network, and more broadly across the state.

ii. Implications

Defining and implementing a standardised monitoring and reporting process to track and communicate alignment with the cancer Optimal Care Pathways (OCPs) has several implications for improving patient outcomes and quality of care:

Improved consistency and quality of care

A standardised monitoring and reporting process ensures that cancer care across different health services and sites adheres to the same best practice guidelines. This reduces variability in the way care is provided, ensuring that all patients receive high-quality, evidence-based treatment.

Automation of reporting process

This monitoring process will provide the VICS with an agreed process for monitoring OCPs. Developing the indicators in SCIP will automate the reporting process through an interactive data dashboard with indicators benchmarked to the Victorian average. They will generate useful, accurate, and relevant data that appropriately convey the quality of cancer service delivery at the health service level.

Identification of outliers and risks

The monitoring process will allow for the detection of deviations from best practice outlined in the OCPs. Outliers, statistically different from the state average, will be identified allowing for investigation into causes for the divergences and will allow further analysis, investigation, and potential quality intervention if required.

Data-driven continuous improvement

Monitoring alignment also offers valuable, data-driven, insights into the effectiveness of care pathways. Complete, consistent and timely data collection will place the VICS in a position to contribute to the development of future editions of the Cancer Australia OCPs.

In summary, a monitoring and reporting process for OCP alignment will monitor consistency of optimal cancer care, identify potential outliers in care and inform continuous improvement.

3. Methods

i. Aim

To establish a transparent, data-driven approach that monitors and communicates progress of clinical practice alignment against the Cancer Optimal Care Pathways through existing data sources, in time improving cancer care quality and outcomes.

ii. Objectives

1. Defining a standardised monitoring process.
2. Defining a standardised suite of indicators that support the ongoing monitoring process.
3. Implementing the standardised monitoring process based on the suite of indicators (not within scope of initial funded project).

iii. Expected Outcomes

1. Recommendation of a suite of indicators covering all aspects of the patient journey and key components of the service delivery including Multidisciplinary Meetings (MDMs) and Supportive Care.
2. Integration of new automatable indicators into the Department of Health's Statewide Cancer Indicator Platform (SCIP), and other platforms as appropriate, through comprehensive data definitions and collaboration with Department of Health Analysis of Linked Information in Cancer (ALIC) data team.
3. Consistency in providing health services with regular data reports against the full suite of agreed indicators.

iv. Scope

Inclusions:

- Paediatric and Adult data sources currently available to VICS including medical records, MDM software, Cancer Service Performance Indicator (CSPI) audits, extract of administrative data sets: VAED, VCR
- Administrative data sets available in SCIP (six Victorian linked datasets)
- Other known state and federal data sources
- Development of indicators and monitoring process
- Recommendations for updates to SCIP

Exclusions:

- Implementation of indicators and monitoring process
- Programming of updates to SCIP

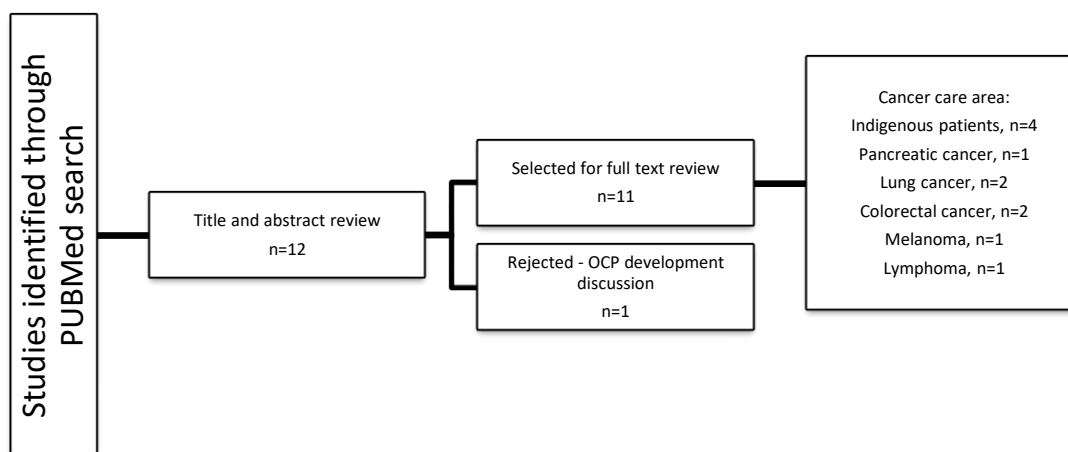
- Negotiation of access to new data sources
- Data sources that are only available in specific health services or regions

v. Environmental scan

Clinical indicators in cancer care have evolved from process-based measures to outcome-driven metrics that support continuous quality improvement. Studies highlight the importance of evidence-based indicator selection, emphasising criteria such as validity, reliability, feasibility, and impact on patient outcomes². Previous research underscores the role of multidisciplinary stakeholder engagement in indicator development, ensuring relevance and applicability across diverse healthcare settings. Furthermore, there is a growing consensus that performance indicators should be automated where possible to minimise reporting burden and maximise timely, actionable insights.

However, there is limited published evidence of the alignment, or compliance, with OCP recommendations³. A PUBMED search using terms “*optimal care pathways*” and *cancer and (monitoring or compliance or alignment or concordance)* for the time period 2014 (the introduction of OCPs) to current (March 2023) returned two studies that demonstrated that care aligned to the OCP was associated with improved outcomes for patients with colon cancer. Changing the search to “*optimal care pathways*” and *cancer* for the same period returned 12 free-text results (Figure 1). One paper describing the development of an OCP in Urology was excluded.

Fig 1. Review of literature process



The modified-Delphi process had previously been identified for use due to its extensive application in the development of quality indicators in healthcare^{4,5}.

Additional grey literature was reviewed including healthcare standards⁸, and safety and quality health standards and cancer control indicators^{6,7}. These papers and the reviewed literature informed the development of the indicator selection and review methodology.

vi. Indicator selection and development

Indicator selection, testing and development is a staged process which draws on both evidence-based literature and advice gathered through clinician engagement, stakeholder input and expert opinion⁸. Criteria was be established to guide the comparison, ranking and assessment of candidate indicator areas for selection.

Design summary

This project involved a two-round, modified reactive Delphi process whereby a scoping review of OCP recommendations for feasibility of data collection by an advisory group informed the first round, and a ranking of indicators by a clinical reference group for their value in monitoring the quality of cancer care and potential to inform impactful improvement activities informed the second round.

Advisory group (steering committee)

A project steering committee of 15 Victorian stakeholders in cancer care was established to provide oversight and expertise to ensure project objectives were met on time and within budget. This group comprised the project working group representatives from WCMICS and PICS and the VICS statewide coordinator, as well as representatives from the VICS Information Managers Group and the VICS Data Governance Advisory Group, Clinical Directors, a Consumer representative, and representatives from the Victorian Department of Health Analysis of Linked Information in Cancer (ALIC) team.

Participants (clinical reference group)

Critical to the development of the indicators was the involvement of clinicians from relevant disciplines.⁸ A clinical reference group (CRG) were convened to rank each proposed indicator. Criteria used to select potential participants for the CRG included experience in evaluating, delivering, or receiving care for cancer. Potential participants working in clinical, quality, and cancer consumer advocacy roles in Victoria were identified by the project working group and invited to participate. Participants were sought from across the state, including regional and metropolitan-based, and care was given to ensuring equitable participation across the VICS.

The key responsibility of the CRG was to provide expert opinion on the value of potential indicators through a modified Delphi process. At a minimum, each of the following disciplines was to be represented in the CRG:

- Medical oncology
- Radiation oncology
- Surgery
- Haematology
- Healthcare operations
- General Practice
- Palliative care
- Health Service Quality

- Allied Health
- Oncology Nursing
- Cancer consumer representative

Initially, two representatives were sought for each discipline. As this was difficult to achieve for all specialties, the group was capped at one representative per area of field of expertise. This was to ensure proportional representation of disciplines.

Interaction with the CRG was designed around allowing time flexibility to ensure participation. The briefing video was pre-recorded to watch at their discretion, and a week was given to complete the indicator rankings. Each nominated specialist was sent a welcome email outlining these CRG requirements:

1. Watching the 10-minute briefing video which describes the project background, aim, outcomes, and CRG purpose and outputs.
2. Completing the round 1 survey
3. Completing the round 2 survey, if required.

All CRG input was to be provided online, individually, with no meetings required to allow members to incorporate participation into their busy schedules.

vii. [Quality indicator framework](#)

The Quality Indicator Framework offers a structured approach to developing indicators that assess how well healthcare aligns with the Australian Cancer Optimal Care Pathways (OCPs). The framework is designed to support the development of indicators that are clinically relevant, patient-centred, measurable, and actionable—enabling health services to monitor performance and drive continuous quality improvement.

The indicator development process includes stakeholder consultation, evidence review, feasibility assessment, and pilot testing to ensure indicators are both meaningful and practical to implement. By embedding these principles, the framework enhances the transparency and accountability of cancer care delivery and supports the provision of timely, coordinated, and evidence-based care in accordance with national standards.

Quality indicator development

In 2023, there were 24 OCPs for adult patients with cancer – 16 for solid tumour cancers, and 8 for blood cancers. The selection process began with a comprehensive review of these OCPs (Appendix 1), mapping recommended actions to measurable clinical indicators. The Optimal Care Pathway for Aboriginal and Torres Strait Islander people with cancer was not reviewed as it is not cancer-type specific and therefore out of scope for this project.

Recommended actions were identified as “should” or “must” statements. Other synonyms for “should” were considered (“ought to”, “need to”, “will”, “have to”) and were not found to be useful in determining recommendations. Examples of “should” or “must” statements include

“The multidisciplinary team *should* discuss all newly diagnosed patients within 2 weeks of diagnosis and staging” and “The proposed treatment *must* be recorded in the patient’s medical record and should be recorded in an MDM database where one exists.”⁹ From the 24 OCPs for adult cancers, 168 recommended actions were identified. For each indicator, the ‘Step in pathway’, the ‘Care point’, and recommendation was recorded.

Feasibility of measurement and data collection

The project working group determined the set of indicators to be presented to the clinical reference group, or ‘longlist’ of potential indicators, through an iterative process of assessing measurability and grouping indicators with the same recommendations across OCPs. Indicators are assessed for feasibility based on data availability, collection burden, and system interoperability.

Ease of measurement was determined if the proportion of patients receiving the recommended treatment could be measured from available data. If numerator and denominator data were available, indicators, were then assessed for ease of data collection. Indicators were classified into five categories (Table 1), from easiest to hardest to access or not available:

1. Data already available to the VICS.
2. Data available to request through existing relationships, e.g. ALIC team.
3. Data available through medical record audit.
4. Data source exists but mechanism to access is unknown or known to be arduous; and
5. No existing data source or practical method of collection.

The indicators in the last category were excluded (n=13).

Table 1 Indicator feasibility categories and examples of data

Indicator feasibility category	Denominator example	No. of indicators
Data already available to the VICS	Number of patients with intravenous systemic anti-cancer therapy (Victorian admitted episode dataset)	41
Data available to request through existing relationships, e.g. ALIC team	Number of patients who have received radiation therapy within 4 weeks (SCIP)	41
Data available through medical record audit	Number of MDMs held (CSPI)	52
Data source exists but mechanism to access is unknown or known to be arduous	Number of patients who received oral chemotherapy (PBS)	21
No existing data source or practical method of collection.	Number of patients whose presenting symptoms were promptly and clinically triaged with a health professional (primary care dataset)	13
Total indicators assessed		168

Indicators were grouped if the numerator and denominator measured the same recommendation. For example, all 24 OCPs recommend that a treatment plan be provided to the patient's GP, therefore this is listed as one indicator, and not 24 separate indicators. Also, the indicators could be grouped if the timeframe in the numerator could be substituted with the variable, *x*. For example, for patients who don't have adjuvant chemotherapy, radiation therapy should begin within *x* weeks of surgery date where *x* is 8 weeks for patients with breast or endometrial cancer, but *x* is 6 weeks for patients with high grade glioma or head and neck cancer.

Key missing data

Key data points were needed to enable measurement of timeliness of care recommendations. Data were unavailable for three key datapoints: date of multidisciplinary meeting (MDM), date of decision to treat, and date the treatment plan was determined. Data proxies were used to calculate these missing values. The advisory group and CRG agreed that data proxies be used for the MDM date, Decision to treat date, and Treatment plan date timepoints noted in the OCPs. The proxy would be the Date of diagnosis reported by VCR plus 14 days to allow for scheduling of the MDM. The steering committee and CRG were consulted on this timeframe.

Other key missing data included non-intravenous chemotherapy which resulted in the exclusion of indicators requiring these data during the feasibility assessment.

Of the remaining 155 recommendations, grouping reduced the total to 36 indicators for clinical assessment.

Modified-Delphi survey

The Delphi technique is a systematic and structured process designed to help a group of experts reach consensus on a particular topic. It uses a combination of in-depth discussions and anonymous, iterative surveys to provide focus and prioritisation to the problem-solving process.

A modified Delphi methodology approach arbitrarily uses two or three rounds of scoring and feedback with consensus levels decided prior to scoring as a closing criterion. The steering group review the results after each round and items that reached consensus are not required for review in the next round¹⁰. Also, survey rounds were to be anonymous to allow for more accurate and uninhibited responses.¹¹

CRG members completed the survey (Appendix 2). Survey data were collected and managed using REDCap electronic data capture tools hosted at Peter MacCallum Cancer Centre.^{11,12} REDCap (Research Electronic Data Capture) is a secure, web-based software platform designed to support data capture for research studies.

In the first Delphi round, the CRG were asked to rank each statement according to the indicators'

value in monitoring the quality of cancer care and potential to inform impactful improvement activities.

The ranking was on an 11-point Likert scale (0 = a very weak indicator and not to be included in the shortlist, 10 = a very strong indicator and to be included in the shortlist) using an online questionnaire. A no score option was also included to account for those with no opinion of the indicator. The survey also included a section for free-text feedback or comments for each of the 36 indicators. The survey was iteratively developed by the steering group, and expert opinion sought on question and measurement design.

Participants were given 2 weeks to complete the survey with 9 of 11 group members submitting the survey within that period. Results were collated in an Excel spreadsheet. Scores were collated for each indicator and the average score per indicator calculated. Comments were received for all indicators and were taken into consideration, where appropriate.

The overarching themes from the comments were:

1. **Lack of Consistency in Timeframes and Definitions**

- Multiple commenters flagged inconsistent use of units in OCPs (e.g., weeks vs. days) and variable timelines for similar indicators across tumour types.

2. **Clinical Relevance and Flexibility Needed**

- Some timelines were viewed as too rigid or unrealistic for certain conditions (e.g., low-grade lymphomas, rectal cancers).
- Clinical judgement and context (e.g., aggressiveness, treatment intent) were often seen as more appropriate than blanket rules.

3. **Equity and Resource Limitations (especially regional services)**

- Concerns about feasibility across all health systems, particularly in regional or lower-resourced settings.

4. **Importance vs. Measurability**

- Many indicators were considered valuable **in theory**, but **hard to measure** reliably due to variable workflows, record-keeping, or interdependencies (e.g., between biopsy and staging).

To assess the indicators for their suitability to measure alignment with OCPs, a matrix was developed to guide prioritisation (Table 2). This compared feasibility ('Ease of collection') categories vs numeric scale of utility/value to inform impactful quality improvement activities. It was decided that a maximum number of indicators would be assessed at each survey round. This was in recognition of the additional work required to pursue the indicators in the lower feasibility categories.

Table 2 Indicator feasibility categories and maximum indicator number per round

Indicator feasibility category	Round 1 Delphi	Round 2 Delphi
	Maximum	Maximum
Data already available to the VICS [#]	20	10
Data available to request through existing relationships	20	10
Data available through medical record audit	10	5
Data source exists but mechanism to access it is unknown or arduous	6	3
No existing data source or practical method of collection	0	0
Maximum number of indicators	56	28

[#] These maximums were nominal, and any feasible indicators in this category would have been included in the survey due to the availability of data.

Pilot Testing and Refinement

The CSPI-based indicators were piloted within VICS health services in 2023 (for patients diagnosed in 2022) and 2024 (for patients diagnosed in 2023) for participating VICS sites. Seven data collection items were added to the 2023 and 2024 CSPI data audit collections representing five shortlisted indicators that require health record audit. The participating VICS collected audit data where available and provided feedback on the ease of data collection.

4. Results

i. Indicator selection

From an initial pool of 168 potential indicators sourced from available adult cancer type Optimal Care Pathways, 36 were evaluated through the modified Delphi process (Table 3).

The consensus threshold was set at 7.5 for indicators which resulted in 26 indicators (7.5-9.1). However, after round 1 feedback two indicators were excluded as their denominators were too difficult to be determined. There were 10 indicators that met the consensus threshold in the data available through medical record audit feasibility category. The three with the lowest consensus scores were to be included in the modified Delphi round 2 survey, however it was agreed by the advisory group that a round 2 survey was not required as the maximum numbers of indicators for inclusion overall had been met.

From round 1 Delphi, seven indicators from each of the top three categories met the inclusion criteria (n = 21). There were no indicators that met the inclusion criteria for the 'data source exists but mechanism to access it is unknown or arduous' category. Notably, the health record audit category includes more indicators than the intended maximum of five, due to two of these indicators already being assessed as part of the CSPI audit reporting process.

Table 3 Count of indicators after round 1 of modified-Delphi

Indicator feasibility category	Number of longlisted indicators in survey (maximum requirement)	Number of shortlisted indicators ^e (score range)
Data already available to the VICS ^a	11 (10)	7 (7.6-8.6)
Data available to request through existing relationships ^b	8 (10)	7 (8.1-9.1)
Data available through medical record audit ^c	16 (10)	7 (8.0-9.0)
Data source exists but mechanism to access it is unknown or arduous	0 (3)	0
No existing data source or practical method of collection	1 (0)	Excluded
Total indicators	36 (28)	21

^a Indicators with a score ≥ 7.5 were included.

^{b, c} Indicators with a score ≥ 8.0 were included. There are more indicators in the health record audit category than the maximum allowed due to two indicators being already included in the CSPI audit.

^d A second round survey was not required as maximum number of indicators was met.

^e Score out of 10.

The 21 indicators chosen for recommendation for implementation span 6 of the 7 steps in the OCPs (Table 4).

Table 4 Indicators ranked for inclusion, ease of data collection criteria, relevant OCP and ranking outcome.

Step in OCP pathway/Indicator	Ease of data collection ^a	OCP type	Ranking outcome
Presentation, initial investigations and referral			
1 Referral to specialist	M	Breast, Cervical, CLL, CML, Colorectal, CUP, Head and neck, Hepatocellular carcinoma, Lung, Melanoma, Oesophagogastric, Ovarian, Pancreatic, High-grade glioma	Included
2 Fertility preservation and contraception	M	All cancer types	-
Diagnosis, staging and treatment planning			
3 Diagnosis and staging	M	Breast, Cervical, CML, Colorectal, CUP, Endometrial, Head and neck, Hodgkin DLBCL, Lung, Melanoma, Multiple Myeloma, Neuroendocrine tumours, Oesophagogastric, Ovarian, Pancreatic, Sarcoma. HCC, Low-grade lymphoma, AML, High-grade glioma, Prostate, Melanoma, Oesophagogastric, CML, Colorectal, Head and neck, HCC, High-grade glioma, Ovarian, Neuroendocrine tumours, Pancreatic	Included
4 Family history	M	AML, Breast, Colorectal, Head and neck, High-grade glioma, Melanoma, Multiple myeloma, Myelodysplastic syndromes, Neuroendocrine tumours, Oesophagogastric, Ovarian, Prostate cancer	Included
5 Molecular genetic testing	M	CLL	-
6 Treatment planning - Referral to breast cancer nurse	M	Breast	Included
7 Treatment planning - Discussed at MDM	M	Breast, Cervical, CLL, CUP, Endometrial, Hodgkin DLBCL, Low-grade lymphoma, Lung, MDS, Multiple myeloma, Prostate, Sarcoma	Included
8 Performance status	U	All cancer types except CML, Cervical, Sarcoma	-
9 Research and clinical trials	M	All cancer types	-
Treatment			
10 Allogenic stem cell transplant	M	AML	-
11 Local therapies timeliness	E	HCC, Neuroendocrine tumours, Lung	-
12 Radiation therapy with adjuvant chemotherapy (Breast)	E	Breast	Included
13 Radiation therapy without adjuvant chemotherapy	E	Breast, Endometrial, High-grade glioma, Head and neck	Included
14 Radiation therapy timeliness	A	Cervical, CUP, CLL, Sarcoma, Colorectal, Endometrial, Melanoma, Ovarian, Pancreatic, Oesophagogastric, Head and neck, Lung, Neuroendocrine tumours, Low-grade lymphoma, Prostate	Included
15 Radiation therapy and systemic therapy concurrently (Head and neck)	E	Head and neck	Included
16 Supportive care	M	All cancer types	-
17 Surgery	A	Breast, Colorectal, Endometrial, HCC, Head and neck, Prostate, Lung, Sarcoma, High-grade glioma, Ovarian, Pancreatic, CUP, Oesophagogastric, Ovarian	Included
18 Surgery, rectal cancer	E	Colorectal	Included
19 Surgery, head and neck	E	Head and neck	Included
20 Systemic therapy, AML	A	AML	Included

21	Systemic therapy, AML	A	AML	Included
22	Systemic therapy	A	Breast	Included
23	Systemic therapy	A	Breast, Endometrial, Melanoma, Ovarian, Pancreatic.	Included
24	Systemic therapy, CML	A	CML	-
25	Systemic therapy	A	Cervical, CUP, Sarcoma, Colorectal, Endometrial, Lung, Oesophagogastric, Hodgkin DLBCL, Multiple myeloma, Neuroendocrine tumours, Head and neck, Low-grade lymphoma, Ovarian, Pancreatic	Included
26	Systemic therapy with radiation therapy, high grade glioma	E	High-grade glioma	Included
27	Systemic therapy after radiation therapy, high grade glioma	E	High-grade glioma	Included
28	Treatment, treatment plan	M	All cancer types	Included
29	Advance care planning	A	All cancer types	-
Care after initial treatment and recovery				
30	Survivorship care plan	M	All cancer types	-
31	Care after initial treatment, treatment summary	M	All cancer types	Included
Managing recurrent, residual or metastatic disease				
32	Advance care planning	A	All cancer types	-
33	Managing recurrent, residual or metastatic disease, palliative care referral	M	All cancer types	-
34	Patient-reported outcome measures (PROMs)	M	All cancer types	-
35	Managing recurrent, residual or metastatic disease, treatment summary	M	All cancer types	-
End-of-life care				
36	End-of-life care, palliative care referral	A	All cancer types	-

Ease of data collection^a : M Data available through medical record audit; U Data source exists but mechanism to access is unknown or known to be arduous; E Data available to request through existing relationships; A Data already available to VICS.

The results of the round 1 survey and responses to the questions raised in the feedback sections of the survey were circulated for discussion to the CRG and the advisory group. The advisory group approved the 21 indicators for development.

ii. Indicator development

Indicator data is available through three data platforms/datasets: SCIP, CSPI and VALT. Indicators were to be developed in SCIP (n=13) by the ALIC team, reported through CSPI (n=7) with data collected by the VICS, and developed in-house using VAED data by VICS data leads (n=1). A summary of indicators by OCP and data source is shown in Appendix 3.

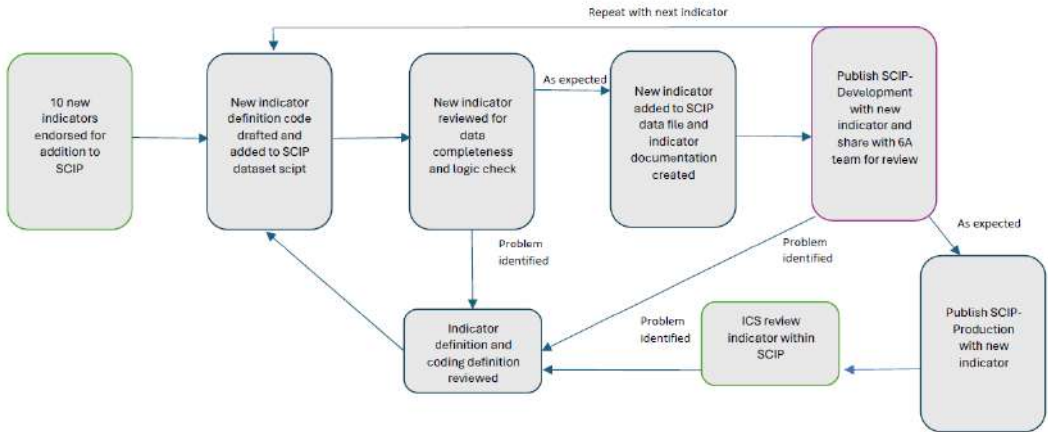
SCIP development

The Department of Health ALIC team agreed to develop the SCIP-based indicators in consultation with the VICS project lead based on a development prioritisation decided by the VICS Program Managers. Detailed definition for enhancements to SCIP were sent to the ALIC team.

Three existing SCIP indicators were modified to align with the new OPC monitoring indicators. These were tested and published.

Ten new indicators were to be developed and published to a test environment for assessment (Figure 2). After commencement of development, two SCIP-based indicators were put on hold for production as the data was not available to produce the indicators. Both needed oral chemotherapy data, which was currently unavailable in SCIP, resulting in low patient numbers with available data.

Fig 2 Flow chart for adding new indicators to SCIP



Box colour	Responsibility
Blue	ALIC team
Purple	ALIC and 6A team
Green	Integrated Cancer Services

Note – preference to work on one indicator at a time unless indicators are related or have similarities.

Source: Analysis Linked data In Cancer (ALIC), Department of Health (7 March 2024)

The ALIC team published the remaining eight indicators directly into SCIP production (live) version in October 2024. DH incurred the loss of key staff and were then unavailable to progress any additional work until June 2025.

VALT development using VAED data

Indicator 21 concerning Consolidation therapy for AML patients was to be developed in the VALT using VAED data. Through workshoping with the VICS data leads and haematology specialists it was concluded that this indicator should be put on hold for additional data sources (Victorian Integrated Non-Admitted Health dataset) as too many inferences were being made about the chemotherapy dates.

Health record audit-based development

Seven indicators required health record audit data. Five indicators would require data collection in addition to what is collected during the CSPI.

iii. Pilot for health record-based indicators

The additional data collection for 5 indicators was piloted in 2023 and 2024 (Table 5). Three VICS participated in the pilot and HRICS provided feedback on feasibility of data collection for each data collection item.

Table 5 VICS pilot sites and number of records audited, 2023 and 2024.

Audit site 2023	Records audited	Audit site 2024	Records audited
GRICS	20	GICS	In progress
NEMICS	8	SMICS	618
WCMICS	98	WCMICS	615
HRICS (feedback only)	-		
Total	126		1,233

A total of 1,359 records were audited over the two-year period. Availability of data for the audit ranges from 38% to 99% across indicators and pilot sites (Table 6). Availability refers to the rate of completion for required dates or evidence. Data may be incomplete for reasons such as alternative referral to GP referral for Indicator 1. These alternative referral pathways are documented in the data collection. Availability rates by site are available in Appendix 4.

This information will be considered when assessing feasibility indicator collection. CSPI-based indicators will be recommended to the Department of Health for adoption if they meet the data service minimum of 10 patients per cancer type and an adequate data completeness threshold.

Where insufficient data is available for an indicator or it is considered too time-consuming to collect this data, the indicator will not be recommended for adoption for the CSPI audit.

Table 6 Results of health record audit-based pilot of new indicators for patients diagnosed in 2023 and 2024

Indicator	Audited	Data availability (range)
Indicator 1) The specialist (linked to a cancer multidisciplinary team) appointment should take place within x weeks of the GP referral for suspected cancer diagnosis. <i>GP referral date will be missing if the patient is an existing patient, accepted via private rooms, an internal referral, via ED or transferred from another health service.</i>	1233	51% (38%-65%)
Indicator 3) Staging/diagnostic investigations should be completed within x days/weeks of initial specialist appointment.	1169	76% (75%-80%)
Indicator 4) Personal and family cancer history taken. Referral to familial cancer service if appropriate.	1233	69% (46%-95%)
Indicator 6) Referral to a breast cancer nurse within 7 days of definitive diagnosis.	142	79% (89%-91%)
Indicator 31) Treatment and follow-up summary provided to patient and/or carer and GP (Care after initial treatment and recovery)	1233	78% (62%-99%)

Feedback from 2023 and 2024 pilots

The piloting of the CSPI indicators in 2023 and 2024 yielded valuable feedback to inform process improvement.

Feedback from the 2023 pilot included:

- detailed instruction needed on required responses and acceptable evidence (in line with current CSPI instructions), including:
 - Acceptable staging systems and examples of staging evidence for non-TNM staging.
 - What evidence of a family history discussion can look like.
- additional education required around the proposed indicators.
- OCP indicator numbering will need to be considered as currently it is confused with the CSPI indicator numbering, especially when the OCP indicator uses CSPI data.

All recommendations from the 2023 audit were considered for the 2024 audit and will be further considered before implementation.

Feedback from the 2024 pilot:

- During the audit WCMICS auditors suggested changes to the project team who iteratively updated the audit documentation. This was shared with the other audit sites prior to the commencement of their audits.
- At time of writing GICS was yet to get agreement from local clinicians perform an audit on the prostate cohort. GICS aims to complete this audit in 2025. GICS also noted they had not collected any CSPI data for Indicator 1 as most of the patients were seen at the private rooms before being referred/admitted to their health services so there were very few (none) GP referrals at the hospital.
- SMICS auditors provided detailed feedback on each of the additional indicators (Appendix 5). Feedback highlighted the need for clear documentation, data definitions and examples of evidence and further auditor training prior to implementation.

Pilot sites provided feedback as to the utility and feasibility of the audit. This feedback where appropriate will be considered and addressed for implementation.

iv. Implementation design

A phased implementation approach will be adopted, prioritising automatable indicators while proposing adoption of select manual indicators into CSPI audits.

Manually generating SCIP reports for each indicator across applicable cancer types and timeframes can involve over 300 steps, making the process burdensome and prone to human error. To streamline this, ALIC will automate the reporting by developing a bespoke report for VICS that loops through current indicator reports with the necessary parameter selections. This report

would sit outside of SCIP and would be generated by the ALIC team and sent to the VICS on an annual basis following the update of the VCR data, or at a time to be decided.

The report would be a summary of all indicator results by Health Service and sent to the relevant VICS for further analysis and distribution (with permission). An example of this report is shown in 'Details of Request' (Appendix 6).

v. Reporting schedule

The VICS data leads were engaged in a co-design process to establish an OCP alignment monitoring process, determining the frequency and method of reporting. This is outlined in the Implementation plan (Appendix 7). VICS agreed that endorsed reports could be incorporated into the standard reporting schedule and distributed annually.

5. Discussion

i. Insights and challenges

The project delivered a comprehensive list of 21 indicators of alignment to deliver of quality cancer care in Australian health services, providing a framework for measurement and monitoring and quality improvement. These indicators monitor alignment to steps in the optimal care continuum from *Presentation, Initial investigations and Referral* to *Care after Initial Treatment and Recovery*.

Following assessment by the project team, 36 indicators satisfied the feasibility of measurement criteria. Based on the clinical expert ratings, 21 of 36 indicators met the consensus criteria for their value in monitoring the quality of cancer care and potential to inform impactful improvement activities. Three of those indicators were later reassessed to be infeasible for data collection, resulting in 18 rigorously assessed, feasible, impactful indicators to monitor OCP alignment in Victorian health services.

Challenges encountered during development included variability of data completeness across institutions, potential resistance to additional reporting requirements, and technical barriers in data extraction. Addressing these challenges required collaboration with health data agencies, iterative refinement of indicator definitions, and stakeholder education to emphasize the value of standardised monitoring.

The successful delivery of the project was impacted by several external factors:

- Official commencement of project and expenditure of ring-fenced funds received was delayed due to competing priorities and staff movement within the ALIC team. Competing priorities included VICS Conditions of Access and Release, and development of SCIP for release into VALT virtual machine environment. Feasibility testing of indicators could not progress without ALIC team input regarding data availability and reliability. Starting the Delphi process before feasibility testing stage would cause infeasible indicators to be included in the prioritisation, creating unnecessary work for the clinical reference group and potentially setting unachievable expectations.

- Development of 11 SCIP indicators was reliant on staff resourcing by the ALIC team. Under direction, ALIC were unavailable for any consultation between October 2024 and April 2025, and any development until May 2025. This delayed the project significantly. Initial SCIP reporting requests were submitted in November 2023 and were not completed until October 2024. The bespoke reporting request for automation was submitted August 2024, approved in June 2025, and is in progress as of June 2025.
- Under DH direction, the ALIC team were not available until June 2025 to discuss testing of the indicators published to SCIP in October 2024.
- Generalisability of Delphi results require an appropriate reference group size, diverse representation of members from different specialties, and geographical distribution.¹¹ Initially, two representatives were sought for each discipline. As this was difficult to achieve for all specialties, the group was capped at one representative per area of field of expertise. This was to ensure proportional representation of disciplines.

Budget & expenditure

For this project:

- the budget was \$48,600 across 6 months, plus in-kind support from both VICS and DH ALIC teams. Funding for this project was endorsed at the VICS Network Group meeting on 20 August 2021. The full budget is detailed in the Project Plan (Appendix 8).
- all funds were expended, however a considerable amount of un-funded project management time (provided by WCMICS, as host of the Project Lead) was required to complete all required project activities. This is estimated at approximately \$48,000 across the additional 12 months.

ii. Lessons learned

Project oversight

The Project Working Group, Steering Committee and Clinical Reference Group members were enthusiastic, cooperative and engaged. The steering committee was large (15 members) making meeting coordination difficult. A smaller committee would have been adequate. Ideally, a larger clinical reference group would have been available for the Delphi survey, with at least 2 representatives per clinical discipline and more consumer input, possibly a consumer with experience from each of the OCP types. However, this would involve a much larger reference group and would complicate delivery of the project.

Feasibility assessment

The feasibility of data collection involved data availability and the ease of collection but should have included an assessment of completeness of available data. More involved consultation with subject matter experts, such as the ALIC team, at the early stages could have avoided the late exclusion of three of the indicators that ranked highly on value for monitoring cancer care. Also,

initial assessments of the number of potential cancer patients that an indicator would apply to could have been considered in determining the value of the indicator.

Use of Delphi procedure

In a recent review, half the studies using the Delphi method held at least one physical meeting of panel participants¹³. This project did not incorporate a face-to-face meeting. While this approach is consistent with the Delphi method's principle of reducing the potential for individual dominance in the consensus process, it may have limited the opportunity for clarifying divergent views through direct interaction, which can be a valuable aspect of in-person communication.

The size of the Delphi panel (n=11) may have resulted in bias. Ideally, this panel would have included at least two representatives per discipline, and a consumer representing each of the OCP areas. However, a panel of this size was infeasible at this time.

Anonymity for the Delphi survey became a problem when 2 of the 11 CRG did not return their survey, and the project team were unable to track who had responded. In future, anonymous surveys would be avoided, but results and discussion items would be kept anonymous from the group.

6. Conclusion

A standardised methodology for developing clinical indicators enhances the ability of cancer services to monitor and improve adherence to OCPs. By integrating evidence-based selection criteria, stakeholder engagement, and pilot testing, this approach provides a scalable framework for ongoing quality improvement. The automation of indicators through SCIP will facilitate efficient data collection and timely reporting, ultimately driving improvements in cancer care outcomes. Future projects should explore the long-term impact of these indicators on patient outcomes and healthcare efficiency.

The final suite of 21 indicators was selected based on their ability to measure the alignment with optimal care recommendations for the key OCP steps within the remit of the ICS, including diagnosis, staging, treatment initiation, and post-treatment care. The rigorous selection methodology ensures indicators align with clinical priorities, are supported by reliable data, and facilitate benchmarking across cancer services. After further investigation development of 3 indicators have been deferred until better data is available resulting in 18 indicators for proposed adoption by the VICS.

Recommendation

From the 18 recommended indicators, use is to be weighted towards ease of collection, data availability and clinical relevance, noting that participation by ICS is voluntary and that they can select the indicators that are most relevant to their health services and regions.

7. Future Directions

i. Planned Implementation

A considered approach (see Appendix 7) to implementing the clinical indicators empowers local Integrated Cancer Services (ICS) to embed a robust, standardised monitoring and reporting process, ensuring alignment with the Optimal Care Pathways (OCPs).

The process requires strategic planning, strong leadership, and continuous engagement with key stakeholders. By embedding these indicators into routine practice, the ICS can drive meaningful improvements in cancer care, enhance transparency in their local regions, and ultimately improve patient outcomes. Its success is dependent on a collaborative approach, data-driven decision-making, and a commitment to ongoing refinement and adaptation.

ii. Sustainability

To ensure project outcomes meet sustainable goals, we recommend:

- Local adoption by VICS of SCIP-based and CSPI-based OCP monitoring indicators.
- Embedding ongoing monitoring, surveillance and reporting into standard reports.
- Reviewing and updating indicator content when new editions of current OCPs are published.
- Develop a plan to review current OCP indicators and include new OCP types.
- Local health service and clinical engagement to develop service improvement initiatives to improve alignment with OCPs based on indicator results.

8. Overview of Project Impact

i. Impact of Project

This project has highlighted that:

- There are limited published reporting on Victorian health service healthcare alignment with the Optimal Care Pathways.
- The VICS have an opportunity to assist in the development of quality improvement projects to better align cancer care with optimal care.

ii. Summary of Key Learnings

Key learnings from this project were:

- To monitor alignment with OCPs in Victorian health services, the VICS require assistance is from the Department of Health.
- Indicators need to be feasible, valuable and have good quality data that is readily accessible.
- For audit-based indicators, detailed, multi-scenario instructions should be included in auditor documentation.
- Thorough auditor training and comprehensive guidelines are needed prior to audit to ensure consistency of categorised results.

iii. Recommendations

The project working group recommend:

1. The VICS adopt the 11 SCIP-based indicators for reporting taking into consideration health services' case-mix and referral pathways.
2. For the 7 CSPI-based indicators, the Department of Health consider the inclusion of the 5 new indicators in future CSPI health record audits. The remaining 2 CSPI-based indicators are currently included in CSPI audit.
3. Three indicators are on hold for future datasets and will be considered for adoption when more data is available.
4. OCP alignment monitoring reports be distributed to Health Services on an annual basis at a time to be decided with ALIC and the VICS, following the creation by ALIC of an automated report for this purpose.
5. VICS are to discuss service improvement opportunities with Health Services following distribution of reports.

9. Appendices

Appendix 1 OCPs reviewed

Appendix 2 OCP monitoring indicator development survey – Round 1 Delphi

Appendix 3 Indicator by OCP type matrix

Appendix 4 CSPI pilot data availability rate by site

Appendix 5 SMICS 2024 pilot feedback

Appendix 6 Request for ALIC Data Analytics

Appendix 7 6A Implementation Plan

Appendix 8 Project Plan

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